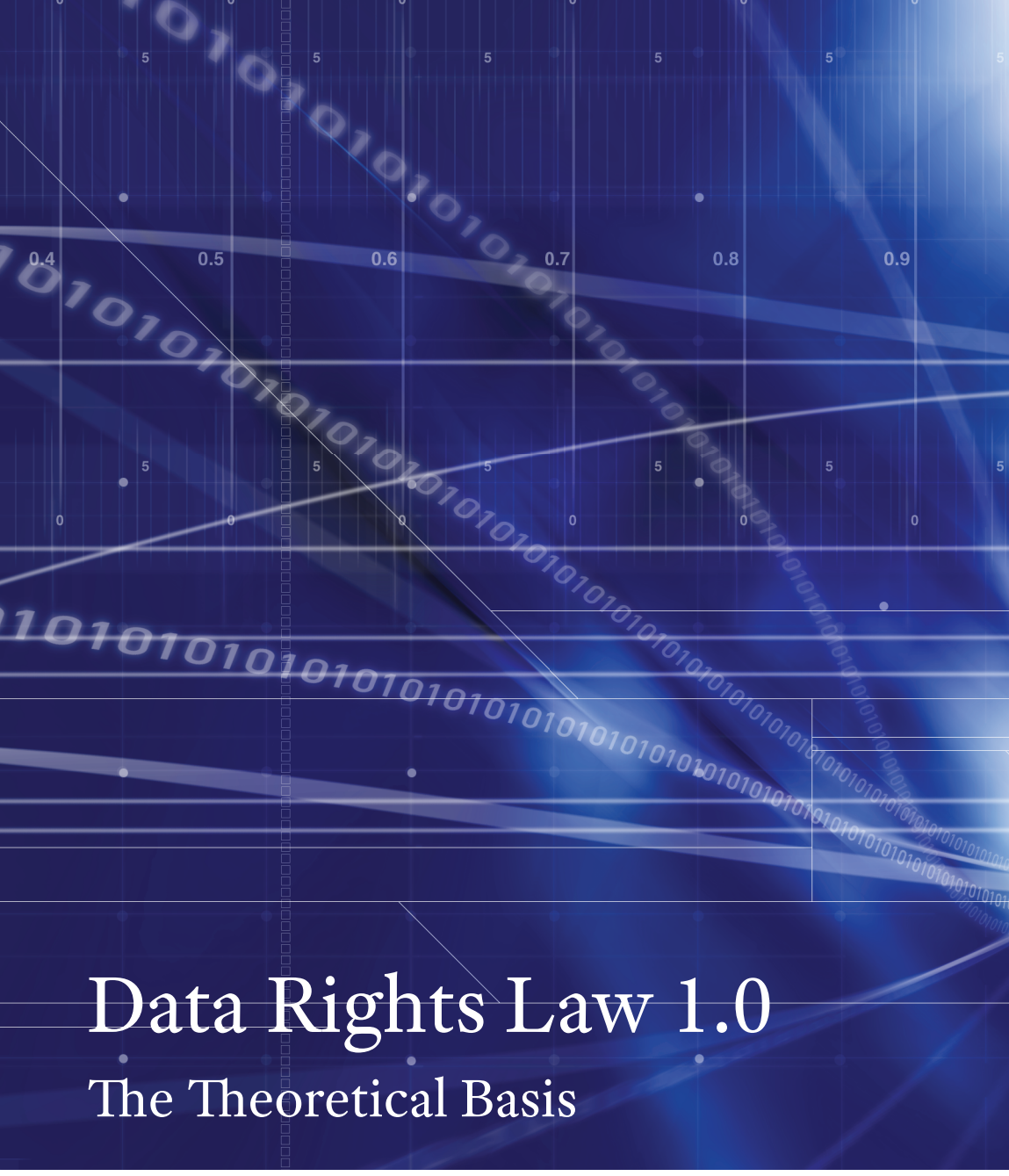

Data Rights Law 1.0

The Theoretical Basis

Key Laboratory of Big Data Strategy

Edited by Lian Yuming

Peter Lang

The proposal of Data Rights Law will be the innovation and breakthrough in the field of law. *Data Rights Law 1.0* boasts ground breaking significance for it is the first book named after and study on Data Rights Law.

– China Tribune

Data Rights Law 1.0 is not only the grand vision for future law studies, but also the cutting-edge work for future civilization studies. Data Rights Theory predicts the real prospects of law and brings us endless imagination.

– Overseas Chinese Newspaper of Europe

According to *Data Rights Law 1.0*, the impact on power and right structure brought by Remixing pushes human beings to re-examine society, and build up new order. Data Rights are the inner source of vigor for digital order. And the proposition of Data Rights is the major power to promote the reconstruction of order.

– Chinesische Handelszeitung

The proposal of "data rights law"is at exactly the right time, which provides us with a new view on the world by the law scale. Data rights law is an eagerly awaited research topic and also a key to open the door of digital civilization in the future.

– Japan-China Business Daily

Data rights law will be the new order in the digital civilization for human beings. It grows out of the era evolution and leads the science and technology to benefit humans in the rule of law. It is the combination of scientific intelligence and law logos, the new chapter of human society development, and the guidance of a new era of digital civilization.

– African Times

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The data rights law is the new order for mankind to move toward digital civilization and the product of the evolution of time.
— China National Committee for Terms in Sciences and Technologies

Institute Introduction

Key Laboratory of Big Data Strategy was established in April 2015, and it is an interdisciplinary, professional, international and open research platform co-founded by the Guiyang Municipal People's Government and Beijing Municipal Science and Technology Commission. It also a new-type, high-level think tank researching on Chinese big data development.

Relying on the Global City Development Corporation Council, Beijing and the Guiyang Innovation-Driven Development Strategy Research Institute, Key Laboratory of Big Data Strategy established two research center in Beijing and Guiyang. And it sets up five research bases, respectively, the Party School of the CPC Central Committee Research Base, the China National Committee for Terms in Sciences and Technologies Research Base, the Zhejiang University Research Base, the China University of Political Science and Law Research Base, and the China (Mianyang) Science & Technology City Research Base. In Guizhou Province, it is approved to established three research platforms, that is, the Block Data Theory and Applicable Innovation Research Platform, the Big Data Applicable Innovation Research Platform for Urban Space Decision, and the Big Data Innovation in Culture Research Platform. The "two centers, five research bases, and three research platforms" structure creates a new research system and a regional collaborative innovation pattern.

The Key Laboratory of Big Data Strategy has published the following books: *Block Data: The Signal of the Arrival of Big Data Time*, *Block Data 2.0: Paradigm Revolution in the era of Big Data, Block Data 3.0: Order Internet and Sovereign Blockchain, Block Data 4.0: Activation Dataology in the Age of Artificial Intelligence, Block Data 5.0: Theories and Methods of Data Sociology, Blue Book of Big Data - Annual Report on Development of Big Data in China (No. 1–No. 3)*. Big data development theories and key innovative fruits in practice have exerted significant influence at home and abroad.

Editor Biography

Professor Lian Yuming

Doctor's Degree in Engineering

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President of Global City Development Corporation Council, Beijing

Director of the Data Rights Law Research Centre in China University of Political Science and Law

Prof. Lian Yuming is a renowned urban-development expert in China. He is the Vice Chairman of the Beijing Chaoyang District People's Political Consultative Conference, member of the Experts Consultative Committee for the the People's Government of Beijing, the Vice Chairman of Beijing Federation of Social Science Circles, the chief expert in the research base of Beijing-Tianjin-Hebei coordinated development, as well as the director of Beijing Key Laboratory of Urban Science Research Based on Big Data. His researches mainly focus on urbanology, Science of Decision Making, and sociology. The master works are *Rising of Cities, Beijing Strategic Positioning, Rediscovery of World Cities*.

In March 2014, Prof. Lian took a temporary post as Mayor Assistant of Guiyang municipal government, and was appointed as the president of Guiyang Innovation-Driven Development Strategy Research Institute, the director of the Key Laboratory of Big Data Strategy. From then on, he has been making researches on Big Data Strategy, and published books like *Block Data: The Signal of the Arrival of Big Data Time*, *Block Data 2.0: Paradigm Revolution in the era of Big Data, Block Data 3.0: Order Internet and Sovereign Blockchain, Block Data 4.0: Activation Dataology in the Age of Artificial Intelligence, Block Data 5.0: Theories and Methods of Data Sociology*.

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Preface

The digital economy is on the rise globally. To promote opening and sharing with the development of the digital economy, countries around the world are working together to build a destiny community of cyberspace. In December 2015, President Xi Jinping delivered a keynote speech at the opening ceremony of the Second World Internet Conference emphasizing that the Internet is the common home of mankind. Countries should jointly build a destiny community of cyberspace to promote the interconnection and sharing of cyberspace, and create a better future for human development. In December 2017, Xi Jinping once again emphasized in his congratulatory letter to the 4th World Internet Conference that he respects cyber sovereignty, wishes to carry forward the spirit of partnership, and calls for jointly taking the Internet and digital economy express. On May 26 of this year, 2018 China International Big Data Industry Expo opened in Guiyang, Guizhou Province. President Xi Jinping further pointed out in the congratulatory letter to the meeting that the new generation of information technology represented by the Internet, big data and artificial intelligence is changing with each passing day, which has a major and far-reaching impact on economic and social development, state management, social governance, and people's lives in all countries. Grasping the important opportunities of the development of big data, promoting the healthy development of the big data industry, and handling the challenges of data security and cyberspace governance require countries to strengthen mutual exchanges and deepen communications and cooperation.

Since the 18th National Congress of the Communist Party of China, with socialism with Chinese characteristics entering a new era, China's big data development has also entered a new era. General Secretary Xi Jinping personally served as the leader of the Central Cyber Security and Informatization Leading Group and put forward the strategic goal of striving to build China into a network power, and promoted with the Two Centenary Goals. On October 9, 2016, when the Political Bureau of the CPC Central Committee conducted the thirty-sixth collective study on

the implementation of the strategy of strengthening the country by the network, General Secretary Xi Jinping further proposed six requirements of acceleration, including "accelerating the promotion of China's international talking right and the right to formulate rules for cyberspace." This sets a new direction for the construction of rule of law in China, and puts forward new expectations for the study of legal theory in China. We must conscientiously study and understand the profound connotation of Xi Jinping's Internet rule of law, and actively carry out the attentions and researches on the frontier issues of law including data rights, data security and data sovereignty, and give full play to the functions of law such as promotion, regulation, guidance, and protection, and carry out widespread theoretical researches and legislative explorations in the fields of big data, Internet, etc., and actively carry out relevant plans of legislative, arrangements of legislative project and design of legal principles, value balance, systems and mechanisms of law enforcement in the field of Internet, and participate in the formulation of international rules, and use the Internet rule of law to better support the national cyber development strategy.

In May of this year, the European Union promulgated the "General Data Protection Regulations" with obvious oaths, which becomes the leader of the global digital economic order. In fact, since the 1980s, European and American countries have spared no effort to promote respective policies of personal data protection globally, and have begun to influence and export rules of data protection. This shows that in the era of digital economy, whoever first achieves effective governance of data has the initiative and voice of information globalization. Based on forward-thinking of the development of new technologies, EU legislators set new rules on the basis of higher civilizations. This is also a kind of push. We must clarify the key points and main tasks of the construction of rule of law in cyberspace as soon as possible, and improve the comprehensiveness and systematicness of the rule of law of the Internet, and form a dominant international power of data rights regulation in the construction of system for the perfection of data rights law.

The biggest international political change in the early twenty-first century was the continued rise of China. For a country, the real rise is to provide a civilization for the world. The reform and opening up has enabled China's comprehensive strength to rapidly increase, gradually established China as a great power in the international community. It let China establish an

image of great power and get closer and closer and walk up the center of the world stage. At the same time, however, China, as a responsible power, has not played its role in the formulation of international law for a long time. At present, China is adjusting its posture and image, changing from the participant of the international order to the role of constructive leaders in the system. Strengthening the legislation of the digital economy has great significance on the building and perfecting of a data governance system that is in line with China's national conditions and a new kinetic framework that promotes innovation and development. In this regard, we have a consensus that if China's laws are going to be introduced to the world, the law of the digital economy is the most likely law. We shall rely on the concept of the development of great powers and solve the future problems with Chinese wisdom, especially focusing on the new civilization form of digital civilization, and looking for the path of value and order reconstruction in the profound transformation of the digital economy.

Legal rules are a reflection, stability and predication of real social relations. In the age of the Internet, big data technology developed rapidly, which has raised new issues for legal works and legal researches. Only an open and inclusive mentality can respond to the needs of reality; only timely and effective legislation, law enforcement and judicial activities can fill the vacuum of law; only by achieving the balance between the stability of rules and the constant changes of society can we break through the new challenges presented by traditional legal concept, means, systems, technologies, etc. From this perspective, we expect that research on data rights law can help the construction of digital China, send out Chinese voices and reflect Chinese views in the era of digital civilization, and provide a better discourse system for the development of digital civilization in the world. For the first time, this book proposes a series of new concepts and new ideas, such as the data rights, data rights system and data rights law. This is a groundbreaking theoretical exploration based on reality and the future. It is believed that they can become basic materials constructing the legal empire, a world of order and norms, in the future era of digital civilization.

Huang Jin
President and Professor of China University of Political Science and Law
August 2018 in Beijing

Editor's Foreword

From the day we first learn about big data, we usually regard it as a new energy, a new technology, a new mode of organization, or as a new force that is changing the future, hoping to create more value through the crossover, fusion, openness and sharing of data. However, open data and data flow often bring more risks. The excessive collection and abuse of personal information brings great challenges to the privacy of data subjects, the information security of enterprises and the stability of society and even the country, which causes widespread and deep concern regarding data sharing, privacy protection and social justice, and becomes a major problem in global data governance.

This problem causes us to think deeper and try to come up with a theoretical hypothesis of "data person" to solve this problem. We call the rights derived from the "data person" the data rights; the order constructed based on the data rights the data rights system; the legal norms formed from the data rights system the data rights law, so as to construct a legal framework of "data rights – data rights system – data rights law." This is the focus of this book.

If regarding the data as a kind of right, based on which a new order and a new law are constructed, then this kind of construction will give more brand-new and profound meanings to the future life of mankind. Human rights, property rights and data rights are three basic rights of the future life of mankind. Proving "Mine and Thine" by law is the primary issue of the relationship of rights. This involves the data rights and human rights, among others. After hundreds of years of development, human society is entering the era of big data, data person will turn from hypothesis into reality, and data relationships are reflected in all aspects such as personal life, business operation and national security. A new thing that is different from traditional things and transcends traditional people begins to enter the vision of legal relations, which is the "data." Data is generated by the times, in turn, the times are created by data. It jumps out of the traditional relationships of legal rights and obligations, reflecting a characteristic of crossover and fusion. It is no longer the traditional "Right as against every possessor of it." The flow and sharing of data are becoming the essence of this era. More importantly, based on the principle of protecting the inherent dignity of human beings, data right is a

new fundamental right at the level of human rights. According to the statement from General Data Protection Regulation (hereinafter referred to as GDPR), it is a basic right for natural persons to obtain protection in terms of personal data processing. This concept encourages us to explore the theoretical basis of the data rights within the context of "theory of human rights" and "theory of property rights," and through the observation of human rights and property rights, reveal the justification of data rights in legal philosophy, and further explain the possibility, necessity and inevitability of the creation of data rights, data rights system and data rights law. Here the data rights break through the limitations of data protection by theories on personality, privacy, property rights, obligatory right, and intellectual property rights, and become a new kind of rights and interests in the data context. This new kind of rights and interests includes data sovereignty, personal data rights and data sharing rights. The data rights, together with human rights and property rights constitute the three basic rights of future life of mankind.

Data rights are a combination of personality rights and property rights. Data has personality and property attributes, but at the same time it is different from personality rights and property rights. The core value of personality rights of data is preserving the dignity of the data subject as a human being. In the era of big data, individuals will leave "data footprints" in a variety of data systems, and restore a person's characteristics through correlation analysis to form a "data person." Recognizing personality rights of data is to emphasize that the data subject enjoys the rights such as freedom without being deprived, reputation without being insulted, privacy without being snooped on, and information without being abused according to the law. At the same time, "data are valued" has become the consensus of the whole society; therefore, it is necessary to give data the property rights and protect it according to the law. As a new property object, data property shall have five legal characteristics which are certainty, controllability, independence, value and scarcity. The personality right of data and the data property right together constitute the two core rights of the data rights.

The subject of the data right is a specific obligee, and the object of the data right is a specific dataset. In a specific legal relationship of data rights, the obligee refers to a specific one. Data rights have different forms of rights such as data collection right, data portability right, right to use data, usufructuary right of data and the right to modify data. Therefore, it is necessary

to determine a specific obligee in combination with specific forms of data rights and prescribed contents. For the object of the data right, single and independent data does not have any value. Only the dataset with independent value combined according to certain rules has specific value, and the individual data in the dataset cannot be taken as separate object of the data right. Therefore, the object of data rights is a specific dataset.

Data rights break through the limitations of "one ownership for one object" and "properties are tangible," and are often manifested as "multiple ownerships for one data." "One ownership for one object" is the dominant essential feature of property rights. The forms of things have gradually enriched with the advancement of science and technology. With the continuous increase of the types of property rights, the separation of the rights and functions of ownership has become increasingly complicated. "One ownership for one object" has been impacted by "multiple ownerships for one thing" and "one ownership for multiple things" in reality. The extent and form of using things is constantly changing. "Multiple ownerships for one thing" and "one ownership for multiple things" have also obtained some legally tacit approval and vague permissions in the trial practice. With the development of the times and the advancement of science and technology, when the cost of things decreases or even approaches zero, the exclusivity of things becomes unnecessary. This is especially true for data resources of abundance and zero marginal cost. Their natural non-property-right objectivity and multi-subjectivity determine the basic principles of "making the best use of data."

The data rights have private right attribute, public right attribute and sovereign attribute. The data rights have an altruistic and shared attribute naturally, which is a kind of existence between conflicts and games of private rights and public rights. Once the data rights arise from a natural right to a kind of co-ownership and "general will," then it definitely transcends its own form and becomes a social right. In the era of big data, if people exist as a kind of data person, then this group of sovereigns composed of data persons will inevitably need a system to ensure that everyone can regain the things lost due to the abandonment of natural rights in the process of securing the private rights with the freedom of being data citizens. As stated in the GDPR: "The right to the protection of personal data is not an absolute right; it must be considered in relation to its function in society and be

balanced with other fundamental rights." In other words, while protecting the rights of data subject, it should still leave room for technological innovation and industrial development at the same time, which is precisely the essence of "making best use of everything" of civil law. Since data has become a key production factor in the digital economy, we need to clarify how data ownership and right to use data are separated. Data rights and data ownership are the core issues which are more important than protection of data rights itself. In the eyes of civil law, everyone is the country itself. This is a very important philosophical framework for defining data rights. Individual sovereignty, social sovereignty, the sovereignty of Internet corporate giants, and the country's data sovereignty shall be the same kind of good, but they also clash with each other, and they are considered as equally important in the history of Western political thoughts, but what is more important is the individual sovereignty that legal person will defend.

There are five basic dimensions in the data rights system. The legal system is the coordinator of social ideals and social reality, or it is an intervening area that is difficult to define clearly between norms and reality. This is especially true of the data rights system. Its significance lies not only in the maintenance and realization of justice, but also in the creation of order, that is, through the combination, adjustment and protection of system arrangements which combines the relationship and rules of data rights and can realize the relationship of data rights effectively, to the greatest extent, to reduce the costs of data transaction and improve the efficiency of data resource allocation. This requires us to build a set of system and operational rules around data rights, including the system of statutory data rights, data ownership system, system of data rights for public interests, system of data usufruct and sharing system. The core of these five dimensions is the system of personal data protection based on value objectives such as security and risk prevention. However, the protection of personal data cannot be limited to the protection of private rights. It needs to go beyond the model of "consent" or "informed," and take a more open, inclusive and friendly attitude towards industrial development and social justice, and maintain the dynamics and flexibility of the rules, better (but not more) through a bottom-up, distributed mechanism of rule generation, establish a supporting system that is more in line with specific value objectives, and form a protection regulation and legal system of data that is more in line with real needs.

Sharing rights is the essence of the data rights. Remixing is the characteristic of the future of human life. The impact of remixing on the structures of power and rights has forced people to reexamine the society and reconstruct a new digital order. Data rights are the source of the inner vitality of the digital order. The idea of data rights is an important force to promote the reconstruction of order. This kind of power marks the decline of traditional power, the expansion of new rights and the transfer of personal sovereignty. Altruism is increasingly becoming the consensus of humanity in the future. Individuals' "natural rights" are the cornerstone of a society ruled by law. But we will always explore the ultimate norm of digital social life in the supremacy of a sovereign collective "general will" while protecting the inalienable individual rights. The data rights, as the right of future based on the hypothesis of data person, also have such a "general will." Only when the data person gets out of the economic ivory tower and the sharing becomes the core of the digital order, the essence of the digital power can be manifested.

The data rights law is the legal norms for adjusting data ownership, data rights, data utilization and data protection. Confirmation of data rights is the logical starting point for the protection of data rights and is a prerequisite for establishing data rules. Data rights are an important part of the legislation of data rights. And a law without content of rights can't raise people's desire for it. In the legislation, the data subject should be given corresponding rights such as the right to know, the right to rectification, the right to be forgotten, the right to collect data, the right to data portability, the right to use data, the right to benefit from data, the right to share data, the right to seek remedy. Not only must there be provisions on the data owner's rights to control, use, and benefit from the data, but also the provisions on rights of others to use the data, such as data usufruct, data rights for public interests and sharing right. The value of data lies in its use, under the premise of adhering to the principle of making the best use of data, we should develop the values of data for political, commercial and civil purposes, and force the development of the data utilization model of the "Three-Chain Integration" covering the whole governance chain, industry chain and service chain. The responsibility of protection is an indispensable part of laws, regulations and rules. If a law lacks the provisions on the responsibility of protection, the rights and obligations provided in the law are some ineffective rules. Collection, storage,

transmission, and use of data need to strengthen security management to prevent data from being attacked, leaked, stolen, falsified and illegally used. In addition, the data is related to national security and public interest, and data sovereignty needs to be protected at the national level.

The data rights law reconstructs a new order of digital civilization. The era of digital civilization is an intelligentized era based on emerging technologies such as big data, the Internet of Things, artificial intelligence, quantum information and blockchain. In this era, the trend of data rights is unprecedentedly active, the real-time flow and sharing of data constitutes a data-based ecosystem, and the entire social production relationship is marked by the relationship of data, and politics, economy, culture, technology and so on can be fully transformed, which will trigger unprecedented changes and reconstruction of the models of entire social development and interest distribution. On the surface, the external framework of the existing legal system is indeed very brilliant. From the Corpus Juris Civilis, Napoleonic Code to German Civil Code and other legislative creations, the legal system has been quite complete in the eyes of all beings. It seems to be perfect enough to satisfy human needs for orderly and organized life and the human desire to repeat the experience or arrangements and the impulse to respond to certain situations. However, in the face of contradictions between the laws, in the fields involving civil law, economic law, administrative law, criminal law, procedural law, international law, etc., how the data rights law crosses the border on earth still remains in a state of divergence. But in any case, the data rights law is indispensable for the orderly circulation of data, the premise of data reuse, the balance between personal privacy and data utilization. It is the basic material of the "square and round" world of the legal empire that constructs the space of digital world. The data rights law will be the new coordinate of the rules in the era of digital civilization, the new paradigm of governance and the new starting point of civilization, and will certainly reconstruct a new order of digital civilization.

The data rights law is an important cornerstone from industrial civilization to digital civilization. From agricultural civilization to industrial civilization and then to digital civilization, the law will realize the transition from the "law of man" to the "law of things" and to the "law of digit." The digital civilization provides the origin of value and the driving force of innovation for the creation of the data rights law. The data rights law also provides an

existence basis for the system maintenance and order promotion of digital civilization. The meaning of the data rights law is condensed in the order paradigm of digital civilization and becomes the normative basis for maintaining and enhancing this civilized order. In this sense, the data rights law is the product of the transition of civilization, and will also be the cornerstone of humanity's transformation from industrial civilization to digital civilization.

It is often said that economists are the least likely professional group to form consensus. In a certain sense, it may be even more difficult for the legal scholars to reach a certain consensus, especially when faced with cross-border and marginal issues like data rights. If we extend the thinking including the data rights law to the level of legal philosophy thinking, we will find that the relationships between people, nature and society under the legal framework reflected by data rights, the relationship between people or legal persons and law in knowledge and the legitimacy of legal authority are even more complicated. Data rights are a kind of relatively independent right. Data rights, the system of rights, the study of data rights law and more related issues have become a legal proposition that is closely related to the times and a grand narrative. The study of the data rights law is a groundbreaking and epoch-making work. It is a major social or academic issue that cannot be avoided in any way. Even if we don't touch it now, the future generations must study it. Therefore, we will maintain such a kind of initial intention and a strategic determination; not based on the present, but on the future; more from the assumptions, bold assumptions and careful verification and cross-border integration. Of course, the work we are doing now is only a theoretical exploration, which only provides scholars with a possible legal proposition or thinking resources of some researches. Just like the world's first steam engine definitely cannot be used, and the first car cannot be driven on the road, the new thing is absolutely imperfect. But I believe in such a judgment: "On the way heading to the world, digital economy laws are most likely to be the pioneer among other Chinese laws." We are making an effort now in this regard. And although it is difficult, I am convinced that the light of scientific wisdom and legal rationality will be reflected in the era of digital civilization.

Lian Yuming
Director of Key Laboratory of Big Data Strategy
August 10, 2018

Introduction

Rights are the source of power. According to Max Weber, power is "the ability to force others to act according to the will of the power owner, and the persecutor does not act like this in other situations." American sociologist Parsons believes that in terms of thinking political phenomena, power is a core concept of the great Western tradition. At present, our jurisprudence research is more about the study of legal rights. Therefore, from the political "power" to the legal "right," the two basic problems are mainly clarified through the normative attributes of the law. One is to directly restrict the power through legislation or making rules, so that the power holder can know the boundary of their power. The other is to define the boundary of the rights of citizens, so that the rights, especially the basic rights, of citizens are authoritative, so that those in power cannot overstep. The most critical research method of law science is to determine the legal relationships, and the content of the legal relationships is the rights and obligations, and the law science is therefore called the law of rights and obligations. But as Foucault believes, power has become a strategic situation, a situation in social life, an effect that basically determines the contrast of social force, a situation that no longer attached to the legal system but permeated the entire society life. At this time, the protection of rights should also be adapted to the changing situation of social life, and effectively maintained in the comparison of new social forces, thus forming a more complete legal system.

On the surface, the external framework of the existing legal system is indeed very brilliant, from the Corpus Juris Civilis, Napoleonic Code to the legislations of German Civil Code, the legal system is quite complete in the eyes of all beings. It seems to be complete enough to satisfy human needs for orderly and organized life and the human desire of repeating the experience or arrangements and the impulse to adapt to certain situations. However, as human beings entered the era of digital civilization, the changes in the relationship between power and rights are profoundly changing the situation of social development. Data power and data rights are intertwined, and relationships of data rights become the main aspects

of the contradiction between productivity and production relations. Data people will come from hypothesis into reality, and data relationships are reflected in personal life, business operation and national security. A new thing that is different from traditional things and transcends traditional people begins to enter the field of legal relations, which is the "data." In the face of contradictions based on the laws of the eighteenth century and the reality of the twenty-first century, in the fields involving civil law, economic law, administrative law, criminal law, procedural law, international law, etc., data rights jump out of the traditional relationships of legal rights and obligations, and it is no longer the traditional "opposition to the possession of all possessors." On the contrary, the flow and sharing of data is becoming an era feature, and at the same time, we urgently need to balance the relationship between personal data protection and data for commercial use in the collection, storage, transmission and processing of data. It is exactly the common issue that global cyberspace governance faces. As Immanuel Kant thought that all legislations involve two factors, the first is law, and the second is motivation. The law mainly focuses on the objective inevitability and forms the obligation; and the obligation determines the motivation through the relationship of the law. No matter which type of legislation, the ultimate point is the rights, including the rights gifted and the rights acquired, as well as the rights of nature and the rights provided by substantive law. But Immanuel Kant also adds that asking a jurist "what is right" is like asking a logician "what is truth" which makes him feel embarrassed. Data as a future right, what it is, where it comes from, which also makes us embarrassed. But let's put it up, maybe the question is worthy of consideration more than the answer itself.

Data rights, human rights and property rights are the core of new rights system with the same value of era. However, since the ownership and boundary of data asset have been in a s vague and controversial state, it is difficult to clearly define the demarcation of the rights, responsibilities and obligations of data subjects, data processors and the actual controller of data separately, which makes data governance to be the most obvious weakness of national governance. The individual rights-based of "I am the master of my information" is difficult to obtain an effective support from the law, which lets the distribution of data rights determined by the ownership of data assets and the division of data quality and security responsibility cannot be implemented,

and interests of data value is monopolized by powerful people and becomes a new origin of social unfairness.

Individual "natural rights" are the cornerstone of a society ruled by law. among various theories of rights up to now, the theory of natural rights is a long-standing classic theory. The theory holds that everyone has certain rights in the sense of being human, and these rights are inherent, non-transferable, and inalienable. At the same time, from the point of view of the current law circle, because the definition of the data rights is unclear, and the related protection is also very controversial. Even if being agreed, it is illegal to buy and sell personal information online. That is to say, even if the account registrant (seller) agrees to sell his or her personal information of citizen, it does not affect the "seller" and the buyer latter to commit the crime of infringing the citizen's personal information. This is because, in jurisprudence, civil validity and criminal violations are two different levels of evaluation. Citizens' personal information is firstly a personality right. Personality and identity have strong personal attributes and cannot be bought and sold at will. In other words, data rights or self-determination of information is only a reason for the seller's innocence, but it cannot deny the criminal responsibility of the "seller" and the buyer latter. Therefore, only if we further clearly define the data rights in law, and put the data rights at the same important position as human rights and property rights, effective protection of data rights can be achieved. The data rights have an altruistic and shared attribute naturally, which is a kind of existence between conflicts and games of private rights and public rights. Once the data rights rise from a natural right to a common and "public will," then it definitely transcends its own form and becomes a social right. As stated in the GDPR: "To protect the right of personal data is not an absolute right. It should be considered in its role in society and should be balanced with other fundamental rights in accordance with the principle of proportionality." In other words, while protecting the rights of subject of data, it should still leave room for technological innovation and industrial development at same time, which is precisely the essence of the "best use of things" of civil law.

The Internet brings data transmission, sharing and value exchange and value-added beyond the space, but also faces the challenge of unbounded, priceless and disorderly. From transmitting data by everyone to exchanging value for everyone and sharing the order by everyone, the Internet also

undergoes an evolution from information Internet to value Internet and to order Internet. This evolution of low-level to high-level and simple to complex, is a data state that can't be copied into copyable, essentially a state of human-centered data flow in virtual space. The non-boundary of such a state makes the data flow unsure, unpriced, untraceable and unregulated. In a sense, the Internet leaves us in disorder and chaos. The flow of data on the Internet is like a wild horse running fast in the wilderness without borders. the wild horses becoming better need to be put on the reins of rules. The establishment of such rules requires both technical support and institutional guarantees.

In the legislative system of our country, on the basis of balancing the personal data rights and the free flow of data value, strengthening the protection of rights of data subjects and the legal definition of obligations of data controllers and processors are the primary and urgent issues the legislation of data rights faced. This kind of urgency not only manifests that how to face and regulate new technologies, formats and models that are changing with each passing day, but also how to promote not impede technological innovation and social development while protecting personal data. but no matter what, the approval of GDPR of Europe Union and the challenges of cross-border flow of data and cyberspace governance are becoming more and more serious. the clear expression and co-identification for the fundamental problem of data ownership, the origin, boundary and attributes of rights, that is, the legal basis of "data rights" are even more important. it is also a subject pertinent for us to seize the important opportunity of developing big data and promote the modernization of the national governance system and governance capacity.

In *Sapiens: A Brief History of Humanity*, Yuval Noah Harari wrote, "Exploring the characteristics of modern society is as difficult as questioning the colors of the chameleon. The only thing we are sure about is that it will change constantly and be an eternal revolution." In contrast to the foreign big names that came to China to promote welfare of science and technology in the past, if Nicholas Negroponte brings the imagination, Kevin Kelly brings inspiration, Harari brings us more with an anxiety that has been abandoned by the times. But they have a common feature and reach an unprecedented consensus on the question that the Internet smashes the old order, the old rules, the old pattern and the old world, however, there

is no answer to how the Internet reconstructs a new world. The introduction of data rights law provides us with a new perspective to re-examine the world with the criteria of law.

Modernity is not a fixed state, but a force field that various strengths compete. Any hegemonic tendency of principles, powers and elements will infringe other rights subjects, and any self-certification of claims and schemes must also communicate and dialogue with others. This "complex modernity" determines the significance of introduction and legislative practice of data rights for humans enter digital civilization. In the face of the increasingly complex digital civilization and the transformation of its social order, the enormous volume and influence of the digital economy, we need to have a relatively clear concept system of data rights, and form a general cognitive framework that inherently regulates digital order with complex features. Promote data rights from necessary to statutory and to reality. This is a process of inclusive and prudent legal practice, and the relationship showed between data rights not recognized and recognized by law, the data rights institutionalized and realized, is not only a reflection and critical consciousness based on historical experience, but also a construction consciousness based on norms and beliefs. Only by respecting the universal norms and values of modernity can we gradually step out of the disorder and chaos of the era of digital economy. Only by forming scientific and reasonable rules of data protection can we realize the full circulation and use of data, promote economic growth and social progress under the premise of ensuring personal dignity and freedom. This is also the common question of human beings moving towards the community of digital civilization.

Harari predicted the law of the future in *Homo Deus: A Brief History of Tomorrow*. He believes that in the future artificial intelligence will gain a dominant position, and our law will become a digital rule, regulate all human behaviors except the laws of physics. For the past, law was a product of civilization; for now, law is a tool for maintaining civilization; for the future, law is a means of promoting civilization. The data rights law is the necessity of orderly circulation of data, the balance of data reuse, personal privacy and data utilization. It is the basic material of the "square" world of the legal empire that constructs digital space. The light of scientific wisdom and the light of legal rationality will complement each other in the era of digital civilization.

Remixing is a kind of internal structure and motor process of symbiosis and mutual transformation of chaos and order. It is not a hard mix of old ways and new ways, but an integration of the elements and reconstruction of arrangement. The evolution of the world in chaos and order makes people realize the power of remixing, and block data interprets such a remix full of power. From deconstruction to reconstruction, as a paradigm of thinking in the field of remix, block data helps humans better grasp the law and predict the future. Human beings are entering an era of remixing and also an era of living together. The human beings living together need order by nature, and the impact of remixing on the structure of rights let people re-examine the society and the construction of a new digital order. Data rights are the source of the inner vitality of digital order. The claim of data rights is an important force to promote the reconstruction of order.

CHAPTER 1

The Significance of Data Rights to Mankind's Common Life

The Age of Remixing

Remixing is a kind of symbiosis and mutual transformation on internal structure and movement process of the formless and order, which is not the rigid mix of the old way and the new way, but the reconstruction of the integration and arrangement of the constituent elements. The evolution of the world in the formless and order has made people realize the power of remixing, and the interpretation of block data is such a kind of power. From deconstruction to reconstruction, block data is used as a thinking paradigm in the field of remixing, which helps us to better grasp the law and predict the future. We human beings are entering a time of remixing and common life as well. Human beings living together demand order from the nature. And the impact of the right structures from remixing makes people re-examine the society, and the construction of new digital order. Data right is the source of the inner vigor of the digital order, and the proposition of data rights is an important force to promote order reconstruction.

We are in and will be in a time of remixing for a long time. The progress of human society has been being propelled mainly by remixing, such as the growth of civilization, the economy, and the data. "Remixing" is an inevitable change of power, which has brought unprecedented impact on legal rules and order of rights.

Remixing and human society: The formless, order and remixing

The universe was born in no forms. In ancient China, there were legends about the formless, among which Pan Gu's story, dividing the heavens from

the earth, is the most famous one. The formless, in the consciousness of the ancients, represents the vague image of the universe before it is divided into heavens and earth. In the West, the ancient Greeks also believed that the formless was the trans-universe material before the world was formed. According to the Book of Genesis: "the earth was waste and without form; and it was dark on the face of the deep." The world is made up of floods and deep darkness. The formless, in the early cognition of the Ancients, was synonymous with disorder and no form.

In the 1970s, with the great progress of science, people gradually realized the deeper essence of the formless – the combination of disorder and order. The vague notion that had puzzled people for many years was gradually made clear by scientific ways. In a vast land of truth, it is the birth of remixing theory and a complex system that refresh the world. The research of complex systems such as nonlinear dynamics, butterfly effect, fractal theory and so on, came into being, which not only added new ideas and vigor to research, but also brought us wide application prospects, and made people realize that variability, uncertainty, complexity and fuzziness are the essence of the world.

The remixing is often mentioned equally with "entropy." "Once upon a time, a singular point was walking along the street, and suddenly it blew up." This is the vivid description of the Big Bang in physics. In statistical physics, the definition of "entropy" is the proportion of the equivalence state in all possible states. Boltzmann defines "entropy" as the number of equivalence state under certain conditions. In fact, entropy is not used to measure the degree of disorder, but to measure the multiplicity of a state, and the state of high entropy is very likely to be disordered (Hidalgo 2015, p. 18). Before the Big Bang began 13.8 billion years ago, everything was in order. However, after the Big Bang, the universe became more and more formless. As everything becomes dispersed, the particles become formless. As to the universe, the degree of the order has been decreasing and entropy has been increasing until today.

As the product of the Big Bang, time is the one-way direction drawn out by the "law of entropy generation" of the second law of thermodynamics., The irreversibility of the "law of entropy generation," also represents that time is irreversible. The irreversibility of time brings us order from the formless (Hidalgo 2015, p. 29). While order and the formless are in opposition

to each other, they can coexist in harmony. Remixing is a kind of symbiosis and mutual transformation on internal structure and movement process of the formless and order. Remixing is not the rigid mix of the old way and new way, but the reconstruction of the integration and arrangement of the constituent elements. Basically, new values are often created by the combining ideas and elements from different sources, such as labor and capital, technology and brand, hardware and software and the globe and region.

Remixing is innovation

Recombination is the intrinsic mechanism of remixing and innovation. It is a basic way to create and innovate in the future. Jobs once said, "Creativity is just connecting things. When you ask creative people how they did something, they feel a little guilty because they didn't really do it, they just saw something. It seemed obvious to them after a while. That's because they were able to connect experiences they've had and synthesize new things." Thus, innovation is to re-break the stable structure of various systems and processes that have already been built, so that it becomes a formless state, and then the original elements are recombined. The so-called "innovation" is to break and recombine the original model and structure, rather than grows out of nothing. Even the birth of the iPhone and WeChat are the breakthroughs and reconstructions to their original situation, trade, practice, mode, and thinking.

Remixing is a vital disruptive way, from which innovation comes. It is a powerful way to create value by combining new methods. The new value can be created by remixing and allocating resources. Remixing is the essence of innovation. In the natural world, the softest graphite and the hardest diamond are both made of carbon atoms, while their huge difference is that they are combined in different ways. Human beings need to release the intelligence of the individual through remixing, and reconstruct our forms of organization, lifestyles, ways of creation, so as to gain collective intelligence.

There are three principles in remixing. First, to be able to identify the potential shared values. Finding more values created by remixing of resources than values created by using resources alone, that is, to dig out

value pre-judgment of "1+1>2." Second, to achieve a harmonious and unified relationship. The combination must operate as a whole in creating value, which is often referred to as collaborative innovation. When recombination is conducted, the shared value does not automatically generate value creation and distribution, but usually depends on how to combine the establishment and management after the initial agreement was concluded. Finally, to share value. Shared value is the ultimate goal of remixing and one of the most important principles as well. Determining the types of income distribution is as difficult as estimating shared values. If the value of remixing cannot be shared, the unfair types of distribution will make the process of remixing fall short.

Disappearance of boundaries and the advent of the remixing age

Remixing means the disappearance of the old boundary. The Internet brings many disappearances of boundaries, such as the disappearance of the boundary between enterprises and market, disappearance of boundaries among industries, and so on. By rearranging the combinations, the boundaries between the original features are broken. The disappearance of the old boundary, the moving from order towards disorder, is not a random mix with a bunch of coincidence, but an orderly arrangement of the combination; so the disorder is carried out in order. Therefore, the remixing is the pursuit of a state of balance between order and disorder.

The real and the virtual world are remixed. The development of the Internet has created a new spatial domain for mankind – the virtual world. The real space coexists with the mixed state of virtual world & reality in the living space. "The entire global economy is tipping away from the material and toward intangible bits" (Kelly 2016, p. 242). The world is also moving from the real world to the virtual world. The virtual world and the real world are embedded in each other, and human beings are forming a digital logic that transcends virtuality and reality. Compared with the real world, there are several major changes in the virtual world. First, the reversibility of time and the sharing of space; second, the instantaneity of time and the flowing of space; third, the elasticity of time and the compression of space. The advent of the virtual world make people say goodbye to a single physical

space structure, but hello to the two-way space of reality and virtuality. The virtual world reflects the human nature of openness and shareability, and the humanistic implication embodied in the virtual space itself is beyond doubt. But at the same time, it frees people from a kind of bondage, to a certain extent, it also separates the development of people and society from the real world.

The world is moving from the traditional "era of labour division" to "era of labour combination." In a remixing world, where crossover occurs at any time, the resources of one area are rearranged in combination with the resources of another, which may lead to innovation. With the continuous evolution of civilization, the progress of science and technology and the growing cognition of the world, the features of the world in front of us are becoming more and more clear. However, with the advent of the remixing era, the present world is still full of uncertainty, often accompanied by unpredictable risks and changes, in which human beings are still walking alone in the vague cognition. There are times when we cannot measure, predict, and control accurately. Values, laws and rules are uncertain, and so are rights. These uncertainties imply complexity and disorder, which bring formless and confusion to human society, and bring risks and challenges to the common life of mankind as well.

Growth stemming from remixing: The growth of civilization stems from remixing

The development process of human society stems from repeated remixing. In the past tens of thousands of years, the development of human society has undergone a process from diffusion to forming into different groups and to the final merger, but the merger does not meaning return to the original point. "So, over the last 70,000 years, humankind first spread out, then separated into distinct groups, and finally merged again. Yet the process of unification did not take us back to the beginning. When the different human groups fused into the global village of today, each brought along its unique legacy of thoughts, tools and behaviours, which it collected and developed along the way. Our modern larders are now stuffed with Middle Eastern wheat, Andean potatoes, New Guinean sugar and Ethiopian coffee. Similarly,

our language, religion, music and politics are replete with heirlooms from across the planet" (Harari 2016, p. 592).

The evolution of human civilization is merely repeated remixing of thoughts. Around 500 BC the golden age of human thought, also known as Axial Age, saw many great spiritual mentors appeared in various civilization – sages of Ancient Greece, Jewish prophets of Israel, Sakyamuni in ancient India and China's ancient philosophers ... The ideas they put forward have shaped different cultural traditions and influenced human life as well. In the past 2,000 years, every social progress has not been the discovery of new ideas, but the rediscovery and practice of some thoughts in Axial Age, such as the Renaissance bringing the progress to Europe, the Protestant Ethics contributing to the rise of America, the Confucianism, Buddhism and Taoism asserting to the influence of China.

The evolution of emerging technologies is only a remixing of early primitive technology. The emergence of technology is accompanied by the development of human beings, which also originates from the needs of human survival. Larry Downes points out in his *Laws of Disruption* that the development of technology was exponential. Brian Arthur, an economist at the Santa Fe Institute, says, "All new technologies come from a combination of existing technologies." Modern technologies are combinations of earlier primitive technologies that have been rearranged and remixed (Kelly 2016, p. 223), and we can combine hundreds of simple technologies with hundreds of thousands of complex technologies, from which countless possible new technologies are created, all of which are the product of remixing.

The innovative development of new media is the remixing of old forms. The historical origins of "remixing" are also embodied in the re-creation of music. At the end of nineteenth century, the recorder's creation made people able to rearrange the normal listening order, which is the first remix of music. Over the past few decades, the birth of hundreds of new forms of media has been remixed by old forms. The traditional media still exist, for example, a newspaper article or a 30-minute television sitcom, or a four-minute pop song. Now, after being recombined, there have been new and attractive forms of medium, such as Weibo, dynamic diagrams, short videos, and so on. In the future, newspaper articles, novels, TV sitcoms, or a four-minute pop music will be remixed in the form of basic elements, and recombined into other new forms.

Economic growth comes from remixing

Starting with classical economics, the impetus of economic growth has always been the research hot spot of mankind. As to what the decisive factor is in economic growth, there is no consensus in theory circle. In economics, it has a long tradition to describe its nature with factors of production (such as capital, labor force). The explanations by different theories on impetus of economic growth mainly focus on the analysis of the contribution to the factors of production, less attention is paid on other factors. At the same time, because of the different characteristics of the times, the research elements and objects that the researchers selected are not the same.

The theme of *The Wealth of Nations*, written by the originator of economics Adam Smith, is "The Nature and Causes of The Wealth of Nations" (Zhou Yuehui 2015), which is to study "How to achieve economic growth of a nation." Adam Smith broke up the economy into land, labor and machinery, and he equated machinery or fixed capital with the growth of people's production capacity. Thus, he regards the physical capital accumulation as a decisive factor in economic growth, and he argues that "The intention of the fixed capital is to increase the productive power of labor, or to enable the same number of laborers to perform a much greater quantity of work." Adam Smith regards the improvement of machinery as the progress of people's production capacity,

> It is upon this account that all such improvements in mechanics, as enable the same number of workmen to perform an equal quantity of work, with cheaper and simpler machinery than had been usual before, are always regarded as advantageous to every society. (Hidalgo 2015, p. 168)

Moreover, in Adam Smith's theory, he holds that the division of labor promotes economic growth. Division of labor is the best way to improve economic efficiency and promote economic growth. David Ricardo, another classical economist, has also pointed out in his book *On the Principles of Political Economy and Taxation* that capital accumulation and profit growth provide favorable conditions for economic growth, and that the driving force for economic growth include increasing labor productivity, compressing necessary working time and reducing workers' wages, etc.

The theory of modern economic growth holds that economic growth depends not only on capital, labor and the relative effect of capital and labor on production growth, but also on the most important driving factor of technological progress.[1] Joseph Schumpeter, an Austrian economist, put forward a unique theory of economic growth in *The Theory of Economic Development*. In Schumpeter's eyes,

> Nor will the mere growth of the economy, as shown by the growth of population and wealth, be designated here as a process of development. For it calls forth no qualitatively new phenomena, but only processes of adaptation of the same kind as the changes in the natural data. (Schumpeter 2012, p. 67)

Schumpeter holds that only innovative activities are the fundamental force to drive economic development. He identifies five types of innovation: 1. the introduction of a new product or new product quality; 2. the introduction of a new production process; 3. the opening up of a new market; 4. the securing of a new source of raw materials or other inputs; 5. the creation and application of a new organizational structure in an industrial sector. Schumpeter further emphasizes that the new combination of innovation and factors of production and the organizers of economic development are entrepreneurs; and it is the "entrepreneurial spirit" that encourages them to innovate, which could introduce a "new combination" of factors and conditions of production that had never been made into the production system to achieve the "new combination." Thus, in Schumpeter's theory, the impetus for economic growth comes from innovative activities and the "entrepreneurial spirit" that promotes such activities.

In the field of entrepreneurship, Schumpeter holds that business routine can be overturned by a new combination of business. Entrepreneurs have taken out these new combinations – the existing and new manufacturing processes, the markets and new sources of supply, the new products and

1 In his book *Future Shock*, Alvin Toffler, an American futurist, also mentions that, behind these startling economic phenomena, there is a huge incentive for change: technology, but that does not mean that it is the only driving force for social change. In fact, changes in the chemical composition of the atmosphere, in the climate, in soil fertility and other factors can lead to social unrest, but it is undeniable that technology remains a major force in accelerating shocks.

technologies, and even the new corporate structures and strategies – that are the cores of Schumpeter's innovation theory. Schumpeter's conclusion of his observations is still applicable, but the combination is not just the ones that entrepreneurs met. Today, the company's executives are promoting this innovation process. In the past 10 years, the strategy of asset and resource combination from inside and outside the company has been widely implemented and popularized. The implementation details of these combinations are different, either temporary or permanent, lose or strict, exclusive or inclusive. But its essence is to create value by remixing or recycling of sources (Gomes-Casseres 2017, p. 7).

Coincidentally, economist Paul Romer holds that "Truly sustainable economic growth stems not from the discovery and use of new resources, but the rearranging of existing resources to generate greater value." This is in the same way as Schumpeter's "Theory of Technological Innovation," which focuses on "new combination" or "new integration." Kevin Kelly, the founding editor of *Wired*, known as the prophet of "the spiritual godfather of Silicon Valley," mentioned in *The Inevitable* that "economic growth comes from remixing." At this point, the study of economic growth turns gradually from the focus on the factors themselves to the reorganization of the factors, which becomes the only source of power to innovation and wealth in digital society (Kelly 2015, p. 242).

Data growth stems from remixing

The bidirectional evolution of knowledge, information and data is the course of human civilization progress. From the perspective of process of human thinking paradigm, the cognitive system at each stage is different, so are the resulting tools of thought. The first stage, knowledge is power; and the knowledge is the product of human thinking. The second stage, information is energy; and information is the product of computer technology. The third stage, data is variable; and borderless data aggregation cannot be achieved by the thinking paradigm of human brain nor computer. It must be the integration of people, intelligent machine and cloud computing – a cloud-brain thinking. In other words, the human thinking paradigm is divided into three stages, namely the human brain age, computer age and cloud-brain age.

Data is both an independent variable and a dependent variable; at the time of its own change, it will cause the change of the outside world. Besides the process of data change of dependent and independent are simultaneous. Data is an objective existence and a data mapping to the real world. The data itself is in the motion and change, and it is the information communication technology that causes the natural growth from improvement of production efficiency to more advanced intelligence stage according to its own development logic (Key Laboratory of Big Data Strategy 2016, p. 15). In terms of quantity, big data is not only huge, but also constantly changing. *The Digital Universe*, a report published by IDC, provides a quantitative assessment of global data stocks and growth trends. The report shows that the global IP (protocol for interconnection between networks) flow reaches 1EB (AI-byte), which takes one year in 2001, only one day in 2013, and only half a day in 2016, to 2020, the digital universe will grow 10 times, the amount of data generated per year from the current 4.4 trillion GB (gigabyte), growing to 44 trillion GB.

Data transboundary is an important precondition for the formation of large connections. All the people, things, objects are embedded in a huge social network, our interconnected relationship is not only the innate, indispensable part of life, but also an eternal force (Christakis 2017). Albeit data in different fields and industries are separated into strips by social division, the transboundary of various industries is forced by development of Internet technology. In its essence, the transboundary is building up new connections among things, especially establishing effective ones among redundant data, in order to discover new value. For example, China Vanke and Taobao established a cooperative relationship, so as to obtain a large amount of customer information; Alibaba not only focuses on e-commerce, but is also involved in logistics, pictures, artificial intelligence and other fields. The attraction of transboundary is to combine and integrate different elements to discover the potential value.

The recombining of data is critical to the continued growth of data volumes. In terms of nature, transboundary and cross-field association and reorganization are the nature of the development of data itself; it can break the boundaries of time and space to quickly transfer and aggregate, which put the data of the same type, in the same field, into classes, with interaction, and the formation of higher-level, cross-field continuous aggregation, to form

a new dataset in new conditions. Multiple forms of data, multiple sources, and complex connections between data make the data world more mysterious and exciting (Key Laboratory of Big Data Strategy 2016, pp. 15–16). A single data is meaningless, while the real value generates from huge subsets through correlation analysis of the recombined, new data set.

Data growth is at the heart of the growth of the digital society. Ma Yun said in the 4th World Internet Conference that, "in the next 30 years, data will become the means of production, computing will be productive force and the Internet will be a production relations. If we do not embrace digitization, and not connect to the Internet, it will be more frightening than didn't connect to the electricity in the past 30 years." A data set in a "sleepy" state needs to be remixed with other datasets to create new value, so the combination of different datasets is always more valuable than a single dataset. The reorganization of data has become the core of growth.

The legal essentials of remixing: Remixing is a double-edged sword

As far as creation is concerned, remixing creation is different from the traditional forms, for it creates new works on the basis of the original work in the form of audio mixing, mix-and-match and so on. In the era of big data, people can create large works by mixing and collaborating, which was unthinkable in the past. Wikipedia, for example, brings together the wisdom of global netizens in a remixed way, the richness of which was far beyond the creation done by traditional encyclopedias. It can be said that remixing creation contributes to the development of culture. Besides, it involves the right of the public to express freely, and the relationship between copyright and freedom of expression, "which can be regarded as the relative two sides of the same coin, the former is ownership, the latter is the political right of society. They are linked together because both involve the flow of information, one for profit and the other for freedom. It's like the Canal gate, which can facilitate the flow of information and may also hinder its flow" (Patterson & Lindberg 1991, pp. 123–124). The copyright owner in remixing creation enjoys exclusive rights to the work, and the public enjoy the right to freedom of expression. The public has the right to obtain works and make use of them, which of course includes the use of originals to create remixing

works, but the public may not violate the relevant laws in the exercise of the right to freedom of expression.

The threshold for innovation in the era of remixing is lower. Technological innovation has changed the possibilities for invention; and the development of digitalization and the Internet has allowed people to innovate at any time, anywhere. In the past, professionals were the mainstay of innovation, but now, everyone has that possibility; in the old days, only few people were able to publish and become famous; whereas, now, everyone has the opportunity to become famous as long as there are mobile phones, computers, and the Internet. The creative environment has changed, as a matter of course, the way to innovate in the era of remixing is more accessible, as the threshold is lower. And people are increasingly choosing to use remixing to express their innovation and desire. But, because of the lower threshold, remixing brings both value and many legal risks to mankind.

"Remixing culture" faces legal conundrum. Lawrence Lessig, an American scholar, discusses the legal issues brought by "remixing" in the book *Remix: Making Art and Commerce Thrive in the Hybrid Economy* (2008). Wikimedia economic phenomena, data collection and trading of search engine ... the threshold of "remixing culture" is so low and common that brings us both business opportunities and increasing tort disputes. When "remixing" is used to describe cultural phenomena, the boundaries of creativity and copying become blurred. Some of the "remixed" works have gone beyond the level of the primary creation that might step on the boundary of copyright infringement. Like, the trendy works of Fan articles or Fan Fictions,[2] and "the transformation problem" mentioned in Kevin Kelly's book *The Inevitable*. Transformation is another expression of "formation." To accept "transformation" means that the works we create today will and should generate something else in the future. Then, how to define the boundary between "transformation" and "formation" and solve the tort problem involved in fan fictions is an urgent legal issue at present.

2 In China, copyright law does not specify the copyright attribution of the Fan Fictions. In Japan, however, the original author has the same rights as the author of the derivative works (that is, the author of the Fan Fictions).

The impact of remixing on order

In the remixing era, human's coexistence and living together require a rudimentary social order. The core of the social order needs for each social community to address the question of how to use common social resources or wealth to continue its own development. This requires each society choose and establish an order of data rights used by who (individual, collective or other forms of organization) and how to use (what nature of rights, etc.). This order is usually centered on the design of the rights system, which takes data rights as the core.

This system of rights basically includes: first, the allocation or confirmation of the range of rights that social subjects can possess; secondly, the recognition of the right of these subjects and the general rules governing the exercise of rights; and thirdly, the protection of the exercise of the rights of the subject and the prohibition or punishment of acts endangering the order (Gao Fuping 2004). The norms of these three types of rights are the basic content of the system of data rights to standardize the data rights in the remixing era. It is the goal to achieve the common and orderly use of social resources by social subject with the three kinds of norms or rights arrangement.

Data rights are the first order of human society in remixing era, which defines the ownership of data resources and constructs the order of resource utilization of the whole society. Data rights defines the scope of several rights among individuals, giving individuals the autonomy to independently deal with the data they own, thus protects individuals from slavery and exploitation by others and safeguards the equality and free life of individuals. Data rights are the link of social organization. Human beings always have to combine into different social organizations in order to survive, from families with blood ties to other economic organizations such as partnerships and companies that are linked by economic interests or contracts, which are social organizations that achieve various purposes and are based on clear data rights. It is difficult for a single subject in society to become an economic organization with a common purpose. Data rights sustains the survival boundary of a social community, from natural villages and towns to countries, where everyone lives in. They are various communities of all levels of human life. The boundaries of such geographical community will extend

in the future, until being defined by data rights, since the primary order of society is to maintain stability and security and non-aggression against the scope of the activities of individuals, families and various social communities.

The remixing challenge to law

In the remixing between the real and the virtual world, people's rights to data gradually transfer from ownership to the right to use. The right to data is moving away from ownership towards the right to use; it is also moving away from replicating value and towards the value of the web; and at the same time towards a world that is bound to come, where there is an ever-growing remix. Although at a slow pace, the relevant laws will be gradually established (Kelly 2015, p. 241). So, what should the new law support in a remixing world? This is a controversy and conundrum that are facing the digital society.

Remixing is the rearrangement and reuse of existing things, which poses a great challenge and destruction to the traditional concept of property and ownership. If a piece of melody is your property, just like your house, then others right to use it will be greatly limited without authorization or payment of the corresponding remuneration. Early in 1813, Thomas Jefferson recognized that opinions could not be regarded as property, or that even if they were property, they were different from real estate. He wrote: "A man has gained a point of view from me; and he has not done me any loss by accepting this view as a guide; it was like using my candlestick to light his candle; and his harvest of light did not dim me at the same time." For the most part, our legal system is still in the guidelines of the agrarian age, regarding property as an entity, which has lagged behind the development of the digital age.

The current intellectual property system and the concept of ownership also constrain the development of remixing. For the possession of non-physical materials (such as music, text, views, etc.), how to define them properly? Whether it is infringement to completely replicate, or it is not a complete "replica" as long as some addition of transformation and change exist. All these still need further clarifications of the social concept and system. There is always controversy over whether it is legal for people to use music clips

as a sample for remixing, especially when the songs used as samples or the songs borrowed have been reaping handsome rewards. There is also a legal controversy over Google's use of part of books by scanning original ones, which has forced Google to stop its "Book Scanning" program. Intellectual property is such a flux. The remixing creation has led to disputes about copyright issues, that it may endanger the interests of copyright owners, mainly in the following aspects. Firstly, remixing creation may undermine the author's moral rights of original works. The creation of the remixed works may destroy the integrity of the original works with deletions and modifications. Secondly, the remixing creation may harm the property interests of the copyright owner. Some authors of the remixed works plagiarized a large number of prior works in their creations, thus forming a competitive relationship with the prior works. In addition, the remixing creation is not a fair use. Some people believe that remixing creation involves copyright infringement, which is not a fair use of prior works. For these reasons, a considerable number of American remix music creators, fearing involvement in litigation, are afraid to publish mixed music works (Hu Kaizhong 2014). Therefore, although the remixing creation could promote cultural development, there are great contradictions and differences in the legitimacy, if this problem is not properly solved, it will hinder the healthy and orderly development of the remixing creation.

Block Data Paradigm

Remixing means the integration of internal and external resources together to create new values, so the value of data lies in the remixing. Block data, with a specific platform to integrate data resources, plays an aggregate role to make multiple integration and correlation analysis, so as to reveal the nature and laws of things and to create new values. In a way, block data is a kind of thinking paradigm in the remixing field. But, it must be pointed out that, after massive data is aggregated and remixed, the problems such as data disorder, ambiguity of data rights become more and more prominent, which need multi-dimensional governance of "technology & system."

Remixing: Value embodiment of data – the datamation of everything

The development history of human civilization is also the course of vast data generation, iteration and evolution. If the significance of the world is refreshing, then data is the fundamental attribute and existence form of the refreshing. Whether we still have the good memory of the old days and the fear of the new era in our hearts, a datamation age of "everything is recorded and analyzed" has come. "In the world of big data age, all social relations can be expressed in data, and people are the sum of relevant data" (Li Guojie 2014). In this era, virtual digital space and the real world are in parallel existence, accurate mapping, and deep blending. Gary King, a sociology professor at Harvard University, said, "This is a revolution. There is a movement of quantification rumbling across fields in academia and science, industry and government." It is not only the era's characteristic that expressing everything in a quantified way or taking data as the essence of the world. It is only because of the development of technology today that is closer to this essence.

Data defines everything. When all relationships can be characterized by data, all trends can be predicted by data, then the way people view the world may change by datamation means that help to understand human behavior and human society and explore how to reveal the common features of social macro-behavior from the randomness and disorder of social micro-behavior. The social orders, social rules, social behaviors and social governance will be reconstructed under the natural, economic and social change. A new digital society will be born.

Data connects everything. Datamation of everything means the interconnection of everything, and "connection" has become the most basic and important feature of the digital age. The development process of human history is a process of constantly expanding and deepening the connection with all things. With the help of modern information technology such as the Internet, big data and artificial intelligence, everything can be connected, people to people, people to things, things to things, which leads to the arrival of the era of the interconnection of everything; furthermore, the interaction is much more frequent and effective that has transcended time, space, geography and even the boundaries of species.

Data quantifies everything. When everything in the world becomes data, it is the realization of "datamation of everything in the world," that is, the

realization of "quantifying everything." All things in the world can be used as "variables," to accept data analysis, and achieve potential value. Lord Kelvin, a British physicist, said, "When you can measure what you are speaking about, and express it in numbers, you know deeply about it; but when you cannot express it in numbers, your knowledge is a meagre and unsatisfactory kind: it may be the beginning of knowledge, but you have scarcely, in your thoughts, advanced to the stage of science." Data, as a new way of expressing the world, is profoundly reforming the human way of communication, organization, production and life, driving mankind into a new era of digital civilization.

The data value lies in remixing

Human understanding on data value can be divided into three stages: first, the small data era pursuing data refinement based on computers; second, the big data era deeply exploring data relation based on systematic data resources; third, the hyperdata era symbolized with data explosion and congestion. Data is everywhere. They hide in the dark and ridicule people who do not make good use of them, and the truth is often hidden in the arrangement and combination of data.

Big data is big not only in its big capacity, more in its big value, and both of them which are based on big integration. Data is a new productivity, but it is fragmented and can only be of real value as long as it is aggregated to allow various data to have an aggregation effect. The value of data does not simply exist in the collection of massive data, but in the correlation between data, and in the rules and principles behind it. That is to say, the value of data is not how big the data is, but how high its relevance is; the law and its value could be found via the analysis of multidimensional and multi-level data and its correlation. The value of data does not exist in static data combination, but in data collisions and aggregation that can release the intrinsic value. A dormant dataset's potential value needs to be released by combining it with other different datasets. Like mineral deposits, the data can also be low-grade or high-grade. As to the dispersed and disordered data, it is necessary to make a combination and integration to come out a fresh analytical logic, so as to reconstruct the traditional industry, social governance, government supervision and legal system.

Integration is the value of big data. The future is an era of cross-border integration in which data creates value and innovation drives the future. Cross-border remixing can realize the "one plus one produces a value far greater than two" which is the essence of data. According to the French post-structuralism philosopher Jacques Derrida, "Each deconstruction manifests itself as the interruption, division, or disintegration of the structure, but the result of each deconstruction produces a new structure." The deconstruction of data, datasets, and data relationships is similar to the deconstruction of the product, that is, each "original," after being deconstructed, will is reassembled with new products to achieve new uses and values. Reconstruction is a kind of overall transformation of the deconstructed data, which constitutes a new set of values different from the past.

Data remixing: Combination, integration, and aggregation

The value of data remixing is the discovery of new rules and new values. The way of data remixing, from the perspective of interaction, can b divided into three levels: data combination, data integration and data aggregation, which is the realization of the deep aggregation of dispersed and disordered data from lower level to higher level (see Figure 1).

The data combination is formed by a simple combination of data from all sides, which can embody the whole characteristics of things. Remixing of such data combination results in a physical reaction, and the nature of the data attribute has not changed. For example, a credit report, including transaction data, communication data, and shopping data, etc., is only a simple collection of information. However, data remixing can realize its value only when multiple data exist and aggregate. Remixing of such data aggregation is a chemical reaction, which create value. Such as, blacklist. It is linked through financial data and communication data to determine whether certain data are blacklisted. For instance, users with abnormal financial behavior and frequently changed mobile phones and times of downtime, can be judged as blacklist users. Data aggregation creates new value from aggregating and incubating on both sides, and the remix of such kind results in a nuclear reaction, thus a new pattern come into being. For example, the installment loan, with the risk control ability of big data, not only reduces the audit

process, but also can carry on the loan monitoring, the post-loan management, and the lost user's location and collection, which is a package plan.

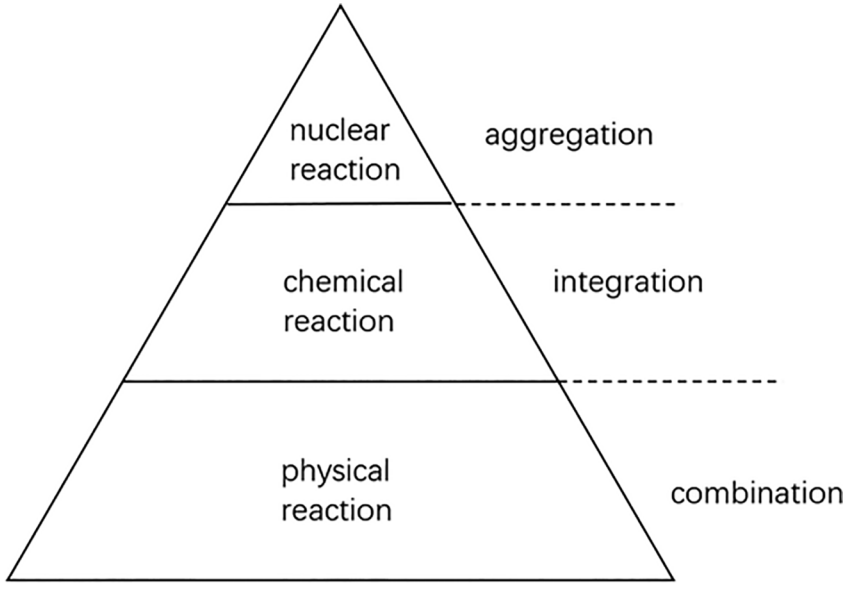

Figure 1. Three Ways of Data Remixing.

The remixing of data is not a simple and easy thing, which cannot be realized overnight. Data dictatorship, data standards, data ownership, data security and other problems remain to be solved. Among them, three problems are relatively more important: first, the problem of data security. How to ensure data security, protect personal privacy and the right to know, and how to guarantee the realization requirements of the legal data subject? Second, the problem of data pricing. The assessment of data property rights and data pricing have not yet formed a mechanism. The problem is how to determine the market price and who has the final pricing rights. Third, the problem of definition of ownership. Questions like how to establish the legal status of data, how to attribute rights, and how to define the distribution of benefits are extremely important problems, and at present they is no final conclusion. The problem of data order is prominent with the increasing number of disputes and cases involving data. In the case of imperfect legal

system, the mining, trading and application of data will bring the data ecosystem into the black hole of infringement, out-of-control and even crime.

Block data: Thinking paradigm in the remixing field

Big data has ushered in a major transformation of the times. Just as telescopes make us to feel the universe, and microscopes make us to observe microbes, big data is changing our ways of lives and ways of understanding the world, which is becoming a source of new inventions and services; and much more changes are coming into play (Mayer-Schönberger & Cukier 2013).

From big data to block data

The booming of massive data has been accompanied by an increase of uncertainty. Data explosion is faced with the potential problem of data waste that is troubling human, which is known as the "Paradox of Massive Data" that needs a new method of data science to solve. It is in such situation that block data came into being. Block data is a sociological paradigm of data taken human as its origin, which emphasizes more on the use of data technology to analyze human behavior, grasp human law, and predict human future. Integration from strip data to block data, and movement from chain era towards block era will lead a thinking mode and behavior paradigm reform of the whole human society fundamentally and subversively.

Point data: Isolated data for discrete systems. With the convergence and interaction of information technology and human production and life, as well the rapid popularization of the Internet, global data presents the characteristics of explosive growth and massive agglomeration. However, large-scale data, without any connections, exist independently, forming various discrete isolated point data. Point data is an important source of big data, which has the characteristics of large volume, decentralization and independence. Point data comes from a discrete system of individuals, businesses, and governments that involves all areas, aspects, and links of people's production and life; such data has been identified and stored in a variety of corresponding systems, but because there are no value correlations

with other data, or the value correlations is not presented, they are not used, analyzed, or even accessed.

Strip data: Data collection under a single dimension. Data, whether the internal data collected by traditional industries, or the department data concerning health, education, transportation, finance, security and other sectors held by governments at all levels, or data of new industries such as e-commerce and Internet finance stored by Internet enterprises, can be defined as strip data that is linked together in an industry and field. At present, the application of big data is mostly presented with strip data. Strip data is a set of data in a certain direction, so it can improve the efficiency of data use, but also made data trapped in the isolated chain, forming various "data islands" and "data chimneys."

Block Data: correlated aggregation on a specific platform. Block data is the aggregation of a variety of discrete point data and segmented strip data on a specific platform, and make it have a continuous polymerization effect. Block data contains a highly correlated mechanism that provides the conditions for continuous aggregation of data. The correlated aggregation of block data occurs on a specific platform and is not limited to an administrative region or physical space. The correlated aggregation of block data can realize the trans-boundary agglomeration of data in different industries, departments and fields. The block data characteristics of platformization, correlation and aggregation promote the development of big data into a new stage of block data fusion, which break the boundary of "strip," and make the realization of strip data integration on the "block" platform. In addition, through the multi-integration and correlation analysis, a faster evaluation and prediction to things can be made more comprehensively, accurately and effectively, so as to uncover the nature and laws of things, and create new values.

Deconstruction and reconstruction of block data

The essence of block data is trans-boundary, integrated, open, and shared. From data to data clustering, from deconstruction to reconstruction, from multi-dimension to shared trinity, they not only promote data flow, establish data connection, but also discover and recreate data value.

From data to data clustering is the starting point for block data. The formation of block data is to put the collected data that is usually in the form of dispersed, isolated, fragmented point data and strip data into a specific platform, that is, via "data clustering" to form the block data. Block data is a multidimensional and infinite variable. Multi-dimension introduces dialectics into the analysis and use of data to form the dialectical thinking of block data; infinity not only represents the huge data quantity of big data, but also reflects the dialectical nature of data in time and space; variables are in the state of unknown, so if we can explore some more fundamental but invisible variables that are not directly perceptible in the multi-variables, and grasp the disturbance factors of the development, the unpredictable may become the predictable that can be given early warning and planning.

The mechanism of block data is the course from deconstruction to reconstruction. Open, shared, connected are the basic mechanism of block data formation. And the open, shared, connected block data will produce a larger block data reticular structure, which is not a simple stacking, but has obvious grids, nodes, skeleton and its own internal logical law. The reason why the existing data should be deconstructed and then reconstructed is that the existing data can generate more value through remixing after deconstruction.

From multi-dimension to sharing is the value presence of block data. In general, the greatest benefit of the big data age is multidimensional and sharing, that is, every person in the age of big data can quickly share the most advanced achievements of human civilization; this kind of multidimensional and sharing is to obtain any information at any time, any place, with anyone, anything, and in any way, that is the charm of sharing. Sharing is the greatest contribution of the big data age to human beings, and what we didn't know in the past can now know; the information we didn't have in the past is now available; what a few people had in the past can now be owned by most. And it is the sharing that is becoming a hallmark of a new era.

Block data: Solutions for the big data age

Block data, accompanied by big data, is the solution of the big data age. Big data emphasizes correlation, while block data emphasizes integration; big data emphasizes technical support, while block data emphasizes platform

support; big data emphasizes informationization, while block data emphasizes self-flow; big data emphasizes number-centric, while block data emphasizes people-centered. These are the differences between block data and big data. Block data, as the core value of big data, is the advanced form of big data development, and a high degree of integration in the era of big data.

Block data is the core value of big data. "Economics, political science, sociology and many scientific disciplines in the age of big data all change and develop essentially, to further affect the human beings' value system, knowledge system and way of life" (Mayer-Schönberger & Cukier 2013). Schoenberg holds that the development of big data is not only to tap the value of data, but more importantly to subvert, innovate and reconstruct the world. Block data combines, integrates and aggregates all kinds of data, to form a shared and open "data pool," so that data and people can fully interact, correlate and integrate with each other, which deconstructs and reconstructs the relationship between data and people, things and things, to create corresponding solutions for business, society and even government, providing a larger value system – block data value chain for industrial development, public services and government governance. The value chain of block data can uncover a brand-new combination of values that transcend the data itself.

Block data is an advanced form of big data development. It is not a branch of big data, nor a replica of big data, but an advanced form of big data development. If big data appears because of "things," then block data is created around "people or organizations." Big data observes and interprets data through human thinking, while block data uses the data thinking to observe and interpret human behavior. Compared with the "4V" features of big data such as large data capacity, wide data types, high commercial value and fast processing speed, the most obvious difference of block data is the upgrade of big data from "4V" to "5V," which added the feature of multidimensional variable. Multidimensional variables of data changed the traditional perspective of data use and analysis, from the original static and isolated state gradually to the state of motion and connection. Just as "the turning point in mathematics is Descartes' variable," the turning point in the big data age is the emergence of multidimensional variables of block data.

Block data is a high-degree integration of big data. Presently, big data applications of human are more of a collection of vast data for particular domain or industry. A series of restricting factors, such as high monopoly,

poor integration ability, difficulty in sharing, low application value and high security risk, seriously hinder the development of big data. It is the significance for block data development to solve the problems of data monotony, data closing and data monopoly. The open, shared, and connected mechanism of block data can realize the high correlated aggregation of data. In addition, block data itself has the characteristics of strong collection, high correlation and high value, which determines that block data can break "data island" and "data monopoly" to solve many difficult problems in the era of big data, and become a new paradigm of data philosophy in the era of remixing.

Data disorder and data governance

The process of block data aggregation includes not only the filling of data space, the reconstruction of spatial data, the configuration of the collection process and the aggregation in the process of configuration, but also the collection of new data and the derivative data from the original combination. By way of aggregating and remixing block data, higher and bigger data value can be exploited. As a result, the security, ownership, order and other issues related to data are becoming more prominent, which requires data governance.

Data security is incomplete. In the process of data opening, data circulation and data application, the problem of data risk is imminent, especially that the weak awareness of risk and security, the poor security and reliability of critical information infrastructure, hacker attacks, data terrorism. Weak technical links and management loopholes, as well as the lack and lag of laws, increase the risk frequency and harm extent. The core of this risk and crisis is subversion, being essential to the "destruction," which directly leads to the change in structure and function, thus exacerbates its social uncertainty, unpredictability and uncontrollable nature. Behind the high risk of data is the loss of human nature, moral abnormality and behavior irregularity. The governance of data security and the construction of external binding mechanisms, such as data legislation, need to be strengthened from a more systematic framework, like technology, ethics, and legal system and so on.

Data utilization is unbalanced. From the perspective of data control, it refers to the imbalance of data control. Some enterprises hold large amounts

of data, in certain markets, forming a dominant position, which will result in the utilization imbalance. From the data flow perspective, it means "not shared data." Data sharing is an important issue, involving multi-stakeholder adjustment. "Not shared data" is an important cause of data island and the data gaps. From the perspective of personal information protection, it refers to "control of personal data." Enterprises collect or share personal information, but do not fulfill their duty to inform or to obtain authorization from individuals; for individuals, enterprises are like black boxes, in which personal information is controlled, "monopolized." From the perspective of data revenue, it is about "exclusive data earnings." How data earning is distributed is a highly controversial issue at the moment (Yang Jianhui 2017). From the perspective of data utilization, the government and enterprises have mastered a large amount of data, but because the technology of development and utilization of data is hard to meet the needs, coupled with absence of personal awareness of big data utilization, the uneven and inadequate data utilization becomes unavoidable.

Data rules are incomplete. With the coming of the big data era, there is a growing consensus on the value of data, and data is widely discovered, unsealed and exploited. On the one hand, human beings are delighted to see the value of data; but on the other, too much useless data is presented to the society. In the age of small data with data scarcity, because of the backwardness of technology in data collection and search, human beings can only obtain limited data. It is difficult for individuals to make accurate judgments and predictions of things, which as people in the dark, unable to distinguish the direction. While in the era of hyper-data, data shortages become data surpluses. The explosion of information and data produces a huge amount of information and data waste, so that human beings are surrounded by borderless data, which eventually lead to the lack of cognition. We define this as "data congestion." In the age of small data, the larger the data is, the more value the data has, while in the hyper-data age, the larger the data is, the smaller the value has. Features of big data, as Viktor Mayer-Schönberger said, such as quantity, value, speed, and so on, will be fatal weaknesses. Borderless data waste can cause cognitive impairment for human beings, and data congestion will be an important problem for future development. As a result, the governance of data congestion will be a major issue in the hyper-data era.

Based on the data view of block data, the new paradigm of data governance is explored through the integration of data science, life science, social science and intelligence science. This kind of organic integration is not a simple integration, but a people-centered one, which aims to achieve the integration of human beings and technology, technology and institutions, rules and order, and then to achieve a comprehensive remixing of human beings, technology and society, so as to provide solutions for human society to clear cognitive barriers, and balance the interests of conflict.

Data Rights and the Reconstruction of Order

Order is a kind of need rooted in the heart of mankind, and the passion for order result from dependence on it. It is an opportunity to rebuild order with the rise of cyberspace that has brought new challenges to mankind. In the new round of order reform, the power of the Internet is highlighted. Data rights has never played such a vital part in the history of order reconstruction like it does today. The essence of human civilization is the establishment of order, while the construction of cyberspace order has become an important proposition in the digital age; and the claim of data rights promotes the reconstruction of this order.

Order and its needs: The essence of human civilization is the construction of order

From the perspective of jurisprudence, American jurist Bodenheimer holds that order "means that there exists a certain degree of consistency, continuity and certainty in the natural process and social process."[3] In short, order

3 "Order" has drawn the researcher's attention since early time, and its specific meaning varied because of the different perspectives of the researchers. To this day, there is still no complete and accurate expression of its meaning. According to Commons, order is "the operating rule of collective action (one of its special examples is 'legal

is the state of association between things. Aristotle wrote in *Metaphysics*, "All things, including fishes, birds and plants, are ordered together in some way, but not in the same way; and the system is not such that there is no relation between one thing and another; there is a definite connection. Everything is ordered together to one end" (Barnard 1972, p. 2). To put it in the abstract, social order indicates that there is a certain degree of stability, continuity of process, regularity of behavior and security of property and psychology in society (Zhang Wenxian 2011). As Maslow points out, "we may generalize and say that the average adult in our society generally prefers a safe, orderly, predictable, organized world, which he can count, on, and in which unexpected, unmanageable or other dangerous things do not happen" (Bodenheimer 2004, p. 239).

Order is a kind of glue to human society, the existence of order and its realization is an important measure to the degree of social civilization. Throughout the process of the development of human civilization, the construction and pursuit of order is the main line. Order is the key word of

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procedure')," "collective action controls individual action," "Sometimes an order seems to be compared to a building, a structure of laws and regulations, in which a person acts like a resident in a house. Sometimes it seems to imply the 'action' of the resident himself. Such operating institutions have operational rules that keep them running; Such organizations from families, firms, trade union and the country itself, are called 'order,'" "they point out what an individual can or cannot do, must or must not do. Dos and don'ts can be achieved by collective action." Hayek believes order to be "A state of affairs in which a multiplicity of elements of various kinds are so related to each other that we may learn from our acquaintance with some spatial or temporal part of the whole to form correct expectations concerning the rest, or at least expectations which have a good chance of proving correct." North defines order as "institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction. In consequence, they structure incentives in human exchange, whether politically, socially or economically." Formal rules, informal rules, and the forms and effectiveness of implementation constitute the three dimensions of order. In philosophy, order is a systematic category, which refers to a regular relationship, in which things exist. In a system, each element of the composing system has its own different existence and operation characteristics. If the relationship between features always shows a constant degree of rule or coordination, that is, the synergy of the system, we say that the system or thing is ordered.

civilization.[4] Order functioned as value guidance and civilization ruler (Feng Fanyan 2016), order is the "Big Dipper" of human society, which guides, but does not explicitly interfere with human society, nor does it make clear provisions on the basic structure of human society. It only delineates a possible space for human society, within which human beings can operate only. In ancient society, witchcraft and religion dominated the whole society, thus mental structure of mankind developed with the reverence to the gods and non-competition that made people pay more attention to divine value in the pursuit of value, which was also an important factor to explain why ancient civilization was still full of divinity and enchantment, despite its material scarcity. After the "disenchantment" of modern society, production and competition have become the core of human life, and the pursuit of interests has become the basic logic. That the indevout and competitive mental structure developed by human beings makes people pay more attention to practical value in the pursuit of value. In a sense, ancient civilization and modern civilization seem to be "lame" civilizations, and the biased pursuit to value is the root cause of the problem. In this sense, the order of value is a "barometer" of the social civilization.

In contrast to order, there is out of order or disorder. "When the state of disorder appears, the stability of the relationship disappears, thus the order of the structure is confused, in which the rules of the behavior and the continuity of the process are broken and the occasional and unpredictable factors constantly interfere with people's social life, therefore the trust between people reduces, leading to increasing insecurity. In order to protect the

4 Liu Zhongjing, a scholar, holds that civilization is the ability to produce the exportation of the surplus order. The primitive tribes were generally self-sufficient in order and entered civilization with the upgrade of the order productivity. The multinational system is the peak of the expansion of the spontaneous order, which corresponds to the time of Confucius and the modern West. The prosperity of civilization is the result of consuming the productive forces of order. If consumption exceeds production, it will decline right after flourish. Decline means that order is in deficit, and correspondingly the unified empire needs to import order from barbarian, while the former multinational system exports order to the barbarians. Barbarians who export order are usually not primitive tribes, but newcomers who have just entered civilization. There is surplus order that can be exported to the declining civilization, which on the surface delays the destruction of the latter, but this may waste its own opportunities and resources to create new civilization.

normal social order, human beings must take measures to eliminate disorder or prevent its occurrence. In a civilized society, law is the primary and often effective means of serving this end" (Zhang Wenxian 2011, pp. 260–261). But the legal adjustment often lags behind, which mainly manifests in the laggard formation of law, the legal norm and the adjustment mechanism.

Classification of order

There are various structures, arrangements and combinations in nature and human society, which form various orders, each of which has its own specific function and value that profoundly affects the life and production of human beings. Order is divided into (Wen Tingxiao & Liu Xuan 2013) natural order and artificial order,[5] real order and virtual order,[6] single order and multidimensional order,[7] simple order and mixed order,[8] explicit order

5 Natural order refers to the law of the universe, the world, all things in nature and the development of human society. It is the object of our cognition. Human beings learn knowledge through the understanding of natural order. Artificial order refers to various kinds of order established by human beings in order to meet certain specific needs, such as rules and regulations, behavior mode, customs and so on.

6 Physical order is a kind of structure formed by arranging the material world and the entity itself. Such as commodity display, book arrangement on the bookshelves, document arrangement, mail classification, etc. Virtual order, away from the physical world or the material world, refers to the conceptual order that exists in our minds, which are the classification system designed through the language and symbol system, such as rules and regulations, the behavior mode, the customs and so on.

7 Single order refers to one-dimensional order, which is formed from a certain characteristic of a thing and satisfies a particular need. For example, the arrangement of books according to the classification number on the bookshelf, and the arrangement of students' seats in class. All matter and entities can only be arranged and combined in a single order. Multi-dimensional order is an order formed from different characteristics of information to meet certain specific needs. For example, the information in the rational order can be arranged and combined in a limited and multidimensional way according to classification, subject, word sequence, time, regions and so on,; and the information in the digital order can be arranged and combined in an indefinite and multidimensional way according to the needs.

8 Simple order refers to the arrangement and combination of only one order at a time, such as a simple numerical or alphabetical order. The mixed order refers to the arrangement and combination of several kinds of order, such as the book classification number

and implicit order,[9] general order and specific order,[10] fixed order and variable order,[11] initial order and derivative order,[12] physical order, rational order and digital order.[13]

In different historical stages of human society, the requirement to order is different. The order model of farming society is a kind of natural order,

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is a mixed order composed of letters and numbers, and the classification system is a mixed order composed of essential characteristics and a series of auxiliary features. Sometimes a simple order cannot effectively distinguish things, and mixed order must be used to gradually cluster things.

9 An explicit order is an order that is visible and detectable. All kinds of order that we can use are explicit order. Implicit order refers to the latent, and hard-to-be-found order. Many natural implicit orders cannot be found and revealed because of the limitations of our understanding.

10 The general order refers to the order which can meet the common needs of everyone, such as the word arrangement in the knowledge organization, the natural number arrangement, and the order of common usage in life. The specific order refers to the order that meets a certain need, such as the arrangement of time, region, literary genre, which are in the knowledge organization.

11 Fixed order refers to an order that cannot be changed, altered, or reversed, and many natural, physical orders are fixed. Such as the movement of the universe, the order of time, and the trajectory of human life, etc. Variable order is an order that can be changed, altered and reversed. Many artificial and virtual orders are changeable, such as mechanical movement, movement of thinking, change of rules, change of system, etc.

12 The initial order is the original and natural order that comes along with things. For example, natural order and physical order are mostly initial order. Derivative order refers to the order derived from the initial order. For example, the rational order is derived from the natural order and the physical order, and the Chinese library classification is the order derived from the arrangement order of the knowledge carrier (books or literature entities).

13 The physical order refers to the order of the material world and things themselves, such as the sorting or arrangement of objects in the family life and work which satisfy their habits (the order of the study, the order of the kitchen, the order of the office, etc.). Rational order refers to the conceptual order that is artificial and reflects the physical order. It is the virtual presentation of the physical order in the human mind, the physical order described by language or symbol, and the derivative order of the physical order. Digital order refers to the disordered state of digital information, and also refers to the diversity, pluralism and multi-dimensional order of digital information, which can be arranged and combined freely according to the needs.

and the simplicity of farming civilization makes all human activities have high certainty that characterizes a kind of static feature, at which time the "natural order" also shows high certainty. After human beings entered the industrialized society, the degree of social complexity increased gradually, and the natural order became unable to adapt to the needs of human production and life. In the late twentieth century, human society began to step into the historical process of post-industrialization, which was accompanied by the rapid growth in the complexity and uncertainty of human society, which posed a challenge to the creation of order. It took only hundreds of years for the industrial society to rapidly promote the complexity of society, pushing society into a highly complex era. Nevertheless, the existing orders and rules faced the dilemma of failure. In the historical coordinates, we can clearly see that the development from farming society to the industrial society presents a complicated process that breaks the natural order of the farming society and puts forward the requirement of rebuilding the order. While in the digital society, with the exponential growth of social complexity, human beings need a new order under the condition of high complexity and uncertainty. A change is needed to build an order that can be adapted to highly complex and uncertain conditions. The historical process of the human development, since the time of separation from live the life of a savage and the era of chaos and ignorance, has evolved in an orderly manner along the spiral from low-level to advanced, from simple to complex, which reflects an inherent "progressive" order.

The creation of order is closely related to the awareness of rights. In the process of industrialization, citizens' awareness of rights is gradually awakened, and the demand for gains of property right and general human rights constantly strengthens the creation of order. The existence of a certain social order is a prerequisite for human activities. In a sense, the creation of rules is the premise of all social activities. When the rules of creation can sustain social development and effectively regulate human behavior, the order of creation of this society is good. Once the creation of rules is not sufficient to sustain social order or regulate human behavior, the creation of order would be seriously challenged. Post-industrialization presents the challenge to this creation of order, making it helpless in the face of the essential requirements of public life, and extremely rigid in the face of the rapidly changing society (Zhang Kangzhi & Zhang Qianyou 2010).

Order demand is the bottleneck demand of mankind

Order is the demand rooted in the heart of mankind. The social biological characteristics of human beings determine that the survival of human beings must process three basic demands, that is, the material goods to meet the biological instinct, the order of rules to maintain the social framework and the meaning construction to perceive the living value. Among them, the demand for the elements of social order is the main content of the whole demand of order. Practice has proved that because "disorder means the existence of fragmentation (or discontinuity) and irregularity, that is, lack of a pattern attainable by our knowledge – manifested in an unpredictable sudden change from one state of affairs to another" (Bodenheimer 2004), order becomes a necessity. The natural yearning for order of human makes people instinctively replace disorder with order; and the main forms of replacement include religious doctrines, moral norms and legal rules. Among them, the compulsion of legal rules is the most complete substitute for disorder and can satisfy the needs of human order. For example, as far as the order in the economic field is concerned, the economic law adjusts it at the macro level, and the contract law and the commercial law regulate the concrete transactions or the market subjects at the micro level; once order anomie occurs, the law is compulsory enough to ensure its continuity.

Order is the need for human beings to live together. Order is decided by various principles, rules and norms formed intentionally or unintentionally by human beings in the practice of production and life, and will change with the changes of various principles, rules and norms. "Therefore, the order of human society must be the historical order, that is, the order in the process of construction, maintenance, deconstruction and reconstruction" (Zhang Shuguang, et al. 2016, p. 130). The pursuit of good order by human beings is the pursuit of "good" way of human life. Human beings seek order "not for the sake of order itself, but for their smooth and peaceful survival and development. Order is only a benign state of orderliness, coordination and sustainability manifested by people's normal living and development, and thus is the embodiment of people's values of living 'a good life.' So, Human beings regard order as an important goal for pursuit and as a standard of conduct for individuals and their mutual relations" (Zhang Shuguang, et al. 2016).

Human demand for order constitutes the basic settings in which the law can be established and operated.

The demand for order is the internal motivation for human development. In a civilized society, law is the first and most effective means to eliminate or prevent disorder (Zhang Wenxian 2011). In the current legislative system of China, big data is in the gray zone of law and supervision, and there are more and more disputes and cases concerning data. These problems stem from the weakness of the legal theory on data rights, especially the lack of dynamic interpretation of the background, the systematic construction of the theoretical system, and the legislative regulation on the order of protection of data rights. Especially with the development of science and technology, the law of data rights protection in our country increasingly shows lagging behind, imperfect and incomplete, so there are difficulties in solving the state of disorder accordingly. Nowadays, the basic problem of food and clothing has been solved. The material and cultural needs are no longer urgent things to meet, but the need for a better life must be satisfied after the demand for order have been basically satisfied. Therefore, the demand for order is the bottleneck one, which is the most urgent demand.

Order Internet and Internet governance

The Internet breaks the limitation of time and space. Virtual space becomes the new space and new field of human life. The boundary between the virtuality and reality is becoming obscured, so does the boundary between data and matter. The virtual world is a unique "living world," its meaning and order are produced in the relatively independent process, and it constitutes a complete human society together with the real society. The Internet has created a new living space–virtual space, on the basis of which "virtuality" has become a new way of human practice, and virtual order is such a way to measure whether the practice is in order or not.

If the Internet is a highway heading to the future, big data is like a car driving on it, while blockchains are the rules and regulations that allow the cars to run legally and orderly on the highway. The Internet has brought us an irregular, insecure and unstable world, while the application of blockchain technology has made the world more orderly, safer and more stable. With

the support and promotion of blockchains, the development of Internet will complete the evolution from the information Internet to value Internet and then to order Internet. Human beings will enter the stage of order Internet. Whatever orders they are, like the financial order, the social order, and the order of people's life, the formation of these orders requires further clarification of data rights on the basis of trust and regulation. If we take it that the information Internet solves the problem of unboundedness, the value Internet solves the problem of invaluableness, then the order Internet solves the problem of data disorder.

Information Internet. Chaos theory holds that "the original state of all things is a pile of seemingly unrelated fragments, but when this state of chaos is over, these inorganic fragments will be organically aggregated into a whole." In the age of the information Internet, massive fragmental information throws the Internet into a state of chaos. In particular, a series of problems, such as invalid information, information overflow and information distortion, which results from obtaining the information freely, would affect people's access to value information, and increasing the difficulty of information analysis and prediction.

Cyberspace order is the projection, reconstruction and transcendence of the synchronic social order in real social space. As an independent social system, cyberspace has the function of regulating the order itself, but it often fails. Since cyberspace has the features of no center, no boundaries, dispersion, virtuality and high changes, it makes the direction of cyberspace target unclear and alters with the change of time and space. An order pointing to freedom is not necessarily the home of freedom, but alienated into the shackles of freedom (Zheng Yefu 2001). This results in the differences of order governance of cyberspace from the real society. At present, the measures taken by governments to control cyberspace in real space have proved to be ineffective. To some extent, the special order of information Internet has already been in a state of disorder in essence, which adds to the public risk of Internet space.

Value Internet. Blockchain is not only an integration technology, a data revolution, an order reconstruction, but a watershed of time. Blockchain has the ability of transferring trust and value, reconstructing value system and rules of order, and is the cornerstone of constructing value Internet. The White Paper Realizing the Potential of Blockchain issued by the World

Economic Forum points out that blockchain technology can generate unprecedented opportunities to create and trade value in society which will lead to a generational shift in the Internet's evolution, from an information Internet to a new generation value Internet. From the perspective of social thoughts trends, the sharing development of value Internet is obviously influenced by *Out of Control*, written by famous sociologist, Kevin Kelly. In his book, Kevin Kelly summarizes evolution in industrial society as evolution based on machine logic, and evolution in information society as evolution based on logic of Bios. Evolution theory based on logic of Bios can be summed up into three words: distribution, decentralization, self-organization. And blockchain is such a true sharing. Sharing is the amplifier of network value and the embodiment of the ultimate value of Internet.

The order Internet. The contractual spirit based on trust is the foundation of order Internet; and trust is the cornerstone and lubricant of network society for the proper operation. Logically, trust and social order can form four types of relations, the fourth type "trust but no order" does not exist in reality; the third type "no trust, no order" means the disorder of social life; the second type "order of trust" is expected to help build a free and prosperous society; the first type is the order in which freedom and prosperous society are sacrificed in the pursuit of order (Zheng Yefu 2001). The blockchain established a low-cost credit mechanism based on technical regulation to realize the reconstruction of order from system to technology. A centralized order does not require a high degree of trust, but a distributed order requires a high degree of trust. Trust is the most important social capital that is a long-term accumulation of ideas, rules, laws, governance, etc. Blockchain helps to build non-personal trust and provide a possibility to evolve a new digital economy and network order. However, trust is not a substitute for supervision. The development of the Internet needs: first, the boundary regulation. The Internet is not an extra-legal space to do whatever a person wants. The healthy development of the Internet requires an orderly market and explicit rules of competition. The freedom of competition and innovation must be bounded by not infringing upon the legitimate rights and interests of others. Second, security regulation. By virtue of its characteristics of decentralization, openness, autonomy, non-tampering with information, and anonymity, the blockchain can solve the network security problems at the technical level, improving the security of network operation. However, it is

far from enough to rely on the technical regulation alone. Construction of a completely credible network environment requires design at the institutional level, especially at the legal level. Third, protection regulation. We must adopt effective technical measures and institutional procedures to re-examine the rules and order on personal data protection, formulate strict personal data protection laws and regulations and supervision system of big data safety.

Information Internet shows people the advantage of the Internet for facilitating communication and reducing information asymmetry; value Internet shows people the potential of blockchain in adding value to material, service and capital, and reconstruct social value system. Order Internet shows people the prospect of innovating social organization, governance system and operation rules by means of technology such as blockchain. Sovereignty and security is the advanced stage of the evolution of Internet from information Internet, to value Internet to order Internet, which is the bottom line to ensure the realization of order Internet. The essence of the order Internet is to maintain the national network security, deal with various non-traditional security threats, and effectively realize the protection for more complex and sensitive data based on national sovereignty and security. Sovereignty is the core and the commanding point of data rights. Only when the data rights are clarified can the data sovereignty really be realized. Therefore, at the time of emphasizing the data sovereignty, better protection of individual data rights of citizens, including data personality rights, data property rights and so on, is the milestone of the arrival of order Internet era (see Figure 2).

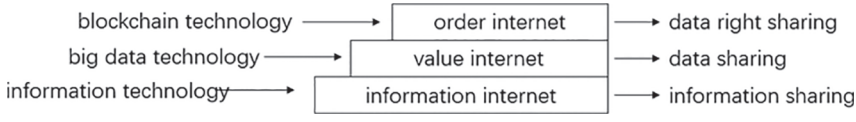

Figure 2. Gradient Leap Model of Information Internet, Value Internet and Order Internet.

Data rights and digital order

Laozi said, "Man follows the earth, the earth follows heaven, heaven follows the way, and the way follows nature." The Stoic School of Greece also put forward the ethical thought of "living according to nature." It can be

seen that human beings have their common ideas and rules, and the future development of human beings will depend, to a great extent, on the creation and convergence of the rules of order of mankind. "Nothing can be accomplished without norms or standards." Mencius said this more than 2,000 years ago, which later became a well-known maxim in China. This shows that Chinese people have long realized that the rules, norms and laws that have been established intentionally or unintentionally in the process of production, life, and survival are of decisive significance to the formation and maintenance of social order.

Order: The foundation of human beings' common life

Order is the premise of human existence and social development, and the respect of highly regularized behavior can provide order and stability for social life. "History shows that wherever human beings have established political or social organizational units, they have tried to prevent uncontrolled chaos and to establish a form of order suitable for survival. This tendency to establish an orderly model of social life is by no means an arbitrary effort or effort 'against nature' made by human beings" (Bodenheimer 2004, p. 228). Human's need for order is deeply rooted in the entire natural and social structure; and human common life is an important part of this structure. Hayek believes that there is a made order and a grown order in society:

> The made order which we have already referred to as an exogenous order or an arrangement may again be described as a construction, an artificial order or, especially where we have to deal with a directed social order, as an organization. The grown order, on the other hand, which we have referred to as a self-generating or endogenous order, is in English most conveniently described as a spontaneous order. (von Hayek 2003, p. 37)

The formation and development of the digital spatial order also exist in, as Hayek calls, the made order and the grown order: "it is just like the free market, the 'invisible hand', as Adam Smith says, is the so-called spontaneous order; and the government interferes with the 'visible hand', that is artificial order" (Que Tianshu 2014). However, the digital age has a high degree of uncertainty." For every moment of the day there is a thrilling modern drama,

and the network order is always under threat and destruction from people, consciously or unintentionally" (Wei Guangfeng 2000), which results in the failure, invalidity and disorder of the spontaneous order of the digital space, while as a remedy for spontaneous order failure, the subsequent order has not been constructed or relatively chaotic.

The different stages of the development of human society accordingly need to construct the appropriate order. In *Power of the New Digital Order*, David Weinberger creatively puts forward three levels of order. He holds that the order of the first level is the physical order – our conventional order, that is, the arrangement of the material world and the things themselves. The second level is rational order, which is based on the order or classification system that we designed in advance, and then the information about things is put into corresponding and fixed positions according to order or classification system. This is an artificial, and virtual order, in which we extract information about the physical world and things themselves according to the need and the pre-designed classification system to arrange and combine in some way. We realize the order of the first level through the order of the second level, and effectively link the two kinds of order together. The third level is digital order, which is a kind of chaos, that is, disorder. Without pre-designed order, beyond the limits of the classification system, it just makes use of rearrangement and combination data to create a particular new order that meets individual needs (Weinberger 2017, p. 4).

Data rights: The core of human common life

The establishment of order is based on data rights. Data empowerment promotes order transformation. Furthermore, the complexity of data empowerment makes order transformation more complex. From data to data rights, this is the inevitable outcome of the digital civilization. The data rights are the greatest realization of value on common divisor of sharing data, including the data right centered on individuals and the data sovereignty centered on countries. We are entering a fresh "era of the right to use" that based on shared concepts. Kevin Kelly, a Silicon Valley thinker, proposed with clarity, "I can pay for them (goods or services), but I won't possess them ... To a certain extent, the right to use became ownership" (Kelly 2012, p. 111). The

same is true to the data, but the limitless use or disposal of data rights will destroy the orderly common life of mankind.

Data rights are the source of internal vitality of digital order. In ancient times, individual interests were always the object of exploitation and suppression, and the small-scale peasant economy could not produce the order concept of "comprehensive and free development of human beings." In modern times, people began to liberate themselves from backward traditional concepts and rigid dogmatic shackles that negate individual interests. From the perspective of system theory, if the elements of the system, that is, individual thinking, are not active, then the overall consciousness and spiritual vitality of the system will gradually decline. In the two ways in which law regulates social relations (rights and obligations), rights are the corroboration of individual initiative and creativity. Therefore, the life of order comes from rights. Take the phenomenon of queuing to buy tickets as an example, there are about three types: first, the police use sticks to maintain the queuing order. Although the order is good, the personality and dignity of the queuers are beaten away by sticks along with the queue jumpers. Second, an atmosphere and strength between the queuers to reject the jumpers are formed. Not only is the order good, but the queues are all proud. Third, the order is chaotic. Everyone is fighting for strength. Women, the elderly and the weak curse and sigh. There is no doubt that the second type of order is the most ideal one, and its formation is precisely due to the extension of rights and the emergence of a concerted force (Xie Pengcheng 1992). Although this is the daily order in the ethical category, it contains the laws and rules of social governance, in which the claim of rights can lead to order. In the digital age, the data subject's concern to the data interests is the eternal theme, so the right to advocate and protect the interests is the source of the digital order's inexhaustible strength.

The rivalry between data rights and digital order. First, the ambiguity of rights versus the certainty of order. The significance of order lies in the elimination of uncertainty, which indicates the realistic data order is identical to actual data order. It is just because the ambiguity of the data rights is in opposition to the certainty of the digital order that it is necessary to legislate on the data rights. Second, the conflict of rights versus the consistency of order. The diversity and conflict of interests determine the diversity and conflict of rights, which are the potential factors to destroy order. If

the conflict between rights surpasses the consistency of rights, order will disappear. The higher the human civilization is, the higher the demand for consistency between rights will be. This consistency in the age of agricultural civilization is only the right to survival, and this consistency in the era of industrial civilization extends to the right to freedom, property rights and other areas. In the age of digital civilization, it is difficult to construct and maintain the digital order if the consistency of data rights required by the times cannot be maintained. Third, the imbalance of rights versus the balance of order. The imbalance of data rights is inevitable in the common life of human beings, and the digital order is essentially the sign that the imbalance can be maintained. Order maintains imbalanced content (that is, the data rights) in the form of balance. If there is no balance, there would have no order, and it is difficult to maintain unbalanced data interests.

Sharing: The future of human common life

Remixing is an inevitable trend. As mentioned earlier, it is the rearrangement and reuse of existing things, which is the integration of internal and external resources to create new value. Remixing has caused unprecedented "destruction" to the traditional concept of property and ownership. In the age of remixing, big computing, big data and big intelligence become the "digital organ" for human understanding of the complex world. The ideological trend of granting rights to data is more active than ever. The real-time flow of data and the sharing of data constitute a digital ecological circle, in which data force and data relation affect social relations. As a result of the mutual influence of this force, the whole social relations of production are branded with the data relations, which will lead to the unprecedented transformation and reconstruction of the social development model, the pattern of benefit distribution and the mode of maintenance of order. The claim of data rights makes the data in chaotic state clear gradually; and it is in here the significance of data rights.

The reconstruction of value and order, as an inevitable requirement of social development, are vital to the establishment of civilized rules and codes of conduct in all society, as well as to the expansion and promotion of the moral and spiritual world, featuring the dual property of "humanity value"

and "social rule." "Every new order sums up all the original ones, and nothing is omitted. However, the new order has been created, and the behavioral patterns brought about by the new phenomena need to be understood and explained at a new level" (Russell 2004). At present, we are in the midst of an unprecedented era of great change and great transformation. This time, the order transition is like a storm, cleaning up all the old ecology, forming a subversive change to the social existence and development. The claim of data rights is not only the result of the transition of civilization, but a new order for the transformation of human beings from industrial civilization to digital civilization.

Data is a kind of shared resource, and the essence of data rights is sharing right. Following the agricultural and industrial civilization, data right has drove human beings to construct a new form of order – digital order, a new civilized form – digital civilization. Digital order is a shared order, and digital civilization is a shared civilization. Shared civilization has three basic properties: first, shared civilization is a new form rising in the development of human society in the twenty-first century; second, shared civilization is the most dynamic and creative civilization; third, shared civilization is a state of modern social civilization, which takes informationization, intellectualization and digitalization as important symbols, with intelligent large-scale production as the dominant mode of production. Human civilization is essentially a process of integration and development, which is possible to build consensus in the process of integration and to find common values from value collisions. The twenty-first century will be the century of shared civilization, and the trend of sharing is the shared future of the development of human civilization.

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CHAPTER 2

Human Rights, Real Rights and Data Rights

Humans and Human Rights

Humans are experiencing a "triple transition" from resource economy to digital economy, from centralized governance to multi-governance, and from industrial civilization to digital civilization. The dramatic change gave birth to the system of data rights, which implies the reconstruction of the system of rights and interests. Data rights are the basic human rights we enjoy in digital civilization, which guarantee the basic rights of humans in the digital world while improving the value of data. In addition to the traditional resources such as land, capital and energy, data has become a new type of resources, a new technology, and represent a new system and a new right. Data rights are different from human rights and real rights. The differences between the subjects, objects, and content of the rights determine that the content of data rights cannot be regulated simply by real rights. The proposal of data rights is not only the improvement of human rights, but also the development of real rights. It will be the most important right and order in future digital civilization.

Human rights are the product of the long-term development of humans, and they stem from the nature, personality, dignity and value of human beings. The development of human rights is a gradual process, and human right is an open and evolving concept, so any rigid or fossilized understanding of human rights can lead to the stagnation of human rights development. In the era of big data, everything is "online" and can be quantified, and all humans, machines and things exist as a kind of "data person." The proposal of "data person" provides a new legal approach for the diversification and universal development of human rights, but it also brings about new problems and challenges for human rights protection.

The philosophical foundation of human rights

Human right has become a widely used term which draws widespread concerns all over the world. Human rights are the rights that people enjoy in order to meet their survival and developmental needs. Human rights are of universality, and all human beings are entitled to human rights.[1] As one of the major achievements of modern and contemporary philosophy, the concept of human rights has gone through thousands of years from the emergence of this idea to the formation of the concept. It can be said that the history of human civilization is the history of human rights development. Human rights can be traced back to the political and legal thoughts in ancient Greece and ancient Rome, and the development of the Renaissance, the Reformation, the natural law theory and the bourgeois revolution. Among them, such five basic theories as theory of natural rights, theory of legal rights, theory of social rights, theory of human nature, and theory of moral rights constitute the philosophical basis of human rights.

Theory of natural rights

The theory of natural rights is a transcendental presumption of human rights which is developed from the French *Declaration of the Rights of Man and of the Citizen*, and it is a classic theory on the source of human rights.[2] It is dominant among the five theories and has a wide influence. The theory of natural law came into being in the declining period of the ancient Greek

1 Article 2 of the *Universal Declaration of Human Rights* provides that "Everyone is entitled to all the rights and freedoms set forth in this Declaration, without distinction of any kind, such as race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status."

2 Transcendentalism is a philosophical trend of thought. It believes that the ideas and concepts formed by human mind have the nature of autonomy, and denies that these ideas and concepts are only the reflection of humans' changing and developing experience. It empowers the intelligence of humans with great power and strength, and holds that experience is formed by the concepts which are built or produced by humans' thoughts to a great degree. Its extreme manifestation is regarding human thought as the only underpinning of the universe.

city-state, and it gradually developed into the modern theory of natural rights through the inheritance and development during the Renaissance and Reformation. Grotius, Hobbes, Locke and Rousseau have made great contribution to it, and Locke had the greatest impact on future generations. In his famous *Two Treatises of Government*,[3] Locke pointed out that before human beings entered civilized society, they lived in a state of nature and were bound by natural laws, which showed human reason. Natural laws endow people with universal natural rights, namely, "the rights endowed by the creator," including personal right, property right, right to equality, right to freedom, right to self-defense, right to self-jurisdiction and so on (Bai 2015, p. 6).

People have the rights to act and dispose their own bodies and properties according to their own free will, and no one needs to take the orders of others. However, this state of nature has a great defect that the natural rights enjoyed by people are not guaranteed and they are often in fear and danger. In order to get rid of the state of nature, humans establish political societies by entering into contracts to make the society act as an arbitrator and use laws to deal with disputes and punish crimes. As a result, states, governments and laws came into being (Bai 2015, p. 6). The aim and purpose of states are to guarantee citizens' rights to life, security, freedom, equality, properties and pursuit of happiness. These rights of citizens are not gifts from the world, but natural rights that citizens enjoy, namely, the inherent rights of humans. Locke also proposed a series of principles for human rights protection, such as the principles of popular sovereignty, rule of law, and separation of powers. He also analyzed and verified the state of nature, natural laws and natural rights so that the development of natural laws and natural rights reached a

3 After the "Glorious Revolution" in England in 1688, Locke published the famous *Two Treatises of Government*. *Two Treatises of Government* mainly refutes the Hobbes and Filmer's theory of absolute despotism. It argues that humans' natural rights to freedom and property are not deprived during the change from a state of nature to society; countries are built on people's mutual contracts, so people themselves must obey the administration of countries; the power of the citizens' rulers is not absolute, but conditional. If the rulers lose their moral credibility, people have the right to overthrow them and re-establish a new government that abides by the contract.

peak and these theories also became the main source of thoughts for some declarations of rights and constitutions.[4]

Theory of legal rights

In the history of Western human rights development, the opposite of the natural rights theory is the legal rights theory, which is also known as the theory of "rights endowed by laws" (Li B. 2004, p. 12). Replacing the theory of natural rights, the theory of legal rights had become the most important ideological basis of human rights theories since the nineteenth century until the end of the Second World War. Representatives of this theory include Bentham, Hart, Dicey, Mill, Austin, Raz, Kelsen, McCormick and so on. They belong to the school of prescriptivism of law in the history of jurisprudence. Theory of legal rights holds that formal or informal legal rules and regulations produce human rights, emphasizing that human rights are not innate, but endowed by law. It denies the ethicality of law and human rights, and believes that ethics are subjective. Everyone has his own views of ethics, so it is difficult to make objective and exact judgments. It also criticizes that "the state of nature" in which people enjoy "natural rights" is fictitious, and "natural laws" are mysterious and thus unscientific (Li B. 2004, p. 12). As Bentham believes, natural laws, the state of nature, original contract and other relative theories are based on "imagination" and "fictions," thus violating the historical realities and being "unauthentic."

In Bentham's view, natural rights do not exist; instead, all rights are endowed by law (Bai 2015, p. 7). Laws are the sum total of the sovereigns' orders or orders adopted by the sovereigns (Wang G. 2015, p. 42). "Rights are the products of laws and are only the products of laws. There is no right without laws" (Shen & Huang 1994, p. 122). When defining the duties and

4 For example, United States Declaration of Independence adopted in 1776 provides that, "We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable rights, that among these are life, liberty and the pursuit of happiness." *Declaration of the Rights of Man and of the Citizen* adopted in 1789 provides that, "The aim of all political association is the preservation of the natural and imprescriptible rights of man. These rights are liberty, property, security and resistance to oppression."

obligations of members of society, laws also endow people with corresponding rights. Based on the principle of utilitarianism, in Bentham's theory of legal rights, it is believed that human rights are driven by interests. In order to replace the human rights principles of "freedom, property, security and resistance to oppression" in the *Declaration of the Rights of Man and of the Citizen*, Bentham put forward the human rights principles of "security, survival, prosperity and equality" based on "legal rights." He believed that the aim of society is to promote the greatest happiness of the majority; and happiness includes security, survival, prosperity and equality. Therefore, the more completely the four goals are achieved, the faster the total amount of social happiness will increase (Bai 2015, p. 7).

Theory of social rights

Theory of social rights is another mainstream besides the theory of natural rights and the theory of legal rights. Its main representatives include the early socialist thinkers Saint-Simon, Fourier and Owen, legal sociology thinkers such as Marx and Weber, and scholars of school of sociological law such as Duguit and Pound (Wang G. 2015, p. 46). The main idea of the social rights theory is to regard law as a kind of social norm, which arises from specific social culture and social structure. According to theory of social rights, people are both "social animals" and "political animals" who can't live independently from the society, and they live in various social networks with various ties between them. Therefore, everyone's interests can be infringed by other people or social organizations; and everyone can infringe the interests of others or social organizations. In such cases, we need laws to address issues and make adjustments, so human rights came into being accordingly. The theory of social rights negates the rational core of the natural rights theory, and denies that people are "born equal and free" and that human rights are derived from "human nature" and "personality and dignity of humans" (Li B. 2004, p. 13).

After the Second World War, theory of social rights gained wide recognition and consensus all around the world. With the emergence of welfare states, the pursuit of social justice, the reaffirmation of human dignity, the challenge of social disruption, and governments' extensive intervention

in economic and social development, social right becomes an appropriate legal term that symbolizes the rightful claims of all people, especially the vulnerable groups (Wang G. 2015, p. 51). Social human rights are not a kind of charity or humanity, but a root-cause interpretation of the social structure of human rights. People are born with some human rights such as rights to life, security, liberty and equality, while some human rights such as the right to vote, the right to be elected and the right to strike are produced under certain historical conditions. The former human rights imply the ideal of human rights and the latter means the actuality of human rights. The ideal and actuality of human rights should be differentiated. Meanwhile, they should also be unified. According to the theory of social rights, human rights need to be adjusted with the changes in social culture and social structure. Social rights are the foundation for the strengthening of social solidarity and social harmony, and also the requirements of safeguarding people's social dignity. The legal order of human society is in constant development and change, so is the exploration of human rights. Law needs to be developed by using the research methods and research results of other disciplines for reference, so that the concept of human rights can be supplemented and improved constantly to conform to specific historical conditions and resolve the conflicts of interest in social fields.

Theory of human nature

The theory of human nature is another influential theory on the source of human rights. In recent years, a large number of scholars at home and abroad have conducted detailed research and demonstration on the theory of human nature, among whom is the Chinese scholar Li Buyun, one of the main representatives of this theory. Li believes that "human rights derive from the nature of human beings, and the nature includes two aspects, namely, the social attribute and the natural attribute of human beings." Social attribute means that people live in various social relationships, and the morality, thoughts, interests and behaviors of humans are influenced and constrained by the nature and characteristics of various social relationships. According to Marx, "Man is a Zoon politikon [political animal] in the most literal sense: he is not only a social animal, but an animal

that can be individualized only within society" (1975). Human right is a kind of social relationship, more specifically, the relationship of interests and morality between people. It's related to the distribution, pursuit and enjoyment of human interests which are supported and recognized by a set of ethical concepts centering on justice in social life (Li B. 2004, p. 14). The natural attribute of human beings is human nature, including such three basic elements as natural instincts, morality and rationality. Natural instincts include life, welfare and freedom and emphasize the protection of human lives from arbitrary deprivation, personal safety from injury, freedom from violation, and people's thoughts from being imprisoned, and also stress the guarantee of humans' basic living standards and their rights to pursue happiness. Morality mainly refers to equality, universal fraternity and justice, emphasizing that humans are advanced animals with ethical pursuits. Rationality includes rational cognitive ability, philosophy and reason, and it emphasizes that humans can understand the laws of everything and further transform the world by rationality. In short, the natural attribute of humans is the internal force of human rights, while the social attribute of humans is the external conditions for the birth of human rights and determines the historical nature of human rights (Bai 2015, pp. 7–8).

Theory of moral rights

"Human rights are generally regarded as moral rights" (Donnelly 2001, p. 13). Professor Shen Zongling believes that human rights are moral rights and obligations because they originally refer to certain values and moral concepts (Shen 1991, p. 22). In Professor Xia Yong's view, human society is a moral one and human beings are moral animals. Human right is the right that every human being should enjoy, and it is essentially neither natural right nor legal right, but moral right. Human rights fall into the moral system and are maintained by moral principles. There are three interrelated principles that play a key role in the formation of the ethics foundation of human rights: firstly, people shall and can enjoy the right that is independent from positive law and exceeds legal rights; secondly, this kind of right should be enjoyed by everyone in accordance with the rule that everyone is

equal and all humans are equal in dignity and values; thirdly, this right should and can show as a statutory right under a certain social system. These three principles constitute the core of human rights and build the framework of the principle of human rights (Xia 2001, p. 232).

The historical progress of the concept of human rights can be explained by its unique moral connotation: firstly, the concept of human rights shows great identity between human beings; secondly, the concept of human rights contains a profound critical spirit; thirdly, the concept of human rights turns humans' requirements for the identity of group and the critique of reality into the right that everyone shall claim by the means of institutionalized procedure, which indicates a new form of social integration (Xia 2001, pp. 222–223). As a moral right, human right is neither endowed by the state, government or law, nor granted by nature, but derived from the morality of human beings. "Humanity," as the basis of human rights, is only a moral assumption. As Maine proposed in the book *Ancient Law*, the concept of "natural law" implies that a moral world is added to the material world. The difference between human beings as a whole and the other categories is probably that human beings have a world of spirit, morality, ethics, consciousness and ideas besides the material world (Bai 2015, p. 8).

A further developed view takes conscience as the source of human rights. This view holds that human rights are based on the similarity of human beings and their compassion and love for each other. Compassion is one of the most primitive moral feelings. "Before human beings had clear moral norms or any concept of moral obligation, a feeling of compassion to others in the same group and family had grown and expanded in the primitive men. This feeling of compassion plays a role in maintaining the group, which is called social morality today" (He 2014). With compassion, people can understand and feel the pain of others and further hope to alleviate and eliminate it, while with love people can experience the happiness of others and further hope to strengthen the feeling (Zhang H. 1997). Based on the sense of identity among the same class or group, people establish the feeling of compassion and love for each other, and form some simple thoughts such as "to feel for others" and "one should not impose on others what he himself does not desire." Conscience, especially compassion, is the most ultimate source of human rights (Bai 2015, pp. 8–9).

Concept of human rights

In 1979, Professor Karel Vasak, a French human rights scholar and former UNESCO legal adviser, firstly proposed the "Three Generations of Human Rights"[5] (see Table 1) when delivering his inaugural speech at the 10th Conference of International Society for Human Rights Studies. According to Professor Vasak, the three great revolutions the world has experienced since modern times have produced three generations of human rights (Qi 2015, p. 64), namely the right to freedom of the first generation, social rights of the second generation, and collective human rights of the third generation. These three generations of human rights echoed the three slogans – "freedom," "equality" and "fraternity" – put forward in the French Revolution, and reflected humans' requirements on human rights at different times, so some scholars also call them "human rights in the first world," "human rights in the second world" and "human rights in the third world."

Table 1. Sketch of the Three Generations of Human Rights.

Development stages of human rights	Summary	Highlights
The first-generation human rights	Appearing in the 1789 French Revolution and focusing on the maintenance of individual freedom by law, it reflected the personal liberalism that prevailed in the seventeenth and eighteenth centuries, and laid the foundation for the arising of civil and political rights.	It stressed individual's opposition to state intervention and required the state carried out the duty of negative inaction. It was called "negative human rights," which included personal rights, property rights, etc.

(*Continued*)

5 The "Three Generations of Human Rights" have been reflected in and supported by three international documents on human rights: the 1966 International Covenant on Civil and Political Rights, the 1966 International Covenant on Economic, Social and Cultural Rights, and the 1986 Declaration on the Right to Development.

Table 1. (*Continued*)

The second-generation human rights	Emerging after the October Revolution in Russia in the early twentieth century, it focused on the requirement that the state shall build basic social and economic environments to promote the realization of individual liberty. It is mainly a reflection of socialism and the Western concept of "welfare state" since the nineteenth century. The content of human rights placed emphasis on economic, social and cultural rights.	It emphasized that the state had a positive obligation to the realization of human rights and was called "positive human rights," mainly including economic, social and cultural rights.
The third-generation human rights	It came into being with the liberation movement of the colonies and oppressed people in the 1950s and 1960s, and aimed to achieve the awakening and development of the country and the nation. It reflected the requirements of the post-war third-world countries for the redistribution of global resources and the response to major issues that threaten the survival of mankind.	It stressed the solidarity, and was called "solidarity right," which included such collective rights as right to self-determination, right to development, right to peace and right to a clean environment.

First-generation human rights

The first-generation human rights are usually called the "right to freedom." On the one hand, it took "freedom" as its main content, and "personal autonomy" as its fundamental purpose. On the other hand, its ideological basis was classical liberalism (Wang G. 2015, p. 121). The first-generation human rights were born in the 1789 French Revolution. Its concept

of human rights was mainly the continuation of the revolutionary claims of the human rights history and progress in the United States, Britain and France. Meanwhile, it combined the individualistic liberalistic philosophy and was inclined to the laissez-faire economic and social theory (Wang G. 2015, p. 123). From the perspective of ideological schools, the first-generation human rights mainly involved theory of inherent rights,[6] theory of natural human rights,[7] will theory of human rights,[8] motivated theory of human rights, interest theory of human rights[9] and religious theory of human rights.[10]

In terms of the social basis of its formation, the first-generation human rights are the result of various factors. It is a human rights theory formed in the confrontation with absolute states, aiming to oppose the state's improper interference with individual freedoms and rights in the name of political rights, and claiming that the state bears the obligation of negative inaction. Therefore, it is called "negative human rights." In other words, human

6 The theory of innate rights of man is an influential human rights theory claimed by many ideologists in the East and West since ancient times. It has been reflected in the legal documents such as *The Declaration of Independence* and *The Declaration of the Rights of Man and of the Citizen*.

7 The theory of natural human rights is also called the theory of natural rights or the theory of instinctive human rights. The theory holds that human right is the natural right of human beings and it is self-evident as a result of humans' instinct in the state of nature. The main representatives are Aristotle and Cicero.

8 Will theory of human rights is also called the human right with internal motivation. It advocates that humans have intrinsic value, that is to say, humans' personal dignity comes from their free will and reason. The representatives are Hegel, Fichte and so on.

9 Interest theory of human rights is also called the interest-driven theory of human rights. It is believed that human beings have rights because of their interests, and human rights are driven by interests. It is systematically elaborated in the theory of Bentham, the founder of utilitarian theory. However, the interest theory of human rights is opposed by those who hold will theory of human rights. One of them is Hegel, who did not agree to study the nature of rights from the perspective of human interests.

10 The religious theory of human rights has been the human rights theory of Christianity, Catholicism and other major religions since the Roman times. The religious theory of human rights basically believes that human beings have rights since they are children of God. Aurelius and Ratzinger are the main representatives of this theory.

rights are proposed only to maintain the most basic functioning of society. By advocating individual rights, the scope and procedures of government rights were limited. The main role of the state is to keep law and order and create a proper environment for free competition, and not to intervene in social and economic life. The saying that "government is best which governs least" is a vivid illustration of this theory.

The claims of the first-generation human rights mainly include the rights to life, personal liberty, freedom of religion, freedom of speech and the press, freedom of assembly and association, freedom of movement and residence, freedom from arbitrary detention, freedom of communications, and political rights such as the right to vote, and it especially stressed that the property rights shall not be violated (Wang G. 2015, p. 123). The first-generation human rights focused on guaranteeing individual freedom by law, which reflected the individual liberalism prevailing in the seventeenth and eighteenth centuries and laid the foundation for the emergence of civil and political rights (Qi 2015, p. 64). However, the negative view of rights has changed with the historical development, especially with the increasing influence of capitalism on individuals and society, and the dramatic changes of functions of the government and the expectations of people on the government. Thereby, the modern concept of human rights has got new connotation and meaning (Wang G. 2015, p. 123).

Second-generation human rights

Second-generation human rights were born after the October Revolution in Russian the early twentieth century and was usually called "social rights."[11] Social rights meant that people's rights in social or economic life were guaranteed by the active intervention of the state with the economy and society (Xu C. 2009, p. 196). Social rights, as the second-generation human rights,

11 The October Revolution in Russia was a great socialist revolution carried out by the Russian working class under the leadership of the Bolshevik Party allied with low-income peasants. The victory of the October Revolution created a new era in human history and laid a foundation for the victory of the proletarian revolutions in the world and the national liberation movements in the colonies and semi-colonies.

originated from the revision of capitalism made by socialism. After over 200 years' evolvement of the first-generation rights to liberty, capitalism swept across the world, taking advantage of the industrial revolution and changed the civilization and lifestyle of humans in the second half of the nineteenth century, especially in the late nineteenth and early twentieth centuries. With the flourishing of capitalism and the continuous development of monopoly enterprises, the shortcomings of capitalism such as poverty, unemployment, food crisis and inflation appeared, laying the society under enormous shadow. Property right and freedom of contract, which were the basis of law of capitalist society and the foundations of all property rights and liberty of contract built up on status liberties, were overwhelmingly beneficial to the bourgeoisies and completely disadvantageous to the proletarians (Wang G. 2015, p. 124).

In this case, all rights and freedom may become illusions with no real significance. Poverty and unemployment were not caused by the laziness of the individual, but the structure of capitalist economy and society. Poverty and unemployment problems can only be solved by the society or even the state (Oosuka 2000, pp. 12–13). As a result, a socialist trend of thinking to correct the shortcomings of capitalism and fight injustice emerged at a historic moment. In terms of rights, this trend of thought required the state to intervene in the activities of capitalists and to protect and improve the lives of workers in order to ensure the fairness in production and distribution (Wang G. 2015, p. 124).

The second-generation human rights focused on the requirement that the state should build an appropriate social and economic environment to promote the realization of individual freedom, and its purpose was to stress that the state should have an active obligation to the realization of human rights, so it was called "positive human rights" (Qi 2015, p. 64). The second-generation human rights centered on social rights such as labor rights and the right to life and were characterized by turning from the pursuit of individual rights to claiming for collective rights and the rights for certain classes. In the aspect of its content, it focused more on economic, social and cultural rights. Besides the rights claimed by first-generation human rights, it further proposed the rights to work, rest, healthcare, education, maintaining a moderate living standard, and laborers solidarity (Wang G. 2015, p. 124).

Third-generation human rights

Third-generation human rights, habitually known as "rights of solidarity," emerged with the liberation movements of the colonies and oppressed people in the 1950s and 1960s. It becomes the main feature of contemporary human rights with the focus on self-determination and development of countries and nations, reflecting the requirements of the third-world countries to reallocate global resources in post-war period, as well as the choices in the face of major problems that endanger human survival (Qi 2015, p. 64). Third-generation human rights explored the collective "rights of solidarity" concerning human conditions, mainly including rights to peace, development, environment, national self-determination and human common heritage. Those human rights are seen as collective human rights because they can be realized "only through the joint efforts of all participants in society, including individuals, countries, public institutions and private sectors and the entire international community" (Wang G. 2010, p. 89).

Third-generation human rights are vastly different from the first and second generations in terms of subject range. If the first and second generations are domestic demands for rights based on the relationship between individuals and the state, as well as groups and the state within a country, the third-generation human rights showed a major change in the direction of right demands. It is no longer the request from individuals to the state but from one nation to another, one country to another, or even one country to all other countries or the international community (Wang G. 2015, p. 131). The third-generation human rights focused on solidarity, and can be called "solidarity rights" with collective nature. It transcends the former concept of "personal human rights," and is known as a collective and even social justice. Third-generation human rights mainly include critical multicultural view of human rights,[12] Asian values of human rights,[13] Confucianism view of

12 The critical multicultural view of human rights was formed on the basis of the concept of "multiculturalism" that emerged in the 1970s, focusing on the use of cultural resources in human rights research, the value premise of human rights, the substantive and procedural foundations of human rights, etc. The representatives include Suppio, Habermas, Yasuaki Oonuma, and Shikihara.

13 The Asian Values of Human Rights emphasizes the significance of the human rights value of traditional Asian culture to the development of human rights. It is based on

human rights,[14] liberalistic view of human rights,[15] collectivist view of human rights,[16] absolutism of human rights,[17] relativism of human rights,[18] etc.

In addition, third-generation human rights also stressed the possible different connotation of human rights in various traditional cultures. For example, in the 1980s, Lee Kuan Yew and Mahathir advocated the human rights views of "Asian value," that is, non-Western views on human rights. At the same time, it also emphasized that under different social and economic conditions, the concept of human rights has different focuses. It is generally believed that in third-world countries, development is the essential basis of various human rights. Although at the theoretical level, civil political rights and economic and social rights are of equal importance, but at the practical level, restricted by the limited resources, medical backwardness, unavailable education and the historical factors of colonial exploitation, these countries can only prioritize people's economic and social rights over their political rights. For those who cannot meet basic living requirements, whatever political rights they had, those rights would be useless (Wang G. 2015, p. 131).

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the reflection of Western culture's monopoly on the right to speak in the field of human rights and attempts to find explanations from traditional Asian culture. Representatives include Singapore's Lee Kuan Yew, Malaysia's Mahathir, South Korea's Cui Zhongku, Japan's Kochu Nobuo, Nobuyuki Yasuda, and Keifu Suzuki.

14 Confucian view of human rights is a human rights theory based on traditional Confucian philosophy and morality. Representatives include Chinese scholars Cheng Zhongying and Du Gangjian.

15 The liberalistic view of human rights is based on individual rights, and its representatives include Rawls, Dworkin, and Nosyk.

16 The collectivist view of human rights is contrary to the liberalistic view of human rights. It pays attention to the collective nature of human rights. It believes that the collective nature of human rights is more important than individuality. Its representatives include McIntyre, Walsh, Ethioni, Zernike, Granton, Bailey, etc.

17 The absolutism of human rights advocates that human rights are innate, natural, untransferable, unconditional and unchanging. Representatives include Breck, Douglas, McClelling, Rostow, Black and so on.

18 The relativity of human rights holds that human rights are social, moral, transferable, conditional and variable. Representatives include Brandeis, Dewey and Hook, Bodenheimer and Schwarz.

Human rights development

"At a certain stage of the human thought development, there must be a basic element to serve as the material for ideological fission and fusion. Human rights are the basic elements for the expansion and promotion of human thoughts in modern times" (Qi 2015, p. 160). The concept system, social customs and standardized system reflected by this element have reshaped the spiritual home for mankind, constructed the social existence of mankind and adjusted the dynamic mechanism and fundamental direction of human civilization. From the perspective of long-span time and space, the development of human rights is a gradual process. A rigid and closed understanding of human rights can lead to the stagnation of human rights development, for human rights are an open and evolving concept. On the contrary, it is scientific and feasible to face and treat the development and evolution of human rights with an inclusive, open-minded perspective.

Limitation of human rights

The three generations of human rights have been iteratively replaced along the historical themes of a particular era. They have established three milestones of rights concept in the history of human civilization, which are "freedom," "equality" and "development." During the development of human rights concept and system, great progress has been made in human freedom and dignity, as well as in human material and spiritual civilization. However, the three generations of human rights have common historical and epochal limitations. The first one is one-sidedness. The three generations of human rights are determined by the specific historical background, mission, and structure of the human rights movements. Requirements and priorities change in different periods; and different countries have different focuses, but the overall situation is always neglected. Secondly, they are of restorative nature. In terms of the origin of rights, the traditional argument for the theory of human rights mainly follows the logic that "rights are inherent but requiring revival." Finally, they are confrontational. In the theoretical argumentation, the three generations are based on the confrontation between people and the state, as well as the society. The right of freedom is generated between

the oppressor and the oppressed, the right to life between the socially strong and vulnerable groups, and the right to development between the oppressed nations and the colonizers, and the less developed countries and the developed countries. In practice, the three generations of human rights also paved their way in the struggle. Briefly, "the three generations focus on part of, not the whole humankind; on the revision, not the innovation; on the conflict, not the harmony" (Xu X. 2006).

The victory of human rights

As a combination of theory, system and practice (Qi 2002), human rights have experienced a process from birth, alienation to reversion. The history, culture and other environments which are closely related to human rights are diverse, and the concept of human rights itself is often variable because the values and academic positions are different. Therefore, the theory and practice of human rights are extremely complicated (Zhao 2008). The simplest way to perceive human rights is to analyze and observe it from three aspects: thought, norms and practice. The human rights as a thought centers on providing a series of principles for the establishment of human rights, such as the reason for human equality (natural rights), the relationship between people and government (limited government), the boundary of rights between society and individuals (the principle of liberty), the way humans prevent misgovernment (the separation of power), the purpose of economy (survivalism), modern state functions (social security), and so on (Xu X. 2000). Human rights as norms refer to human rights norms that have been transformed from human rights as thoughts through the design of legislators.[19] Human rights as a practice refer to the state in which human rights as thought and human rights as static systems are enjoyed and exercised by people in real life. From the historical perspective, human rights have achieved great success in the three aspects of thought, norms and practice,

19 Functionally, the norms of human rights include the declarations of human rights and the relief of human rights.

and the protection of human rights has been widely recognized and valued by the whole world (see Table 2).

Table 2. Some Human Rights Protection Mechanisms.

Time	Name	Main content	significance
1215	*Magna Carta*	It guaranteed the freedom of the church to elect faculty members; protected the inheritance rights of the nobility and knights that the king shall not illegally levy a territorial inheritance tax; without the consent of the "kingdom council" composed of nobility, priests and knights, the king might not levy or grant subsidies and shield costs to the immediate vassals; canceled the king's right to interfere in the judicial judgment of the feudal court; without the judgment of the nobility in the same rank, the king shall not arbitrarily arrest or imprison any free person or confiscate his properties.	Marking the beginning of the institution-alization of human rights
1628	*Petition of Right*	The king was required not to collect debts or taxes from the people without the consent of the Congress; shall arrest people or deprive them of their properties only in accordance with national laws or court decisions; shall not arrest citizens at will according to the martial law; shall not forcibly occupy civilian housing for station troops.	Consolidating the foundation of human rights institutionalization
1679	*Habeas Corpus*	The detained person should be sent to the court to determine whether his or her detention is legal; any person who is detained may challenge the court's legality by himself or others and obtain a ruling in a short time.	
1689	*English Bill of Rights*	It restricted the king's power, restrained the king's actual ruling, and guaranteed the parliament's legislative, fiscal, judicial, and military powers.	

Time	Name	Main content	significance
1776	*Declaration of Independence*	It explained the political system ideology, that is, the theory of natural rights and the idea of popular sovereign; counted the crimes of Britain's oppression of the colonial people in North America, indicating that the colonial people were forced to take up arms under the unbearable circumstances, and strove for the legitimacy and justice of independence. The United States declared independence.	The human rights system obtained unprecedented opportunities and momentum for development
1789	*United States Bill of Rights*	It listed the freedoms and rights that are not clearly stated in the body of *the Constitution*, such as the freedom of religion, speech, the press, and assembly, the right to retain and carry weapons, not to be unreasonably searched and detained, and to refuse the search and seizure of personal properties without search warrants or attachment orders reasonably issued, and the privilege of the grand jury that they could issue a death penalty or other "non-honor crime" indictment to anyone. It guaranteed a prompt and open trial by a fair jury, and prohibited double trials.	A model of modern human rights legislation
1945	*Charter of the United Nations*	It expressed the determination to stop humanity from suffering from the scourge of war, and stipulated the purposes, principles, rights, obligations, the scope of the main body's authority, etc. *The Charter* stated that the purpose of the United Nations (UN) is to "maintain international peace and security," "stop acts of aggression," "develop friendly relations among nations based on respect for the principle of equal rights and self-	Human rights norms were developed to cover the world.

(*Continued*)

Table 2. (*Continued*)

Time	Name	Main content	significance
		determination of peoples" and "promote international cooperation"; it also required that the UN and its member states shall abide by the sovereign equality of all countries, as well as the peaceful settlement of international disputes by all countries, the non-use of force or threat of force in international relations, and the principle that the UN must not interfere in the internal affairs of states.	
1948	*Universal Declaration of Human Rights*	It inherited and absorbed the general concepts of freedom, equality and human rights in the cultural heritage of mankind, especially the legislation and implementation experience of human rights in modern Western countries, basically reflecting the strong desire of people all over the world for the struggle for and protection of human rights after the end of the Second World War and the level of understanding of the majority at that time. Compared with the concept of human rights embodied in the human rights legislation of European and American countries at that time, it enriched and expanded the specific provisions, and made significant contributions to the theory and practice of human rights.	
1966	*International Covenant on Economic, Social and Cultural Rights*	It established human economic, social and cultural rights, including the rights to work, organization and participation in trade union, rest, equal pay for equal work, access to social security, access to considerable standards of living, freedom from hunger, physical and mental health, education, participation in cultural life, and the right to special protection for women and children.	

Time	Name	Main content	significance
1966	*International Covenant on Civil and Political Rights*	It established human rights to life, freedom from torture, slavery and forced labor, rights to personal liberty and security, freedom of movement, equality before the law, personal privacy, freedom of religious belief and expression, peaceful assembly and freedom of association, and the right to participation to public affairs, the rights of minorities, the rights of family, marriage and children, etc.	

The extension of human rights

The development and popularization of next-generation IT such as the Internet, cloud computing, artificial intelligence, blockchain, and quantum communications have enabled human society to enter an era of big data with data as a key element. Data has been profoundly changing the production and life style in society and forming a "data space" that can be extended indefinitely, resulting in the great expansion of the field of human activities. In the era of big data, the human ability to collect, store, and analyze data has reached an unprecedented degree. The rise of big data has also triggered a series of ethical and legal issues. It has been reshaping the legal system formed in ancient times, changing the rights relationship between citizens, and creating many ways of social control without the help of the law (Zheng 2016). For human rights, big data provides new ways for human rights protection, but it also poses new challenges and difficulties.

As for the impact on human rights, big data's violations of human rights mainly present in the following aspects: firstly, in the era of big data, the extraordinary capability in data collection has increased the possibility of human rights violations. Any trace of human activities can be converted into digital numbers to form a "data person," thus infringing on the digital personality of citizens and enhancing the ability to violate human rights. Secondly, big data does not depend on causality, but relies on data relevance for prediction and inference. People can infer sensitive information that is covered purposely based on known data, and dig out enough data to find out a person's personality

through correlation analysis. In this way, non-sensitive data can be turned into sensitive one, and non-confidential into confidential, making newly discovered information non-intuitive and unpredictable, thus increasing the possibility of human rights violations. Thirdly, technologies to promote human senses in the era of big data are constantly developing. Sensory enhancement technology enables people to obtain, from "outside-the-wall," information that originally must be obtained through physical intrusion into private houses. The effect is equivalent to the physical intrusion into a house which causes a great violation of the personality rights of the parties. Finally, the consequences of human rights violations in the era have also changed. The permanent storage, ease of dissemination and search ability of data in data space lead to people's frustrated expectation that data won't fade with time, resulting in long-term damage to human rights, which will aggravate the damage.

From the perspective of rights, challenges brought by big data to human rights are mainly concentrated in the following aspects. Firstly, it is difficult to determine the subject of human rights violations; and subjects of tort could easily escape due to the diversification of data collection subjects, diversification of metadata utilization methods, and the secrecy of infringement methods. Secondly, the value of data makes it necessary for building up human rights norms to balance the interests of many aspects, which is not easy. Thirdly, the relationship between human rights and data is more elusive and creates difficulties for human rights legislation. Fourthly, the results of human rights damage tend to be diversified and are no longer limited to spiritual damage like damage to reputation. Economic damage, unfair treatment, and personal injury also occur sometimes, and the intensity of spiritual damage is greatly enhanced. At last, the direct causal relationship between damage outcomes and behavior is often unclear. All these factors have increased the possibility of human rights violations, making it more difficult to protect human rights in the era of big data.

Res and Real Right

Industrial civilization created a more just, effective and complete system than that in agricultural civilization and countries under the rule of law emerged with the emergence of industrial civilization. Real right law advocates that

private subject has absolute ownership of *res corporales*, which is the manifestation of industrial civilization in real right system. Real right law is an essential achievement in industrial civilization.

Value of things: Human values and the value of things

It is well known that the idea and concept of value was first brought up in the category of economics. "Use-value" refers to the usefulness meeting people's material needs. With the development of productivity in the later period of primitive society, people's understanding is also improving. When people extend the category of "value" to the subject of human beings, the category of "human value" appears. If a person, as the object, can satisfies the needs of another human subject, we can say that he or she is valuable to the other person, and this usefulness is called "human values" (Miao 2016, p. 56). Marx also pointed out in his works that "human value" refers to the value of workers, more specifically, "the value of labor force" embodied by workers in the form of a commodity, just as other commodities. Therefore, Marx also believed that people are also objects of value and can be of significance and value to humans. The survival and development of human beings need to be created and maintained via human labor. This is the requirement and needs of people themselves, which is also the value of humans to themselves (Miao 2016, p. 56). At the same time, satisfaction of people's many needs also lies in other people's labor creation, which means that other people who satisfy our needs create values for us. On the whole, human value is a category of relation in which human serves both as the subject and the object.

Generally speaking, things are considered valuable to people if they, as objects, can satisfy the needs of human subjects. The value of things is a special relation between human subjects and the objects that satisfy people's needs, that is, the usefulness of certain things or phenomenon to humans. Interestingly, Marx also believed that "the general concept of 'value' stems from the behavior of human beings towards the things found in the outside world which satisfy their needs." Thus, "the value of things" in philosophy refers to usefulness of things to human beings and it's based on human needs. Therefore, things and phenomenon can only be of value when they can satisfy people's needs. But since things cannot actively satisfy our needs, they can only achieve and realize their values with humans' help or through human activities. Things can only serve as objects and satisfy the needs of human subjects,

whereas humans can be either the subject or the object. Under this context, human value reflects the relationship where human objects meet the needs of human subjects.

It can be seen from the above arguments that human-to-human values and significance as well as human-to-human needs, while the value of things is vested by human, and is potential and passive. Therefore, human value and the value of things are closely connected; human value is higher than, yet depending on the value of things. In the relationship between human activities and human values, human is both the ends and the means. If people want to survive, create and realize values, they must enjoy certain material substance and must acquire and enjoy certain value of things. In a deeper sense, the material value of things is not only the foundation of human survival and development, but also the manifestation of people's creation and realization of human values. "Without certain achievements of material value, creation and realization of human values are but empty talk" (Wang Y. 2009, p. 28). It is worth noting that the economic category only provides a possibility to "make the appreciation in things in direct proportion to the depreciation in human world." To make this possibility a reality, we must have corresponding institutional conditions (Zhu & Lv 2005, p. 9).

Origins of real right

As early as the seventeenth century, German jurists began to explore the differences between things and property, focusing on rights in things. Marx believed that "the actual basis of private property, the possession, is a factum." Before the founding of countries, human beings originally lived in the state of nature,[20] which was like Utopia for human beings. During that period,

20 The state of nature refers to the state humans lived in before the existence of organized societies. In the eighteenth century, there were two currents of political thoughts in Europe and America, one being liberalism, based on empiricism, founded by Scottish Enlightenment philosophers David Hume, Adam Smith and Adam Ferguson and represented by John Locke; the other being democracy, based on Descartes' rationalism, represented by Jean-Jacques Rousseau. Starting from the state of nature, Locke analyzed the deficiencies of the state of nature and formed the theory of liberalism

due to abundant resources and limited desires, people enjoyed freedom and equality and everyone's concern of self-protection was not to harm others. With further development of human societies and accumulation of more experience, people stopped living independently in the natural state and must form temporary groups for the sake of safety and survival benefits, thus subconsciously formed vague concepts of obligation towards each other and benefits in fulfilling them. With development of human societies, people gave up living on trees or in caves and started building houses, which gradually leading to the formation of families and private ownership. It can be argued that the emergence of private property for families is the inevitable result of the development of social productivity. "Private" at that time was only an unstable and lawless reality, but it has begun to take possession of the family centered object.

However, possession of things was not equal to ownership of things in the initial stage of human society. If anyone wanted to call something "his own," he had to possess that thing as an object of his. Otherwise, he couldn't call *res corporales* "mine" unless he could be sure that even though he didn't possess it physically, he possessed it in another sense. At first, possession could satisfy people's needs for materials, but with continuous advancement of production technology, people began to realize that possession showed uncertainty, which was to the disadvantage of sustainable development of production. Continuous production required continuous possession of production tools and land and support from others on this possession. Therefore, the system of ownership gradually came into being. It is worth mentioning that with the development of labor productivity, the world witnessed large-scale social division of labor and the establishment of private ownership, which led to significant social changes and material abundance.

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where private property is inviolable and individual's natural rights should check state power. Similarly, based on the state of nature, Rousseau depicted humans in the true state of nature and the phases that man has undergone from natural state to a civilized society, and brought up the theory of democracy where citizens have authorities. The differences in the political thoughts of Locke and Rousseau are due to their different hypotheses, that is to say, there is a huge difference between their theories of the state of nature.

In summary, the emergence of ownership system was of great significance to the development of human society.

With the development of social productivity, human beings began to live together in the unit of countries. This was the emergence of countries. The emergence of countries and laws are two interconnected aspects of the same period in history and are concomitant with each other (Chen 2002). It can be argued that when people had the de facto possession of things, that is, after a private and exclusive possession relationship was protected by laws, such relationship had the nature of legal right. That is to say, possession of things by the possessors became a kind of right protected by law, which gave rise to the initial real right relationship in legal sense. At the same time, with the progress of mankind and the development of economy, as well as the gradual emergence of trade, consistent possession of commodities could no longer meet the requirements of social development. Goods need to flow in order to exert its greater value. Therefore, the concept of real right was further developed and real rights for security and usufructuary rights came into existence.

Legal characteristics and significance of res

"Res" in legal sense refers to material object that exists outside human body and can satisfy social needs of people and be controlled and dominated by people (Wei 2016, p. 122). This definition shows that res in civil laws has physical attributes and is also philosophical substance. But not all things and substances in physical and philosophical senses can be treated as res in legal sense. For example, the sun, the moon and the stars are not part of the res defined in law. In another perspective, as an object in civil laws, res covers a wide range of things. All natural objects or human creations, other than human bodies, which can satisfy certain social needs of people and be controlled and dominated by people, can be res in law (Wei 2016, p. 122). From this perspective, the scope of res in law tends to expand with the expansion of human abilities to transform and conquer nature. Therefore, res in civil law can only exist outside human body and cannot be human body. Res must have usability and have value and use-value, because only objects that can satisfy people's needs in life or production can be owned and exchanged by subjects.

Res in civil law has not only the natural attributes, but also the legal attributes, and shows the following legal characteristics. First, they have to be *res corporales*, that is to say, corporeal or tangible things or those perceptible to the senses. The scope of *res corporales* is also expanding with expansion of human ability to dominate over nature. For example, we didn't regard natural forces like lightning, sound, light or heat as *res corporales*, but nowadays, their materiality has been recognized by people. Res in civil laws should be *res corporales*. Generally, only matters in physics can be recognized as res in law. But in some cases, rights can be seen as res as well. For example, when the right to use land is mortgaged, the mortgage right is deemed as a kind of real right.

Second, res must exist outside human body. Res in law is impersonal. Human beings are no longer treated as objects of rights after abolition of slavery. In modern civil law, people are the subjects of rights, but cannot be the objects of rights. Therefore, neither human beings nor body parts (unless separated from human beings) can be seen as res in law. Trade of human organs is not protected by law nor subject to law enforcement.

Third, res can satisfy the social needs of people. Res in civil laws must have certain use-value so as to satisfy the social needs of people. Things without use-value cannot be regarded as res in legal sense. Social needs are divided into for material needs and spiritual needs. Things that meet either type of needs can be deemed as res in civil laws. For example, things with economic values can satisfy people's need for materials in life; and things with emotional or cultural values can satisfy people's spiritual needs.

Fourth, res can be actually controlled or dominated by human power. Res in civil laws is a thing that can be owned and exchanged by subjects. If a thing cannot be controlled or dominated by human power, it cannot be owned by a particular subject nor used in trade. Therefore, even if certain things are matters in physics, they still cannot be regarded as res in civil laws if they cannot be actually controlled or dominated by human power. For example, electricity, heat, light and gas are treated as res only after they can be controlled and dominated by man. Therefore, the scope of res in civil laws is constantly expanding with increasing human dominance.

It's worth noting that res generally refers to *res corporales* like land, buildings and other kinds of objects. In recent years, theoretical explanation of *res corporales* has been gradually expanding, covering more things.

It's believed that *res corporales* do not have to have physical forms or fixed volume and that solids, liquids and gases are all regarded as *res corporales* (Wei 2016, p. 122). As for resources like light, heat and electricity, they are also seen as res in civil laws since we can technically control them, and they have been often used in industry and commerce as well as our daily life. Res should be objective realities, different from virtual property. Virtual property can serve as objects in civil laws and be protected by law, but they're virtual, not real. Res must be independent. *Real Right Law* follows the principle of "one ownership for one object" (meaning that one and only one ownership can be established for an independent object), so res in legal sense must be independent. Means of livelihood and production cannot be regarded as res in law if they cannot be used independently by human beings.

Res plays an important role in civil laws as it is the object in many legal relationships. Some legal relationships, such as ownership, directly take res as objects; some legal relationships, such as creditor's rights in deliverables, though taking behaviors as objects, are still closely related to res. To a large extent, res is crucial to the validity of civil legal relationships. Besides the subjects and content, the subject matter of an legal relationship also determines its validity (Wei 2016, p. 124). For example, land in China cannot be used as objects in private ownership; things whose circulation is prohibited by law cannot be the objects of trade; consumables cannot be the subject matter in loan for use and leasing. Moreover, res makes a difference in legal procedure and can influence the jurisdiction of cases under certain circumstances.

Nature of real right: Definition and classification of real right

Real right is the dominance over things, but actually reflects the relationship between different people. Paragraph 3, Article 2 of the *Real Right Law of the PRC* promulgated in 2007 expressly provides that "The term 'real rights' as mentioned in this Law refers to the exclusive right enjoyed by the holder to directly control specific res." This clearly defines the concept of real right in law, which ostensibly reflects man's dominance over things, but actually reflects the person-to-person relationship. Firstly, in essence, even though

real right is the right of the obligee to directly dispose "specific things," the nature of real right is not about the relationship between man and things, but that between different people. Secondly, real right is the property right enjoyed by the obligee over "specific things." It's a kind of property right, the right in things, as opposed to the right *in personam*, that is, creditor's rights. Thirdly, real right is mainly the right to dispose *res corporales*, which means that the obligee can realize his own rights independently without other people's intervention or help. Judging from the scope of changes in *Real Right Law*, major adjustments concern property ownership and use of *res corporales*.

According to *Real Right Law*, there are three types of real rights – ownership, usufructuary right and real rights for security. Firstly, ownership refers to the right of the obligee to possess, use, benefit from, and dispose of his real or personal property in accordance with the laws.[21] Ownership is the foundation of real right and the ownership system is the soul of real right law. The owner can possess, use, benefit from and dispose of the property he owns, and may exclude other people's interference against his will. Ownership is the most complete and full real right. Secondly, ownership is *jus in re propria* (i.e. the right to use the property in any legal manner), while the usufructuary right is *jus in re aliena* (i.e. the right over property over another) (limited real right). The so-called usufructuary right refers to the right of a non-owner to possess, use and benefit from the property of others (Wang L. 2014, p. 154). The usufructuary right as provided in *Real Right Law* includes the right to land contractual management of land, the right to use the construction land, the right to use the homestead land and easement. Thirdly, real rights for security refers to the right of the holder of real rights for security to have priority of compensation in satisfying his or her claim in accordance with the law where a debtor fails to perform his or her debts due or where the circumstances of realizing the real right for security occurred as stipulated by the parties.[22] The purpose of establishing real rights for security is to secure the realization of the creditor's claims, including mortgage, pledge and lien.

21 See provisions of Article 39 in *Real Right Law of the People's Republic of China*.
22 See provisions of Article 170 in *Real Right Law of the People's Republic of China*.

Basic characteristics of real right

Jean-Jacques Rousseau pointed out in *The Social Contract* that "His [Man's] first law is to provide for his own preservation. His first cares are those he owes to himself." Man's first needs are survival needs, which manifest firstly in his care for his property. However, real rights and property right are two different concepts and have their own connotation and denotation. It's generally believed that property right are rights the targets of which have property value, including real rights, creditor's rights, intellectual property rights and right of inheritance. Real right is only one type of property rights. Real right refers to the right enjoyed by the subject of right to directly control specific property, which has the content of man's direct control over a thing as well as the effect of acting against a third party other than the subject of right (Xie 2011, p. 8).

From the perspective of its nature and origin, real right, as a type of rights, can be seen as a genuine "private right," and its essence is private and independent. "Private" means that the subject of real rights is a particular person or some persons and it means nothing to others. Therefore, the subject of res can control things, enjoy and pursue due profits from things based on his or her own free will, free from other people's interference. However, real right is not entirely free from constraints since the main purpose of real rights is to solve problems caused by scarcity of resources and the inevitable conflict of interests resulted from endless human desires.

As a legal relationship, the relationship of real right is different from those of property rights in many aspects. First, the subject of real right is a particular obligee. Since in Western countries, real right is established around private properties, there is no need to define subjects of state ownership and collective ownership, and the subject of real right can be defined with simple concepts like natural persons or legal persons. While in China, ownership includes both state ownership, collective ownership and individual ownership. Therefore, in the *Real Right Law of the P.R.C.*, subject of real right is referred to as the "obligee." The obligee in the real right is definite. Second, objects of real right are particular *res corporales*. Different from intellectual property rights, objects of real right are *res corporales* instead of intangible properties or intellectual achievements. Third, the nature of real right is a right to dispose. The subject of real right enjoys the right to directly dispose things,

free from others' interference. Here, "to directly dispose" means that the obligee can achieve his or her own right without the help of others (Wang L. 2014, p. 152). Obligee of real right can legally possess and use things on his or her own will without others' interference. Fourth, real right is exclusive. As long as certain requirements are met, a real right can be established and take effects. Even if the obligee didn't actually possess or control certain things, he or she should still enjoy due rights and ownership of those things.

Effects of real right

The concept of effects of real right originates from Roman laws. It was brought up to make sure that obligee of real right can directly dispose the object and enjoy benefits gained from the object without infringement. Effects of real right refer to the obligee's ability to dispose the object and the exclusive effect of real right (Cui 2017, p. 6). Most publications on continental laws in China propose that effects of real right are shown as the right to exclude, preferential effect of right in rem and the retroactive effect, which will be elaborated below.

First, the exclusive effect of real right. According to Article 2 of the *Real Right Law* in China, real right is a kind of exclusive right free from other people's interference. Simply put, there cannot be two or more than two incompatible real rights on the same object. It's generally believed that the exclusive effect is shown in two aspects, that is, excluding the interference from the public powers and that from private rights. Public powers cannot infringe a private right, including real right; likewise, subjects of private rights cannot infringe real right either. Obligee has right to protect his or her own lawful rights and interests by stopping unlawful infringement. Powers are exercised by legal person of public law to protect public interests in line with regulations and legal procedures. Exclusiveness is not a natural attribute of real right, but something prescribed in laws and enforced and maintained by laws, dividing public powers from private rights (Cui 2017, p. 6). Furthermore, real right is a right to dispose directly, so obligee of real right can fully realize his or her right only when others' interference is excluded.

Second, the priority effect of real right. It is generally believed that the priority effect of real right refers not only to the priority real right has

over creditor's rights, but also to the priority among different real right (Liang 1998, p. 78). Real right has priority because it is an absolute right, a right in rem, and the obligee has right to directly dispose a particular thing without other's intervention. On the same subject matter, there cannot exist multiple real rights with the same content. Priority is given according to the time of events. As for ownership and other real rights, the latter is exercised in limited conditions and has priority over ownership. Furthermore, creditor's right is a right to claim, a right *in personam*. There is no priority between different creditor's rights as they are all equal. Therefore, if there are both real rights and creditor's rights on a subject matter, real rights, that is, ownership, real rights for security and usufructuary rights, have priority. There are also exceptions. For example, any change of ownership to the lease item does not affect the validity of the leasing contract; and creditor's rights included in the advance notice registration have priority over real rights.

Third, the retroactive effect of real right. Retroactive effect means that after real rights are established, no matter in whose hands the subject matter is, the obligee has right to directly dispose the subject matter.[23] Anyone other than the holder of real right has an obligation not to keep the obligee from exercising his or her rights. Anyone who obtained properties illegally has an obligation to return them to the owner and the owner has a right to ask the current holder of properties to return them. For example, Article 867 of the *Civil Code* in Taiwan provides clearly that "After the creation of a mortgage, the owner of the real property may transfer the real property to another person, but the mortgage will not be affected thereby." If a debt is not paid in due time, the mortgagee can retrieve the real property and apply for auction of the collateral by the court. However, it should be noted that

23 Some believe that the retroactive effect of real rights is also a kind of priority effect (Zheng Yubo: *Real Right in Civil Laws*, p. 31). See Judicial Yuan's "Yuan" Interpretation No. 1771: "The mortgage right should not be affected even if the owner transferred the ownership to others. If the collateral is sent for auction by the court, the mortgage right still should be exercised in no different way. Therefore, if the creditor asked the court to sell the collateral at auction but didn't claim compensation from the proceeds, he or she only lost one chance to be compensated. Creditor's right is not removed and the creditor still can exercise the retroactive right on the auction winner."

the retroactive effect of real right is not absolute. The bona fide acquisition system represents a limitation to the retroactive effect.

Property rights and industrial civilization: Evolution of human civilization

Civilization reflects social productivity. "Civilization is the accumulation of the progress and achievements that mankind has made by transforming the nature, the society and ourselves" (Sun & Gan 2007, p. 12). Some scholars think that "civilization is a summary of mankind's material and spiritual wealth from the transformation of the world and it symbolizes the civilization of human beings and progress of our society" (Li X. 2002, p. 12). Others believe that the nature of civilization is the development of mankind's abilities. We gradually "get rid of all spontaneity" and became "a complete person," which means that we gradually evolved from animals to men and developed into a completely humane society without animality (Wu Y. 2009, p. 50). History tells us that civilizations are created by human beings, who are the strongest driving force of civilization. Where there is mankind, there is civilization. Generally speaking, civilization developed from a lower level to a higher level, and from unitarity to diversity. Looking back into the history of human societies, based on different production modes, human civilizations can be divided into three states: hunting-gathering, agricultural and industrial civilization. Here, "civilization" refers to a cultural pattern, which includes material culture and the institutional culture and the ideological culture. They are interrelated, mutually restricted and yet unified in development. The different development of these cultures results in different civilization (see Table 3).

Table 3. Evolution of Production Mode and Dominant Resources.

Types	Hunting-gathering era	Agricultural era	Industrial era
Main characteristics	fruit-gathering, fishing and hunting	farming and animal husbandry	mine digging and machine building

(*Continued*)

Table 3. (*Continued*)

Types	Hunting-gathering era	Agricultural era	Industrial era
Modes of production	Object of labor: wild animals and plants Methods: gathering, fishing and hunting Products: fruits and prey	Object of labor: land and prairie Methods: plantation, animal raising and handcraft Products: produce, livestock and handicrafts	Object of labor: natural mines Methods: excavation, smelting, building Products: natural chemical materials, energy, artificial products, physical energy, space base
Tools and resources	stoneware, bone tools; manpower	metal tools; fuel wood, animal power	intelligent machinery; mineral reserves

After mid-eighteenth century, Western countries like the UK started to use non-renewable resources like coal and petroleum. Industrial Revolution features widespread use of steam engine driving human society to the flourishing industrial civilization. Looking back into the development of the world industrial civilization, we can clearly find three industrial revolutions. The first one marked the beginning of the "age of steam engines" and the transition from agricultural civilization to industrial civilization; the second one symbolized the beginning of the "age of electricity," when heavy industries like electricity, railways, chemical engineering and automobiles began to emerge and petroleum became the new resources; the third industrial revolution after the Second World War started the "age of information," when information and resources around the world began to exchange in higher speed. The first three industrial revolutions not only greatly facilitated the revolution in our economy, politics and culture, but also influenced our ways of living and thinking. Now, the fourth industrial revolution is in the air with new resources development as the core task. The fourth one is a technological revolution characterized by various technological advancements, such as Internet, Internet of Things, big data, cloud computing, AI, VR and biotechnology. It can be inferred that the fourth revolution will have deeper and wider influence on human society than the previous ones.

Order in real right ownership

Order plays an important role in our social life. It is a precondition for human activities, a basic need for human communities in all time as well as a basic value required by rules and laws under any political and social mechanism. History tells us that life in order is generally more beneficial to human beings than life in chaos (Sun Y. 2011, p. 11). Due to the universality and consistency of laws and rules, legal system to some extent makes human activities more predictable and thus is required for an orderly society to eliminate arbitrariness. Furthermore, according to Bodenheimer, in terms of order, laws focus on the adoption of certain rules and standards by a community or political society. Such rules and standards are established to provide a frame or structure for numerous yet disordered human activities so that they wouldn't be out of control. Thus, orders are more relevant to the form instead of nature of social life (Bodenheimer 2004). Therefore, orders play a fundamental role to protect people's security and social stability. As people's ability to utilize resources develops, resources become more and more scarce. With limited resources, conflicts and disputes among people over material goods are inevitable. It indicates that states need to provide protection and confirmation of ownership via legal systems.

People's dependence on material goods leads to the requirements to acquire and retain material goods, while the scarcity of resources decides that in countries ruled by law, people need legal protection from governments over their material goods (Sun Y. 2011, p. 11). Material goods under the protection of law are properties. Therefore, property law or real right law came into existence.[24] This means that stable possession with reasonable

24 According to Professor Zhang Wenxian's interpretation of the draft real right law, "Res includes 'movable properties' and 'immovable properties'. Res refers to 'properties' and the so-called 'real right' is actually property right, including movable properties and immovable properties. In this sense, real right equals to property right." As mentioned by Professor Zhang, "Since the 20th century, especially after 1950s, property-rights economics redefined 'real right' and 'property right'. Most property-rights economists defined property rights based on the fact that the right originated from the disputes caused by scarce resources. Res is not simply things, but economic materials, productive factors and material goods." Please refer to Professor Zhang Wenxian's speech at China University of Political Science and Law on April 25, 2006, titled "What kind

causes requires the acceptance of other people. Rights are not the relationship between humans and things, but ones between different people. The nature of rights is a kind of social relationship and should be accepted and respected by others as an effective claim. Following authoritative orders, people would restrain themselves and respect each other's property rights, and thus the concept of just and rights came into existence.

All in all, laws are important for protecting social orders, which is mainly achieved through definition of properties. Real right is the result of the changes in possession of things in real right law. Therefore, orders are the most fundamental goal in real right law in terms of instrumental value and concept. Real right law should not only meet the needs to maintain social orders and guarantee utilization of resources in order, but also develop along with the complication of social orders so as to satisfy social requirements (Sun Y. 2011, p. 11). The goal of real right law is to establish legal orders and regulations on res and other limited resources (Wang Z. 2001, p. 14). For individuals, the most direct and important values of real right law is its protection over one's properties.

Industrial civilization and "property-oriented laws"

Civilization is the aggregated physical and spiritual achievements of human beings in their transformation of the world. It is the symbol of the progress of human society while law is like the twin of civilization. Diachronically, human civilization developed from pastoral society into agricultural society, industrial society and finally into the current information society. Industrial civilization witnessed a more fair, effective and comprehensive mechanism than the one in agricultural civilization. It goes together with the appearance of countries ruled by law. "Human-oriented laws" in agricultural civilization were gradually replaced by "property-oriented laws" with the protection of private rights as core in industrial civilization. Laws undergone major changes from "status" to "contract." In 2007, *Real Right Law*, which affects every Chinese citizen's rights and interests, came into force, which symbolizes China's entry into the real right age. In China's legal system, *Real Right Law of the PRC*, as a basic

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of real right law do we need – reflections on real right law from the perspective of philosophy of right."

civil law, is the detail and embodiment of the provisions about properties in China's constitution. From the respective of legal philosophy, the goal of legal system is to specify and protect rights. Generally speaking, "res" refers to owner's properties and "right" refers to the owner's right to freely dispose his or her properties without others' interference. *Real Right Law of the PRC* advocates that private subject has absolute ownership of *res corporales*, which is the manifestation of industrial civilization in real right system. *Real Right Law of the PRC* is an essential achievement in the context of industrial civilization.

It takes a long and complicated process to evolve from one civilization to another, during which the bud of a new civilization can be found in the old one (Li Z. 2012, p. 4). Currently, human society is undergoing another peculiar revolution, where science, productivity, politics, economies and societies are all changing. Under the impact of information revolution, the real society and the Internet society are going side by side while interacted and inter-mapped. Through the Internet, human beings are building a new order – the digital order, and a new civilization – the digital civilization. However, current real right rules are used in an attempt to harm data rights via limiting or prohibiting rights or to satisfy the obligee's desire for data rights through limiting rights and power. Such a mechanism can hardly break out the limitation of real right system; and data rights cannot be freed from the routine of traditional real right law. In the meantime, due to the irreconcilable conflicts and contradictions between exclusiveness of real right and the special features of data rights (public right characteristics, private right characteristics, shareability), using real right law to protect data rights would be conservative and unbalanced, unable to meet people's needs for data rights. Therefore, we urgently need to improve the mechanism over *res corporales*. Since real right law has limitations in data rights protection, changes to traditional laws and thoughts are inevitable in digital civilization.

Data and Data Rights

In digital civilization, people begin to rethink about the relationship between data and human beings and the right of a "data person." In the age of big data, data represents a factor of production, a new resource, an organization method and a new type of right. Utilization of data has become a main

way to gain profits. Protection of data rights becomes an important symbol of digital civilization. We enjoy data rights, just like human rights and real rights. The proposal of digital rights will be an essential driving force and legal foundation of the reconstruction of orders that pushes digital civilization forward. Data right breaks the limitations in data protection of the traditional theories of personality rights, privacy, real rights, creditor's rights and intellectual properties. It becomes a new type of rights in big data era, which at least should include data sovereignty, personal data rights and data sharing rights.

Hypothesis of "data man": Economic man, social man and data man

ECONOMIC MAN

"Economic man" is a fundamental hypothesis in Western economics about human being's economic behaviors. It originated from the statement of the British economist Adam Smith in 1776 in *The Wealth of Nations*. Adam Smith believes that human behaviors are driven by economic incentives and all behaviors of human beings are aimed to satisfy one's own interests to the greatest extent. Everyone is in pursuit of his own interests, which in return, under "natural orders," will promote the increase of social interest more effectively when he acts on his own will (Zang 2009, p. 12). The so-called "economic man" is not just "self-interested." Maximizing personal interests is the goal of the "economic man," which will also maximize interests of the whole society (Yang 2006, p. 83). The nature of "economic man" is to be self-interested and self-interests are the basic motive for people to engage in productions. In the hypothesis of "economic man," for the first time, the motivation and behavior of a person going after his or her own interests were incorporated into the economic analysis framework in a clear and systematic way, and the relationship between personal interests and social interests, which were originally perceived from moral and philosophical perspectives, is summarized into a systematic and clear economic argument (Zang 2009, p. 12).

SOCIAL MAN

Some behaviorists point out that besides economic behaviors resulted from the pursuit of personal interests, people also engage in activities due to

responsibility, vanity, the sense of honor, sympathy, love for families and friends and customs *per se* (Zhang & Mao 2009, p. 127). People act not only because of interests or the principle of maximization. There are also altruistic behaviors in our society, which cannot be understood via the "economic man" hypothesis alone. "Social man" is one of the hypotheses about human nature in Western modern management, which is originated from the Hawthorne Experiment conducted by Mayo.[25] The hypothesis is that human beings are "social men," who are not alone but engaged in certain social relationships bounded by the community. Besides materials, people also pursue love and friendliness among different people, morality, sense of belonging and honor. The hypothesis of "social man" can be used to explain human characteristics not reflected by "economic man" and those mechanisms not in line with maximization of efficiency or interests (Zhang & Mao 2009, p. 127). With the hypothesis of "social man," we can understand many altruistic behaviors out of responsibility or morality, as well as the existence of policies on tax and redistribution out of consideration of social equity. The transition from "economic man" to "social man" is a breakthrough not only in economics, but also in social sciences, which greatly promotes the extension of economics into other fields like social sciences.

DATA MAN

For laws in digital civilization, its hypothesis of human nature is different from industrial civilization. The individualism and self-interested trend praised in the "economic man" hypothesis is no doubt most suitable for the age of industrial revolution (Wu X. 2015, p. 72). Digital civilization is the reflection and response to industrial civilization and is more advanced than industrial civilization. More than 2,500 years ago, the ancient Greek philosopher Pythagoras proposed that "all is number," meaning that number is the nature of the world and dominates human societies and even the whole nature. Nowadays, microcomputers like smartphones and wearable devices

25 The Hawthorne Experiment, which is about changes in relationships among a group of people, is a famous experiment in managerial psychology. It was conducted on workers at the Hawthorne plant of the Western Electric Company in suburban Chicago by the Harvard professor George Elton Mayo (1880–1949) during 1924–1932. The experiment found that workers are not only "economic men" driven by money and personal attitude plays an important role in behavior changing.

measure and record the physical world in bytes, 24 hours a day. Human beings are now really in the era of big data where "all is number and number is all." "Data man" is not only a digitized version of human beings, but also digitized version of all objects and parts, which will interact and affect each other. "Data man," as a new type of legal personality, exists on the basis of digital civilization. Laws and regulations based on digital civilization and "data man" go beyond the traditional boundary between good and evil and break out traditional limitations to effective organization. We can say that compared with traditional hypotheses of human nature, "data man" is more suitable for theories and practice in digital civilization.

The core of the "data man" hypothesis is altruism

"Altruism" is a human virtue. It is a saying in ethics referring to life attitudes and principles of behaviors that put social interests at first and advocate the sacrifice of personal interests for social interests. In the nineteenth century, Comte, a French philosopher who founded the discipline of praxeology, brought up the concept of "altruism" and used it to explain the selfless behaviors in societies. He described altruism as our "moral obligation to renounce self-interest and live for others." Therefore, altruism emphasizes on other's interests and advocates the utter devotion to sacrifice oneself for others' benefits. Currently, it's generally believed that altruism is characterized by helping others willingly without hoping for return in the future (Han K. 2017, p. 8). Interdisciplinary studies of the game theory and biological evolutionism show that communities with the characteristic of altruism have more evolutionary advantages in ecological competitions.

Digital civilization and comprehensive development of human beings. Altruistic data culture is a mainstream culture that originates from digital civilization. "Data man" emphasizes the altruism in human behaviors and existence. The function of "data man" is to help human beings create a public big data space that can be shared. Its value as a tool decides that "data man" is altruistic in nature. If the altruism of "data man" can bring more benefits and convenience for human beings, more altruistic behaviors will be generated due to pursuit of interests. Once the original subject of data rights gains necessary legal rights, altruistic behaviors would unfold another era in

data utilization. The altruistic feature of "data man" will help facilitate the development of big data during its application and promotion.

Darwin wrote in *The Descent of Man* that "a tribe including many members who, from possessing in a high degree the spirit of patriotism, fidelity, obedience, courage, and sympathy, were always ready to aid one another, and to sacrifice themselves for the common good, would be victorious over most other tribes" (Darwin 1871, pp. 159–60). The altruistic feature of "data man" can also help facilitate cooperation between different human beings. At the beginning, only a small group of people would benefit from the cooperation, but with the involvement of more people, such altruistic behaviors will step up from accidental cooperation to stable legal relationship so as to ensure that man can gain continued interests from altruistic behaviors. Therefore, driven by the needs to improve social benefits and promote common progress, governments should establish a protection mechanism for "altruistic behaviors," that is altruistic rights. Such right not only meets the requirements of social development, but also is a manifestation of the altruistic functions of "data man" in law.

Protection of data man's rights

It seems that laws and development are always opposite to each other (Long 2016, p. 2). Laws are the result of summarizing past experiences and can hardly predict the future. Restricted by the philosophical understanding in the nineteenth century, traditional capacity for rights was endowed only to the natural person and the juridical person, while other human beings and organizations were ignored (Liu 2015, p. 121). "Data man" is a new subject in the big data era and new legal rights and relationships will be created around "data man," such as data rights, data power and data sovereignty. Here, data right is not a stand-alone right system, but an intentional right used to fill the gap created by data space in the current legal system. Out of the existing right protection system, data conflicts generated from this intentional right have no corresponding laws to refer to, so conflicts in data processing behaviors became a new type of stand-alone conflicts. When new right emerges and the traditional legal relationship becomes a barrier unable to be gotten over, a new right system needs to be established.

The original subject of data right has complete rights over his or her data before data is collected and becomes part of the big data. However, after that, on that data there's both the right of the original right owner and the right of the big data controller, so the original right owner only has limited rights over this part of data in the big data. American scholar Neil M. Richards proposed the "Three Paradoxes of Big Data,"[26] one of which is the Power Paradox. It means that big data has great power to transform society, but big data also has power effects of its own, which gives privilege to entities such as service providers and governments at the expense of ordinary individuals. It is likely to benefit institutions who have control over personal data. Therefore, it is necessary to establish a new data rights legal system, different from the existing one, to protect the right of the original data rights owner.

People have been collecting, analyzing and using data for a long time, but traditional data activities didn't bring such great changes and instabilities to our society and life. Based on the Internet and modern technologies like cloud computing, big data improves the self-management of our society, and at the same time, does impose unprecedented threat to our society and life. Existing legal system, ethics and social norms are not forceful enough to protect our social values like security and privacy. And the deep imbalance exists between data controller's control of the big data and the general people's incapability of their own data (Xiao & Wen 2015, p. 74). According to Michael Mann, "Human beings are restless, purposive, and rational, striving to increase their enjoyment of the good things of life and capable of choosing and pursuing appropriate means for doing

26 N. E. Richards brought up the "Three Paradoxes of Big Data": a. The Transparency Paradox, that is the paradox between transparency of information and secrets of information collections. Big data promises to use this data to make the world more transparent, but its collection is invisible, and its tools and techniques are opaque, shrouded by layers of physical, legal, and technical privacy by design. b. The Identity Paradox, that is to say big data seeks to identify, but it also threatens identity. Though big data evangelists talk in terms of miraculous outcomes, this rhetoric ignores the fact that big data seeks to identify at the expense of individual and collective identity. c. The Power Paradox. It means that big data has great power to transform society, but big data also has power effects of its own, which privilege entities such as service providers and governments at the expense of ordinary individuals. It is likely to benefit institutions who have control over personal data.

so" (Mann 2012, p. 4). No doubt that in order for human beings to enjoy "the good things of life," deliberate establishment of right/power is also an "appropriate mean" that people will choose and pursue. Therefore, now that utilization of big data is quite popular, in order to enjoy all kinds of benefits brought by big data, we should also deliberately establish relevant rights in the big data ecosystem and form a data right mechanism based on data right and data power.

Empowerment of data

The legal nature of data is logically the starting point for deciding data ownership, while deciding data ownership is key to both the formation and adjustment of legal relationships and the utilization and communication of data (Ji 2008, p. 54). In big data era, data is a kind of asset, a productive force and an indispensable resource. By empowering data, social forces will change from violence, wealth and knowledge to data[27] and data will become a new object of right.

Data is a new object of right

With WeChat, Weibo, We-Media, social networks and e-commerce websites becoming the new social focuses, data explosion has been driving the establishment of new power relationships. This is an age with data as the key, and data has changed people's ways of recognition, coordination and

27 In 1990, Toffler pointed out in his book Powershift that power, which is used to dominate others, had always been achieved via violence, wealth and knowledge since ancient times. In the third wave of civilization, knowledge would become the facet of power and whoever has knowledge has power. Once a person or organization owns the violence or wealth, it cannot be owned by other people or organizations. Different from violence and wealth, which are exclusive, knowledge can be owned by different people at the same time. Therefore, "knowledge is the most democratic source of Power." Whoever has control and the right to spread knowledge has initiative in power. In the age of data, every "data center" becomes a sort of "power center" and these "power centers" will have the say.

communication. In future data society, everything will be "online" and everything can be quantified. All human beings, things and machines will exist, interact, create values and promote future development as a kind of data. With the development of time and technologies, data is given new connotations and denotations.

Data is a new object of right. It's not the new crude oil, but a completely new type of resources. The rapidly developing Internet technologies are making our world even more transparent, online and digitized. Especially with the help of big data and the Internet of Things, everyone can become a "data man," with all human activities being exposed and behaviors being predictable via data analysis, and thus there would be no privacy at all. Through regulations of laws, we can save an uninterrupted personal space for ourselves in the digitized world.

Human beings are connected to the Internet as the object and become nodes that constantly collect data and upload data to the cloud, which marks the beginning of the digitization of mankind. Our minds and thoughts, life habits, existence and activities can all be digitized and interact with other people, things and machines via information disclose, data sharing and trade. In the age of "data man," abundant and thorough data resources are constantly improving our methods of communication and mutual understanding. Things are connected with things and people with people, making all people, things and machines exist, interact and create values as data. No matter humans are natural beings or social beings, we are always data producers and controllers throughout our lives. Governments have power on the condition that they protect the rights of their citizens. In order to ensure fair use of data of the "data man," the government should empower "data man" to protect his or her data security and privacy so as to avoid insecure or inefficient exchange and utilization of data caused by "the natural expansion of power."

Legal attribute of data

Data rights are still up in the air due to the uncertain legal attribute, which limits the development and utilization of data as well as the healthy and sustainable development of the data industry (Ji 2008, p. 54). According to the

definition of "data" in ISO, in terms of human behaviors and activities, digits, texts, sound, images and graphs in general sense can all be regarded as data after coding.[28] As a new type of property, data can be listed for transactions in data centers or on data platforms following certain rules,[29] which obviously shows its attribute as a property. "Data originates from the aggregation of personal information, which has personality features" (Ji 2008, p. 56). Therefore, it is also believed that data has personality attribute.

According to different sources, data can be divided into derived data and recorded data. Derived data mainly derives from aggregation of personal information. Personal information is a combination of all information formed in personal development that can be used to identify a person, thus involving the personality interest of the subject. In Article 109 of the *General Provisions of the Civil Law of the PRC*, it states that "The personal freedom and human dignity of a natural person shall be protected by law." Personal information should be protected by law because of the right of self-determination on personal information, whose jurisprudential basis can be found in laws about personal freedom and human dignity (Ji 2008, p. 56). We are human beings because we have exclusive right to decide our own personality formation and development. Collection, procession and utilization of personal information are directly related to personal freedom and human dignity. Like ownership, derived data has exclusivity and independence and individuals shall enjoy all interests brought by his or her own data.

Recorded data is recorded via tools like cookies by network providers while data subjects are using the Internet. Such data is not identifiable and thus does not have personality attribute nor is private. Utilization of such recorded data will not cause privacy problems for data subjects. While

28 The exact definition in ISO is as follows: Data are representations of real world facts, concepts or instructions in a formalized manner suitable for communication, interpretation or processing by human beings or automatic means.

29 Since February 2014, China has established over 10 big data trading platforms or centers, such as Zhongguancun Shuhai Big Data Trading Platform, GBDEx, Yangtze River Big Data Exchange, East Lake Trading Center for Big Data, Xuzhou Big Data Exchange, Hebei Trading Center for Big Data, Haerbin Data Exchange, Jiangsu Big Data Exchange, Shanghai Data Exchange, Xixian Big Data Exchange of Shaanxi Province and Zhejiang Big Data Exchange Center.

enjoying the convenience brought by data, data subjects are also amenable to tolerate to a certain extent such utilization (Tao 2016, p. 158). In some sense, the absence of personality attribute in recorded data deepens the property attribute of data. In short, the legal attribute of derived data is personality interests and that of recorded data is property.

The power and right of data

"Power" is a concept mainly used in politics, and "rights" in legal studies. "Power exists on the basis of legal rights and aims to realize legal rights, and rights, as a qualification in law, limit the form, process, content and procedures of power. Moreover, certain rights can only be achieved with the exercise of power" (Chang 2014, p. 110). Based on the political theories, big data is not only a paradigm of power, but also a narrative of power, which follows the logic of power to continuously produce, reshape and dominate new political, economic and social relationships.

Data power is a modern power, which is a binary power that dominates reasons and is also dominated by reasons.[30] First, data is the information integration of modern powers and the informatization of modern powers. It is universally accepted that information is power. According to Brynjolfsson, data power means that information is at the core of power and becomes the power to allocate resources (Brynjolfsson & McAfee 2014). This means a revolution in our will to power and the invasion of unconscious (or subideology) data into the existing social power. Second, data power is the reconstruction of modern powers in values. If we say that the incorporation of data into modern powers has made powers assessable and tradable, as if it is the result of power capitalization, then the reconstruction of modern powers in values means the digitization of the trading logic between power

30 Power of big data consists of two types of logic, that is, logic of capability and logic of structure. The former manifests itself in such dimensions as role, object and technology, whereas the latter is characterized by such dimensions as relationship, rule and pattern. The two kinds of logic contain positive endogenous power; however, they may also stun and shock the normal social power system to induce risks of mismatch and conflicts in both public and private domains. Accordingly, a type of rational and prudent common insight as well as governance concept on power of big data is to be constructed.

and capitals. In other words, data is incorporated into the power system as big data and, as Ethan Zuckerman said, redefined the operating and trading logic of modern capitals (Zuckerman 2013). At last, data power is the evolution of modern powers in theories. Data power is the trigger of the revolution in knowledge graph and is the core language attached to modern civilization and systems. Reading and recognizing such data will lead the trend in modern powers, explain and predict the changes as well as deconstruct and combine units in modern powers (Lin & He 2016, p. 486).

"Civil rights represent possibilities of a kind of national protection, according to which the right holder can perform certain conduct or require others to perform certain conduct to his or her benefits" (Tong 1990, p. 66). The nature of right is the free will of the subject, and the object is the external Dasein of right, which confirms right in a relevantly fixed way. Data rights determine the allocation of data value and interests as well as the demarcation of data security responsibility and data quality. We can start the discussion on data rights from the point of the object of the rights. It's generally accepted in China that rights in civil laws involve real rights, creditor's rights, intellectual property and personality rights, with their objects being res, behaviors, intellectual achievements and personality interests (Wen 2016, p. 15). The age of big data is multi-dimensional and dynamic, so not only the unidirectional property allocation of original data, but also the dynamic structure and rights of multiple subjects should be reflected in the civil legal rights. Therefore, the information and values in data involves the interests in not only personality rights but also property rights. In short, data right is a combination of different rights and involves both data personality right and data property right. In the future digital civilization, a new type of right – data right – is emerging. It combines personality right and property right and will actively utilize and grant others to utilize data.

A third right: Data right is the combination of personality right and property right

Digital order will become the first order in future's society. Establishing rights for data is in accordance with the will of the people; the institutionalization

of data rights represents the general trend; and the protection of data rights via the *Constitution* is inevitable in this age. Data right has four "new" characteristics: first, data right is a new object of right; second, data right is a new type of right; third, data right represents a new attribute of right; fourth, data right has new powers and functions of right. Data right is under a different category with different content and attributes, so it needs a different protection mechanism (see Table 4 for more details).

Table 4. Characteristics of Data Rights.

Characteristics	Summary
Objects of right	Data is not the "res" defined in civil law (not the object of real right). It is neither a physical object nor *res incorporales* defined in intellectual properties. Data is an independent, objective existence in the digital world, beyond the physical and spiritual world. The subject of data rights is particular obligees, which include the particular person that data points to and those who collect, store, transmit and process data (including natural person, legal person, unincorporated organization, etc.). Different subjects have different rights. The object of data rights is a particular data set. Data is made of a series of numbers, codes, images, texts and so on. A single number or code has no value. Only a data set after combination, integration and aggregation of data has value. Therefore, the object of data rights should be a particular data set that has certain patterns and values.
Types of right	According to traditional legal interpretation, humans have two kinds of rights – personality rights and property rights. In the age of data, people leave "data footsteps" in various data ecosystem. Data is fragments of human behaviors, an important vehicle to social activities and an essential extension of one's personality. We should protect the dignity of the data subject as a human being, whose freedom should not be deprived, reputation not damaged, privacy not intervened and information not stolen. Furthermore, such data are important social resources and can be priced, which have values and can bring economic interests to the data subject. Therefore, data property right should be established. Thus, data right becomes a comprehensive right involving both personality right and property right.

Characteristics	Summary
Attributes of right	Data right is the combination of pubic right and private right. It includes both data sovereignty, which is country-centered and shows the dignity of a country, and data rights, which is individual-centered and emphasizes the dignity of personal interests. The legal attribute of data rights should be analyzed from both the perspective of private rights like personal rights and the perspective of public rights like national security. That is to say, data rights need the autonomy of private rights as well as the intervention of public rights.
Powers and functions	Real right shares the exclusiveness of ownership. There cannot be two ownership on the same thing and everyone has the obligation of not interfering with the obligee's absolute control over his or her things. Data right, on the other hand, is no longer an exclusive right, but a shared right. "There can be multiple ownerships on the same data," which is the core and nature of data rights. The proposal of the important legal theory – "The nature of data rights is a shared right" – will mark the changing of civilization rules.

Differentiation between human right, real right and data right

Human right is the only symbol that is shared by all human beings and is the greatest common divisor for people around the world. The so-called human rights are "rights enjoyed and should be enjoyed by human beings based on the nature and social essence of humans" (Li B. 2003, p. 169). The human in human rights does not refer to economic man, moral man nor political man,[31] but natural persons with biological characteristics and without any additional factors. We should be able to enjoy human rights just because we are human beings. The establishment of human rights is related to the philosophical foundation of human rights. There are many theories about

31 First, it doesn't refer to economic man. Economic man goes after interests and human rights wouldn't have enough protection if everyone is economic man. Second, it doesn't refer to moral man since human rights is not related to the existence nor level of morality. At last, it doesn't refer to political man. Though human rights has political attributes, using human rights as tools in political struggles will limit human rights.

the origins of human rights, such as customary rights, natural rights, legal rights and utilitarian human rights, human nature and moral rights.[32] Human rights are rights in nature, "rights – human rights – legal rights – basic rights of citizens are concepts that incorporate and belong to one another" (Lin Z. 2004). The concept and connotation of human right is relatively broad and the protection of human rights covers a lot more than what legal rights and basic rights do. With the development of our economic society, the dimension and type of human right as well as its connotation and denotation will expand.

The proposal of real rights is the starting point of a new civilization. The mechanism of real right has ownership as the core and is supported by real rights for security and usufructuary rights. Real right is the right to control *res corporales*, which means that the obligee has the right to possess, utilize, dispose of and obtain profits from his or her properties according to his or her own will and free from other people's interruptions. Acceptance of real rights is, after all, the acceptance of values created by individuals and the right of individual autonomy. Therefore, real right is a special, basic human rights related to things. The acceptance and protection of real rights show that we began to establish a new social civilization centered around "humans." Under this new system, we have the idea that real right is not only an important part, but also an essential protection of human rights. Only when we fully protect the rights of each individual in our society can we promote the development of interests for the whole. *Real Right Law* is not only a law to protect properties and rights for Chinese people, but also

32 Customary rights: this is an empirical deduction of human rights represented by *Magna Carter*, with the logic being "customary rights → legal rights." Natural rights: this is a transcendental deduction of human rights represented by the French *Declaration of the Rights of Man and of the Citizen*, a classic theory of human right, with the logic being "natural rights → legal rights." Legal rights and utilitarian human rights: it is believed that human rights originated from formal or informal laws and regulations and free and equal pursuit of happiness and interests is the biggest value and virtue. The theory of human nature: it is believed that human nature has both natural and social attributes, with the natural attributes being the internal reason and foundation of human rights and the social attributes being the external reason and conditions. Moral rights: it is believed that human rights lie in the moral system and should be maintained by morality. The legitimacy of human rights is based on human morality.

a law that shifts social concepts and reshapes our culture psychologies (Gao 2007) (see Table 5).

Table 5. Differences between Human Rights, Real Rights and Data Rights.

	Human Rights	Real Rights	Data Rights
Subject	individuals, organizations	particular persons	particular obligees, including the particular person that data points to and those who collect, store, transmit and process data (including natural person, legal person, unincorporated organization, etc.)
Object	rights to things, behaviors, spiritual products, information and so on	particular things controlled by people; rights provided by laws	data sets with certain values or patterns; exceptions can be provided in laws
Content	personal and personality rights; political rights and freedom; economic, social and cultural rights; rights of vulnerable groups and special groups; rights of international communities and so on	ownership; rights over others' properties (real rights for security and usufructuary rights)	ownership; usufructuary rights; data rights for public interests; data sharing rights

Data is different from the "res" mentioned in civil laws in the past. Unlike other things, the control of data is not exclusive, which is decided by the intangible format of data. In this case, data is similar to intellectual achievements. But data is not "res" (real or movable properties) nor intellectual achievements or rights. Data is a kind of object different from the "res" with tangible formats, and the control of data is not exclusive nor consumable (Li A. 2018, p. 72). The allocation and control of the property rights in data is different from the possession and control of *res corporales*, so the real right system for *res corporales* is not applicable to data. It can be said that data right is not the same as any other traditional right, though they may

share some characteristics in common. We should not try to include data in existing laws by expanding the real right law or IP law, but rather follow our long-time practice to establish a new law for data. Therefore, besides the current property rights system, we should set up a new type of right for *res incorporales*, establish data sovereignty and relevant legal systems for data rights, thus creating a standalone property protection system that is different from the one for *res corporales*.

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CHAPTER 3

The Concept of Data Rights

Data is a fundamental resource in a modern society. Its value has been well recognized. Meanwhile, the digital age has also brought unprecedented challenges to civil law, real right law and other traditional laws. Traits of data like personality and property have become unavoidable legal issues. In the legal academia, debates have been made on data rights and their ownership for a long time. Theories have been established regarding the new personality rights, intellectual property rights, data property rights, etc. These theories and ideas, although well-established, cannot cover all the features of data rights. Our research finds that data rights are a comprehensive combination of data personality rights and data property rights. The right of possession is the essence of real rights while the right to share is the essence of data rights. With the development of big data, data rights and their ownership have become global issues. The introduction of data rights law will become an important cornerstone for mankind stepping into the era of data rights from the era of property rights.

Theories of Data Rights

While data rights develop from idealistic to actual ones, discussion on data rights is definitely inevitable. In consideration of the threat brought by rapid development of the Internet and big data, it is particularly important and urgent for us to strengthen the protection of data rights by legislation. In the legal academia, heated discussions have been made on data rights and their ownership. Although no consensus has been reached so far, the mainstream views generally fall into four categories: theory of a new type of personality

right, theory of intellectual property, theory of trade secrets, and theory of data property rights.

Theory of a new type of personality right

The traditional personality right refers to a right with the subject's inherent personality interests as the object for the purpose of maintaining and realizing the equality of personality, personal dignity and personal freedom. It is a traditional civil right (Hu 2011). "The personality right is the right to the personality of the right holder himself, that is, the rights and interests a person has in the society are protected by law since personality is an integral part of a person, including the rights of life, body, freedom, chastity, reputation, portrait, name, credibility, etc." (Zheng 1988). There are relevant provisions in the *Constitution of the P.R.C.* and the *General Principles of the Civil Law*. In accordance with Article 38 of the *Constitution of the P.R.C.*: "The personal dignity of citizens of the People's Republic of China is inviolable. Insult, libel, false accusation or false incrimination directed against citizens by any means is prohibited." The *General Principles of the Civil Law of the P.R.C.* stipulates the protection of personality rights including the rights of name, portrait, reputation and privacy.

Personality rights are an open-ended system of private rights (Wang 2015). With the improvement of science and technology and social development, the scope and content of the rights are constantly evolving. Big data has been widely and deeply utilized in various aspects such as economic operation mechanism, social lifestyle, national governance capability, national defense and army building. Data has become increasingly and prominently important and, meanwhile, brought new challenges to data protection. In the process of data processing, some personal private information which is not expected to be disclosed by the owner can be extracted, and the "data image" of the subject can be obtained through data-fusion and association analysis. The more data are provided, the more specific the image will be. In reality, illegally sorting out fragmented data, such as videos, social media content, personal account information, location information, and online consumption information, can undermine personal interests, such as the rights of life, name, etc., which form an integral part of personality rights.

Personal data protection has gone far beyond the scope of traditional personality rights. Traditional personal data protection is mainly regulated by the system of privacy. Despite overlapping in content (for instance, both data rights and privacy aim to protect the data owner's personal dignity), the two rights are fundamentally different: first, privacy means disclosure of personal information is absolutely forbidden, whereas data rights refer to the protection granted to data during the process of data controlling, using, benefits gaining and sharing; second, privacy emphasizes the passive protection of individual privacy, while data rights stress actively guiding the utilization of personal data in social activities; third, unlike the object of privacy in which there are specific personality rights to names and portraits, etc., when a person changes his or her mobile phone number, home address, etc., he or she can still be traced with the reference of other data. Wang Liming and other scholars state that personal information, identifiable and sometimes collected for public interests and other purposes not related to property, should not be simply defined as a property right (Wang 2012). Given the content and features of personal data right, it should be deemed as a new type of personality right. This idea was developed on the grounds as follows.

First, the commercialization of personality rights is widespread. The traditional personality rights focus on spiritual interests instead of physical value. Under the development of market economy, some of the personality rights are being commercialized. With the improvement of the appraisal mechanism of property value of the personality rights, people at large have begun to pay attention to the spiritual rights, which increases the commercial value of personality rights featured with *res incorporales*. For instance, the names and portraits of renowned people are licensed to be used for commercial purposes for the sake of the effect of celebrity. At the same time, the storage, dissemination and utilization of personal data in the cyberspace are open, immediate, and convenient. Fragmented data, through association analysis and data-fusion, can be spliced into a "data person" and, subsequently, the results of the "data person" analysis can be used for commercial purposes. The commercialization of personality rights has prevailed in the society of market economy (Wang 2013), which made it necessary to reconsider the traditional personality rights.

Second, the existing personal information protection systems are not sufficient for personal data protection. Personal information was initially part

of privacy protection, but with the development of information technology, personal information was given personality value. The system of privacy is therefore apparently insufficient to protect personal data. The determination of the legal nature of personal information rights relates to the composition of the protection mechanism of personal information, especially the civil rights system. On November 15, 2017, the Civil Law Office of the NPC Legal Affairs Committee issued *The Chapter of Personality of the Civil Rights of the People's Republic of China (Draft)* (Internal draft), in which the provisions regarding personal information are of great significance to the improvement of legal system and judicial practice.

Third, the legislation on personal data rights is of great significance. In traditional civil right system, property rights are the kernel of civil rights. However, in the era of big data, the right to personality has drawn more and more attention in the society. It is therefore necessary to establish a new personality right system in modern civil law to adapt to the development of the information age. The right to personal data should cover the protection of both spiritual interests and property interests of the personality, that is, a data subject can, for a commercial purpose, trade his personal data in the market of data products as long as his personality is not damaged. In case of an infringement on property interests, the losses incurred by the data subject can be calculated at market prices (Wu 2016).

The theory of intellectual property rights

Some law scholars found that data is inextricably linked to the protection of intellectual property rights since data is reproducible and reusable. They suggested that the theory of intellectual property rights can apply to data rights. The theory of intellectual property rights cannot provide complete protection to data due to the limitation of the theory of immaterial objects, but, with the technological development, creation and processing of data by data subjects, such as association analysis, data fusion and data mining, a new data set or a personal database comes into existence and bears a trait of originality to a certain extent. It therefore should be deemed as intellectual property rights.

Data property rights are similar to information property rights, whereas information property rights are an extension of intellectual property rights

(Zheng & Zhu 2006). With the development and widespread use of information technology, many laws regarding the protection of information processing technology and transmission technology have been enacted, but little attention has been paid to the protection of information itself. In the *Outline of Intellectual Property Strategy* promulgated in Japan in 2002, information property and intellectual property were said to be the most important assets of the twenty-first century. "Information property rights" and "intellectual property rights" are the same in meaning (ibid.). The third wave of the technological revolution has brought about a revolutionary change. Information has become the main property, replacing land, machinery and other tangible property. However, information property rights are protected mainly under the traditional intellectual property law.

In cyberspace, infringements of patent, the rights to information network dissemination, business models, source code, etc., occur frequently. The *Special Report on the Big Data of IP Infringements* (hereinafter referred to as *Special Report*), issued by the Supreme Court in September, 2017, showed that, in 2015 and 2016, copyright cases accounted for 50.2 percent of intellectual property cases in China; and three quarters of them were cases involving infringement on right to information network dissemination or right to display. The statistics in the *Special Report* showed that the time the court spent on cases of passing off others' patents, infringement of patent of invention, and infringement of software copyright exceeds the average case-handling time. And the lawsuits involving IP infringement were settled mainly by withdrawal of complaints. Issues involved in the big data lawsuits handled by the court are such as the original data subjects were unclear, the legal nature of data rights was undetermined, people did not know what cause of action they could have to protect their rights, etc. Under the current legal framework, neither theoretical discussions nor judicial practices have provided definite answers to these questions.

In a word, what the law protects shall be fixed in a particular media and in a certain form (Li 2013). The protection of data rights related to big data includes copyright, patent for business modes and data analysis, trademark of data products, trade secret, etc. Different data rights can be protected by different competences in IP systems, based on the rights and interests in data resources.

The protection model of products with originality. Throughout the whole process from data creation to utilization, four types of protection of rights and interests are involved. First, data which is collected, transmitted and stored in the database is eligible for copyright protection. Second, data, through association, fusion, mining analysis, maximize their value, and are eligible for trade secret protection. Third, creative techniques and methods that are created in the process of data processing are eligible for patent protection. Fourth, data products fixed in software are eligible for copyright protection of computer software.

The protection model of products without originality. Data without originality is also collected and processed at substantial costs. Scholars of traditional theory of originality propose to exclude from copyright protection collected and arranged data with high-value-density but no originality. Neighboring rights protection can be extended to objects that copyright protection cannot cover, so data collectors or possessors are granted neighboring rights. The era of big data is the era of data explosion. The cost of finding effective data in the data torrent gradually outweighs the creativity of expression. Most datasets established for collection and dissemination of effective contents are not original. Meanwhile, the rapid development and widespread application of data mining technology, intelligent technology and business modes have made data play an increasingly important role in all areas of economic and social development. Datasets, as special objects, although not eligible for the protection under copyright law or unfair competition law, can be protected by neighboring rights, given its features of non-originality and high value density.

The theory of trade secrets

In the era of big data, the global data volumes are exploding every day. Data is easy to be obtained due to its attribute of easy dissemination. Today, with the rapid development of digitization, trade secrets are mainly manifested in the form of data. Unlike in the traditional network environment, trade secrets in the era of big data are easier to be disclosed. And under the traditional legal framework, the security of trade secrets has become an outstanding and tricky issue mainly due to the circumstances, such as legal restraints on

data transactions, especially data transactions involving trade secrets, are lacking; a large number of trade secrets data is stored in a unified server, being susceptible to attack; the complete trade secrets can be obtained from scattered corporate data by big data mining technology; corporate employees are prone to disclose important enterprise information for lacking awareness of data protection; data storage and transmission are hard to be controlled due to its easy-to-store and easy-to-disseminate features, which goes against the protection of trade secrets and corporate rights; high technology in the era of big data makes infringement more elusive, its impact is more complicated and serious, and protection of trade secrets more difficult. All these issues have posed more challenges to the existing laws and regulations.

The *Anti-Unfair Competition Law of the P.R.C.* provides for the trade secrets protection, but fails to define the "right to trade secret." Meanwhile, the *General Provisions of the Civil Law* has included trade secret into intellectual property and gives a definition thereto. A trade secret has trade value. It is confidential and non-exclusive. On the one hand, a trade secret shall be unknown to the public. Once a trade secret falls into the public domain or is disclosed, its trade value will be lost. This characteristic makes it obviously different from traditional intellectual property. On the other hand, trade secret right is relative and non-exclusive. Once a third person obtains a trade secret by proper means, he shall have the same right with the prior owner. Data also has economic value. It is also confidential and non-exclusive. Under certain circumstances, data may be deemed as a trade secret. A trade secret has three elements: value, confidentiality and manageability, but in the era of big data, many new circumstances have posed challenges to the requirement in the following aspects.

First, conflict in confidentiality identification. The conflict in confidentiality identification mainly refers to the conflict of privacy with accessibility and the conflict of confidentiality with transparency. Conflict between privacy and accessibility. Unlike in the traditional network environment, the era of big data has brought about new changes: there emerges a great many new types of media, the information access channel is more diversified and extensive, and data acquisition has become extremely easy. Thus, whether a particular data is confidential has become controversial, making it difficult to identify the confidentiality of trade secrets. In the production management of enterprises, network information technology is widely used.

Social network software, WeChat, QQ, e-mail and other business information dissemination methods, online cloud service data processing methods, and corporate employees' communication by the social network software on business sensitive information, etc., have increased the risk of disclosure of trade secrets to varying degrees. These kinds of business sensitive data are inadvertently transformed into network data in daily work. And the features of network data being easy to be accessed undermines the confidentiality of trade secrets.

Second, conflict between confidentiality and transparency. All data stored in the cloud is completely transparent to cloud service providers. The account password of the enterprise user is useless for the cloud service provider. Data stored in the cloud by enterprise users is actively and voluntarily uploaded. Generally speaking, such voluntary disclosure of trade secrets is not legally protected. If enterprises do not pay attention to this transparency feature of big data, it is likely that trade secrets are exposed to potential risks at law.

Similarly, an enterprise transmitting its trade secrets to a third party does not constitute voluntary disclosure of the secrets. Nor does it mean that the enterprise gives up the confidentiality of the trade secrets. As long as the data is not disclosed or used by others, and the right holder has taken other protective measures and kept it confidential, the trade secrets data shall still be under protection of the trade secret law. Therefore, express confidentiality agreement on trade secrets protection is crucial when it comes to the storage and transmission of trade secrets data. Second, "reasonable confidentiality measures" are difficult to identify. Manageability is an indispensable element of trade secret. The law requires right holders to take reasonable measures to protect trade secrets.

However, in big data applications, it's hard to identify whether some acts fall under the category of "reasonable confidentiality measures." For instance, if a rights holder uploads trade secret data to a password-protected cloud, will the act adversely affect the protection status of the trade secrets? Some scholars hold that "reasonable confidentiality measures" have been taken if the data is stored in a private cloud and "reasonable confidentiality measures" have not been taken if the data is stored in the public cloud. It does not make any difference whether the password is an ordinary one or not, since, unlike public cloud, private cloud itself features isolation of

other users. However, some other scholars assert that public cloud service providers provide ordinary password protection (accessible only through a username and password) while providing service to customers, so there are "reasonable confidentiality measures" as long as other people are aware of these confidentiality measures which can ensure the user's trade secret data cannot be obtained easily by the search engine. In addition, the technical level of cloud service providers also can affect the identification of "reasonable measures." The characteristics of dynamic sharing of cloud service data make data management very challenging. If the technical level of cloud service providers is too low, unauthorized data access and network attacks will threaten users' data security, resulting in users' data being easily stolen, which directly affects the identification of "reasonable measures."

In addition, it is difficult to determine the scope of the objects. With the emergence of mobile communication devices such as smart phones, the mobile Internet has developed rapidly, and its powerful data generation capability has become one of the main driving forces for the development of big data in the world. Nowadays, obtaining and sharing data has become an important part of human social life. According to statistics, there are about 5 billion mobile communication users in the world. These users are potential information recipients and consumers. Such a large user group means unimaginable business value. Through social network platforms (such as Weibo and WeChat public account), enterprises can promote business and gain business benefits. Moreover, as the enterprise enhances its account management, the online relationship circle of the account is increasingly expanding and maturing and, consequently, the influence of the enterprise will continue to expand. Moreover, these social network accounts, as representatives of the enterprise on the network, are an integral part of the enterprise and hence are irreplaceable. Therefore, the protection of corporate social network accounts by the trade secret law is a demand of many enterprises. As a result, the object scope of trade secret extends from enterprises to corporate social network accounts, giving rise to the problem of the expansion of the object scope. Judged from the cases which have been handled, this practice has not been supported by the court yet. However, with the development of big data, it is likely that the data that was not deemed as a trade secret in the past will be included in the object scope of trade secrets protection.

Theory of data property rights

In accordance with the theory of data property rights, data is property in nature. It is a new type of property. Under the background that the current legal systems of personality rights, intellectual property rights and trade secrets are insufficient to provide reasonable protection for data, it is of great practical significance to establish data property rights through legislation. "Data banking" and "data conventions" which appeared as early as 2008 show that the global market of big data, with data as the transaction object, has been formed, and it is well-accepted that data is a new type of property.

Data is not a "thing" in the Real Right Law. Therefore, data property right and real right are not identical. Data property rights cannot be regulated by the real right system. The concepts of "a thing" and "real right" were proposed in the German Civil Code in the second half of the nineteenth century, in which "a thing" is defined as a tangible object and "real right" as the right to dispose a tangible object. These definitions are made on the basis of the idea that the ownership to interests in a thing is determined by the ownership to the thing. The right to economic interests in the thing and the thing itself shall belong to the same subject. Ownership to a "thing" constitutes complete real rights while the thing is the object to which the real rights are attached. Under the general doctrine of jurisprudence in China, a "thing" is characterized with its exclusivity and disposability. The exclusivity of real right is determined by the physical form of a thing. At the same time, the subject of a "thing" is unique and a "thing" cannot be owned by two subjects. One subject's control over the "thing" constitutes exclusion of others on the "thing." The exclusivity of real right is attributed to the two factors: 1. the physical form of a "thing" objectively determines the actual monopoly in possession of the "thing," that is, it can be owned only by one person rather than two at the same time; 2. in the process of use, the value of the "thing" itself and its use will be reduced overtime. When one gains profits from the "thing," others will be excluded from gaining profits from it at the same time.

Contrary to a "thing" which has physical form, the most striking feature of data is its non-physical form. Data is different in nature from electricity, heat or other "non-physical" objects under the *Real Right Law*. Each unit of electricity or heat can be owed by one subject at one time. And electricity

or heat as an object can be consumed by its subject. Meanwhile, the non-physical data can be copied indefinitely nearly at zero cost and without any loss. The value of data does not lie in data itself but its contents. Therefore, data theoretically is not exclusive in terms of possession and disposability. In the development of data industry, since data can be infinitely copied without any loss, it has become an internal demand of the data industry for using data as sufficiently and frequently as possible.

The non-physical form makes controllability of data differ from exclusivity of a thing. Although data can be copied and used indefinitely, it does not mean that data is uncontrollable. A rights subject may control the data in his or her possession in accordance with the law. Other subjects may be authorized by the rights subject to use the data within certain scope. Thus, the possession and control of data is not physical monopoly. Unlike property which can only be owned by one subject at one time, data can be owed by two or more subjects at one time.

In a word, data is a new type of object which has no physical form and is non-exclusive and non-depleting. Take personal data for example, individuals, enterprises, and government agencies can use the same personal data at the same time. Although personal data is targeted at individuals, the three subjects do not conflict with and exclude from each other in disposing the same data. Of course, enterprises shall meet certain requirements before using the data; government agencies may use it for the purposes of national security, social management and provision of public services. In addition, the value and the use value of the data are not reduced when it is used. Therefore, in terms of attributes, data and a "thing" in the Real Right Law are inherently different. Besides, data property rights shall not be interpreted as an expansion of real rights. The concept of ownership is derived from the integration of a person and a "thing." Its value lies in identifying who owns a "thing," and establishing the complete possession of and control over the "thing" by the subject. It can be seen that tangible objects are the basis of real rights system and the theories on real rights system. But it is obviously inappropriate to apply real rights theories to data property rights. To apply the theories of things and ownership to other *res incorporales* will inevitably cause a theoretical dilemma. The transfer of rights is a manifestation of transfer of property of all kinds in a civil relationship. Thus, as long as the ownership is defined by law, *res incorporales* can be understood from the perspective of

ownership and transfer of ownership, regardless of the framework of objects and ownership. Data property and tangible property are owned and disposed in different ways. Therefore, the real rights system, which is applicable to tangible property, cannot be applied to data (see Table 6).

Table 6. Theories of Data Rights.

Theory	Main ideas, reasons, and drawbacks
Theory of a new type of personality rights	Main ideas: Personal data rights fall into the category of personality right. It is a specific new type of personality right.
	Reasons: First, in terms of the connotation of the right, personal data right shall protect personal interests. The subject of data has a right to possess and dispose their personal data, which is the special connotation of the right. Second, in terms of richness of the object of the right, citizen's personal data generally include personal general data, personal private data, and personal sensitive data, some of which, such as name, portrait, privacy, has become specific personality rights for which, unlike other data, the protection mechanism of personal data rights is unnecessary. Third, in terms of the effectiveness of the protection mechanism, if a personal data right is deemed as a property right, it is unnecessary to protect against infringements on personal data of individuals; if it is deemed otherwise as a personality right, then on the one hand, the protection is necessary in ensuring that distinctions are not made on the way of calculation due to the difference in people's identities, thus in conformity with the principle of equality of personality; on the other hand, citizens may claim for compensation for spiritual damage in accordance with Article 22 of the *Tort Law*. Finally, from the perspective of comparative law, personal data protection laws all over the world mainly aim at protecting citizen's personal interests.
	Drawbacks: The personality rights of a natural person are exclusive and unmarketable. Any economic value produced therefrom cannot be deemed as property; otherwise, the value of identity as a natural person will be derogated.
The theory of intellectual property rights	Main ideas: Personal data rights fall into the category of intellectual property rights and, therefore, can be protected by copyright and neighboring rights.
	Reasons: First, databases or datasets with originality in selection and arrangement may be deemed as a copyrightable compilation. In

Theory	Main ideas, reasons, and drawbacks
	accordance with Article 14 of the *Copyright Law of the P.R.C.*, the copyright of a compilation with originality in selection and arranging of the contents of any works, excerpts of works, data which does not constitute a work, or other materials shall belong to the person who compiles the work. The "originality" therein does not refer to that in contents but in selection and arrangement of the contents. Second, databases and datasets without originality can be protected under the system of neighboring rights which are granted to the people who disseminate the works. German laws expressly provide that the system of neighboring rights applies to the protection of databases. The holder of a database who has made substantive investments in collecting data and establishing the database shall have the neighboring right to the compilation as a compensation for the labor and money the holder spent on the collection and arrangement of the data.
	Drawbacks: The low identification rate of data and the unique ways to realize its value make data difficult to become an object of intellectual property right. First, the identification rate of data is inferior to any of the objects of intellectual property right in creativity and novelty. Once the low-identification-rate data is illegally used, it is difficult to be discovered and redressed in a timely and effective manner. "There is no right without relief." Lack of relieves makes effective protection of data impossible even if rights are granted. Second, the value of intellectual property lies in the benefits gained through monopoly of economic use or circulation. The value of data is more manifested in the mining of potential information. The value of intellectual property object lies in the "results" of intellectual creation, which are valuable themselves, while the value of data with no value in itself lies in the instrumental "utilization," that is, operational control and content analysis.
The theory of trade secrets	Main ideas: Personal data is analogous to trade secrets and can be deemed as trade secrets under certain circumstances.
	Reasons: First, commercial benefits can be obtained by appropriating commercially valuable trade secrets. At the same time, trade secrets are non-public and non-exclusive due to its non-exclusive possession and control. Therefore, once it is disclosed and known by a third person, its commercial value to the original right holder will be diminished. Second, through the mining and analysis of data, corresponding commercial benefits can also be obtained and therefore data has

(*Continued*)

Table 6. (*Continued*)

Theory	Main ideas, reasons, and drawbacks
	economic value. Appropriation of data by a third person means that data is out of the control of the original holder and consequently the third person has the same rights in the data. Therefore, data is non-public and non-exclusive. Third, with the help of big data technology, complete trade secrets can be obtained by analyzing the fragmented commercial data, leading to the disclosure of trade secrets.
	Drawbacks: Trade secrets are characterized by being unknown to the public and bringing economic benefits to the right holders while data in cyberspace is accessible to the public, that is, most data are not trade secrets. In addition, the mere including data in trade secrets will seriously hinder circulation and application of data, which makes the achievement of the value of data impossible.
The theory of data property rights	Main idea: "Data property right" is a new type of property right. It means that each citizen has right to the commercial value of his own personal data.
	Reasons: With the advent of digital age, personal data has in fact the function of safeguarding the property interest of the subject. At this time, what should be done is to recognize at law and in theory that the subject has property rights in his personal data. Some scholars take the citizens' personal data right as a kind of ownership, that is, citizens have the right to possess, use, benefit from, and dispose of their own data.
	Defect: If a personal data right is deemed as a property right, its commercial value would be over-emphasized and the protection of citizens' personal data could be ignored. The latter is actually the primary goal of the personal data legal system and the most realistic demand of citizens. In addition, if the "person" in "personal data" is neglected, equality of personality will be inevitably impaired since "business is business." "People's information are different in value due to their different economic conditions, but their personality should be equally protected."

Definition of Data Rights

The aforementioned theories of a new type of personality rights, intellectual property rights, trade secrets, and data property rights, though reasonable to some degree, fail to exhaust all the circumstances that should be covered by

the data rights system. Data rights shall not be considered from a perspective of one particular right. Instead, Other perspectives shall also be taken into consideration. Meanwhile, data rights shall also be defined in the aspects of the subject, object, civil rights, state sovereignty, sharing rights, etc.

The subject and object of data rights

A. THE SUBJECT OF REAL RIGHT VS. THE SUBJECT OF DATA RIGHTS

Both Roman law and Germanic law defined the scope of real right with restrictions. In the period of Roman law, the subject of real right referred to a natural person who had all or part of the personality. Only those who had a complete personality could exercise full real rights. A slave as an object of real right could not be the subject of real right. In the period of Germanic Law, the subject of real right is divided in a top-down approach in correspondence with his hierarchical identity. Although people with different identities have different real rights, kings, lords, free people and serfs were all regarded as the subjects of real right. In China, as the *Book of Songs* said, "Of all that is under Heaven, no place is not the king's land; and to the farthest shores of all the land, no man is not the king's subject." In the feudal dynasty before the Republic of China, the subject of real right referred to the ruling class represented by the king or the emperor. Later, under the influence of Confucianism, parents and patriarchs became the representatives of real right subject, but they were also severely restricted. Since the modern times, under the impetus of social progress, the subject of real right has no restrictions in terms of social hierarchy. The *Real Right Law* stipulates the subject of real right as rights holders and imposes no restrictions on the subject of real right. In China, the subject of real right refers to the state, collective, legal persons, unincorporated organizations and individuals.

Data rights refer to the legal right of the subject requesting or claiming for the possession of data by the claimant, for the return of data, or for the recognition of particular facts (behavior) of data. The subject of data rights is a particular person of right, that is, a particular person or a person responsible for collecting, processing, transmitting, and storing the data. The said "person" includes natural persons, legal persons, unincorporated organizations, etc. However, the rights of different right subjects should

be different. For example, the copyright holder in the Copyright Law has copyright and full personal and property rights to the work. The one who creates a work by adapting, translating, annotating, and organizing existing works also has copyright with the prerequisite that no infringement is made on the copyright of prior works; the performer and producer of audio and video recordings must obtain the dual permission of the copyright holder for the performance and recording of the adapted works, and also enjoy certain rights of performers and producers of audio and video recordings. Therefore, for the subject of data rights, the uses of the data can be classified, and specific rights can be granted or restrictions on rights can be imposed.

B. THE OBJECT OF REAL RIGHTS VS. THE OBJECT OF DATA RIGHTS

The object of rights is the object pointed to by the contents of rights, or the object to which the rights are exercised. It indicates the circumstances under which the subject of rights can act or not act on an external object (material object or spiritual object). This kind of object always co-exists with the rights themselves. The object of real right is the object of real right enjoyed by the real right holder. The object of real right has the following characteristics.

First, the object of real rights is a thing. The so-called thing only refers to tangible physical property. The elements of physical property are as follows: the thing is physical; it exists independent of the human body, except as otherwise provided by law; it is capable of being controlled by man; it has use value and exchange value and thus can meet the spiritual and material needs of people. Things are physical, so they are also called tangible property or *res corporales*. None of non-physical property can be called *res incorporales*. Some of them can only be called intangible property rather than *res incorporales*. Sound, light, electricity and heat do not have a physical form, but are still physical, fall under the category of physical property. They, as special manifestation of physical property, are extensions of tangible property. Deeming them as intangible property from the perspective of human sense is understandable, but what the book intends to emphasize is that there is no such a thing as a *res incorporale* defined in real right law. The theory of *res incorporale* not only conflicts with the semantic rules, but is also likely to cause confusion of the basic principles in civil law.

Second, the object of real rights must be specific. A specific thing refers to a unique one which has special traits and cannot be replaced by other things. Real rights are the rights enjoyed by a particular right holder to control a thing, and the thing under control must be specific or definite. Things which are not specific are not controllable to a particular right holder. The so-called real rights hence do not exist. Therefore, the real rights owned by a right owner must refer to the rights and interests in a specific physical object, such as land, houses, refrigerators and color TVs. Meanwhile, any transfer of real rights shall be demonstrated by registration or delivery. If the object of real rights is not specific, registration or delivery cannot be made. It, therefore, can be concluded that the legal relationship of real rights has a natural and logical requirement that the object of real rights must be specific. A species, in contrast to a specific thing, is not the object of real rights; but when specified, for instance, by selection or delivery, it will become the object of real rights.

Third, the object of real rights is controllable. The real rights lie in controlling the property and enjoying the interests therein. This concept is obviously different from the obligatory rights. The real rights refer to the control of a person over a thing while the obligatory rights refer to the rights of a person to make a claim to another. The control of a subject over a thing means that the subject, through no media, can impose his will upon a thing as an object, that is, the right holder is capable of controlling a thing without any influence from others.

Fourth, the object of real rights is exclusive. The real rights can be fully obtained only by excluding others from interference including illegal interference of both public powers and private rights. A right holder may exercise his real rights at his own will. He is free to dispose his property. No prior consent or interference by a third party is needed. When an infringement occurs, the right holder may claim for relieves including injunction, restitution and compensation.

Compared with real rights, data rights belong to a new type of right relationship with a focus on the rights and obligations of the subject of data rights to the data. For data, the requirements of specificity, controllability and exclusivity of real rights are difficult to satisfy, so data cannot be a "thing" as the object of real rights. In addition, data, unlike intellectual property, is hard to be identified, and the methods to realize its value are

comparatively unique. All these factors prevent data from becoming the object of intellectual property rights. Therefore, a new type of rights relationship between people and data should be established independently of real rights and intellectual property rights.

The object of the data rights is specific data, especially datasets. In the data society, a single datum is no more than a meaningless digital symbol. Only a specific dataset is valuable. Data is different from the thing defined in civil law. Generally speaking, the so-called object refers to the *res corporales* and natural forces that exist independently of the human body, and can be controlled by human to meet the needs of human society. Because data is intangible, it is difficult for civil subjects to achieve complete control over it. The control is actually very limited. In addition, data is not fully deliverable. Data is easily retained in the transaction process due to its feature of reproducibility, which makes it difficult be absolutely exclusive. Although the storage and transmission of data will take up space, this space is virtual rather than physical. Therefore, data is different from things and does not fall under the category of a "thing," but this feature does not hinder data from meeting certain social needs. Data right holders have the right of control over the use of data sets in the similar way they use things.

Data rights: A new type of civil rights

A. WHAT ARE DATA RIGHTS?

With the advent of the big data era, data has now become an objective and independent reality. Nonetheless, being something not tangible but digitalized symbols, data falls outside the category of "property" as defined in the *Property Law*. Since the *Property Law* governs the ownership and use of tangible properties, data is not something within its parameter. In an era of big data like nowadays, citizens enjoy such rights, that is, data rights. Data rights comprise a number of rights with regard to data, such as the right to own, collect, store and utilize data, the right to data privacy and the right to be informed. Those who enjoy data rights, that is, citizens, may automatically enjoy a wide range of rights as could be seen encompassing rights of personality and rights of property (see Figure 3).

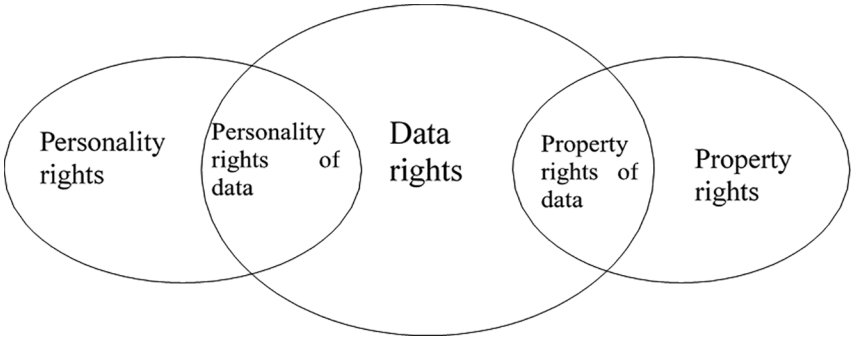

Figure 3. The Relations of Data Rights.

Data rights embody the personality rights of citizens. In most traditional civil law theories, personality rights are inherent, inalienable and imprescriptible rights enjoyed by the subject, which are in nature passive and defensive, exclusive of property attributes. The objects of personality rights are elements that compose an individual's personality. Personality rights belong exclusively to the subject and are with no direct property attributes. Personal data, as an inherent element that composes the personality of an individual, plays the crucial role of maintaining one's personal dignity. To begin with, personal data of a citizen is a kind of personally identifiable information that are exclusively owned by a specific natural person and that traces to a particular natural person. The personal data of a citizen can be used to identify the person. Also, a citizen's independent control over his or her personal data reflects individual personal dignity. In terms of content, data right could also be defined as a right of personality. However, unlike traditional rights of personality, the nature of data rights is derivative. Data rights are derived from traditional personality rights. The object and content of data rights are also different from those of traditional privacy right. Therefore, data rights are not only a new and independent category of rights, but also irreplaceable by traditional personality rights and privacy right in term of functions. The personality rights of a citizen embodied in personal data determines that, as the object of personality right, personal data must be protected and secured.

Data rights also embody property rights. Personal data often contains great value. Such values may mean great economic benefits for obtainers of

personal data when it is exploited by another party other than the legitimate owner of such personal data. In the past, due to limited economic and technological resources, personal data had not been commercialized and its potential economic value underestimated. Now, with the advancement of information technology, people come to realize, exploit and tap into the potential economic value of personal data. Data has gradually become a category of resources. Since every resource has its property attributes, data rights should be viewed as falling into the category of property rights and thus properly protected.

Data rights are independent from other types of rights. Data rights shall not be simply identified with personality rights or property rights, but are more like an integration of the two while remaining independence. In fact, contents of data protection could be found in both personality right law and property right law. These two kinds of laws are with different means and focus and cannot completely substitute each other. With regard to data rights, property law and personality law are not "either-or" but "both-and." Personal data of citizens, as the object of data rights, epitomizes the personality and property attributes of data rights. Nevertheless, personal data is not the only object of data property rights. Other data with economic value may also be considered as objects of data property rights. Along this line of thought, the personality rights and property rights may play concerted role in the protection of personal data; while other data with economic value could only be related to property rights.

B. CORRELATION AND GAME PLAYING BETWEEN DATA RIGHTS

Data rights tend to be recognized along with the producing of data, and have been attracting wider attention with the reality of big data. As big data evolves, new types of data rights emerge, including not only conventional rights such as information property rights and the right to privacy, but also new rights. All too often, for each type of data rights, the information involved and the subject of right are different from one another. Different data rights are interconnected, intertwined and interdependent. Such an interaction or game playing among those rights give rise to a new regime of rights that may bring huge impact on various aspects of our social life.

In addition, the most recent information technologies, such as big data and mobile Internet, have facilitated digitalization of our society and continuously lowered the cost of data collection, storage and utilization. As the main source of data, people produce data in every single minute throughout his or her life. Data exists in huge quantity and vast diversity. With the help of powerful computing capacity of machines, data users can easily sort out the correlations of different data and identify every single trace of a particular person's life or lives of a group of people. Going one step further, these data can even be used to predict future behaviors and thus producing economic benefits. Hence, it is necessary to provide sufficient protection for data rights against illegal collection and utilization of personal data.

Furthermore, mass data indicate mass values. Personal data in large quantity and diversified forms could be rather valuable in both strategic and economic terms. Without effective collection, storage, cleansing and digging, personal data can hardly be turned into end products, nor can data technology be effectively upgraded. Therefore, data rights not only reflect the personality rights and property rights of individuals, but also influence the development of digital economy of a nation. For data companies that have a pressing demand for dealing with personal data, in particular, it is of crucial importance to specify whether they are eligible for obtaining personal data, if the data are obtained through legitimate channels, and what types of rights they possess. To some extent, data rights protection and the relevant regime may play a vital role in data traffic and the development of the entire data industry.

C. PREDICAMENT OF PROTECTING DATA RIGHTS

The existing regime of legal rights is defined by real-life concrete elements. This right regime is human-centric and constantly evolves with the outside world. New legal relations will take shape when changes happen in the outside world. In the era of big data, data rights could be perceived as such kind of emerging legal relations. Data rights are not a set of independent rights but rights derived from the virtual world that could hardly be handled within the existing concrete legal regime.

First, take a look at the limitations of the personality right theory. Personality right, such as the right to name, image and reputation, plays a

very limited role in terms of the protection of personal data. Processing of personal data, such as names and images of individuals, doesn't always constitute a violation of personality rights. According to traditional civil law theories, the personality right is purely a right with spiritual ramification. With the expansion of commercialization, personality rights begin to take on attributes of properties. People began to realize and uncover property rights embodied in the rights to name and image. However, the key function of personality rights remains intact. Data rights consist of both personality and property rights, and both spiritual rights and property rights of individuals shall be subject to protection. Under such a category of rights, relations among the possessor, processor and users of data shall be balanced. Therefore, data rights should cover not only the spiritual and property rights and interests of data possessors, but also the property rights and interests of data processors and users.

Let's then examine the limitations of the privacy right theory. Personal data does not equal privacy because the latter does not cover the extended meaning of data rights. Privacy refers to the right of individuals to seclude information about themselves, their personal activities and personal space. Such information entails no public interests and is not made public. Personal data may already be disclosed to the public or fall within the sphere of public order, whereas the protection of its privacy may thus be restricted by public interests. A very small portion of personal data would be kept in confidentiality and the majority is non-confidential. "Genetic information, medical records, health check documents, criminal records, home addresses, private activities"[1] and other sensitive information are protected by the privacy law. However, personal data, such as name, telephone number and address, once disclosed by its owner, may not be protected by the privacy law no matter how it is utilized by a third party. Once disclosed to the public, technical desensitization of personal data increases the complexity of privacy protection. It is then difficult for an individual to resort to the privacy law and to enjoin other people from using his or her personal data. Consequently,

1 The Supreme People's Court. 2014. *Provisions of the Supreme People's Court on Several Issues concerning the Application of Law in the Trial of Cases involving Civil Disputes over Infringements upon Personal Rights and Interests through Information Networks* [EB/OL] (October 21) <http://www.court.gov.cn>.

personal data would not be protected by means of seeking relief from the property law. In a word, in terms of the processing of personal data, the existing privacy rights and interests can only offer very limited protection mechanism for personal data.

The limitations of the property rights theory will be addressed in the following paragraph. When data rights are concerned, the theory of property rights delivers its functions mainly through an emphasis on the right to control data rather than the right to use data. Data lacks the independence of a civil object; thus, it is contradictory with the principle of "one ownership for one object" (meaning that one and only one ownership can be established for an independent object). Individuals are the primary producer and source of data. When these original data are collected, processed and analyzed by other parties, individuals are no longer the sole contributor, actual possessor or controller of data. In other words, individuals are only providers of data. Without the network services and technical support provided by data collectors, data cannot be generated and the information embodied in data will not exist.[2] "All data rights and interest allocations in data provided in our laws need appropriate codes to decipher" (Mei 2016). This means that, individuals don't enjoy comprehensive property rights of their personal data. Nor can they do transactions of data, or exercise data rights in accordance with property laws. All in all, the property rights theory has obvious limitations in the protection of data rights.

What about limitations in the theory of creditor's rights? The theory of creditor's rights advocates the protection of virtual property by using the law of contract and emphasizes the contractual relations between network service providers and their subscribers. In terms of data creditor-debtor relations, the owner and the collector of data may have contractual relations. However, given the complexity and dynamism of data rights, the data owner and other data users may not be able to strike a contract for the benefit of third-parties. Even if such a contract is established, out of consideration for interests, data users often exclude the lawful rights of data owners when drafting the contract. Without contractual terms on data rights, data owners lack

2 For instance, on August 19, 2013, when Yahoo China stopped its email service, all of its users could not log in or use Yahoo mail and all the emails and other content stored in its email server could not be accessed any longer.

the legal basis to request the nullification of the right exclusion clause. In the eyes of the parties to contract, data is not viewed as a contractual object, but an invisible object. Unless the legal status of data is clearly sorted out and properly defined, a series of problems will not be resolved in the protection of data rights using contractual clauses.

Finally, limitations of the theory of intellectual property rights will be discussed here. Intellectual property rights do not cover the protection of personal data. So far, there is no such a country around the world that uses intellectual property rights to address the protection of personal data. Scholars who proposed the inclusion of personal data to the scheme of intellectual property protection only find it easier and more feasible to protect the relevant rights of data users but not those of data possessors. Since there is an intrinsic connection between data and knowledge, data rights and intellectual property rights share many similarities. Meanwhile, data rights protection aims to facilitate data use while ensuring open access to data. It is thus fair to say that IP law is the closest right protection regime relating to the protection of data rights. Yet, in essence, it is impossible to apply IP laws here in the matter of data rights protection. First and foremost, data does not meet the originality requirement of IPRs; secondly, intellectual property protection cannot ensure the monopolized commercial utilization of data for obligees. Besides, IPRs follow the principle of exhaustion of rights, which means that owner of an IP right does not have absolute control over his or her patented products. However, data rights are reproducible and not exhaustive. In sum, IP protection would not be the same as the protection of data rights.

Data sovereignty: A new type of national sovereignty

Cyberspace is also under the reach of law. It also has sovereignty. At the Third World Internet Conference, President Xi Jinping proposed the concept of cyber sovereignty. *Cybersecurity Law of the People's Republic of China* also provides for the principle of cyberspace sovereignty. Sovereign equality is the basic principle established by the UN Charter in the physical international space. Respect for cyberspace sovereignty is the extension and development of this principle in virtual cyberspace. Data is the core existence

of cyberspace; whose security is beyond the traditional security scope and rises to the level of national security. Nowadays, many countries and regions, including China, have put forward the requirements for localization of data storage. Like cyberspace sovereignty, data sovereignty has become a new type of national sovereignty. Defending national data sovereignty in the global data torrent is an unavoidable key issue in the era of big data.

A. THE CONNOTATION OF DATA SOVEREIGNTY

Data sovereignty refers to a country's highest jurisdiction in generating, collecting, transmitting, storing, analyzing, and using all the data in the forms of text, pictures, audio, video, code, programs, etc., generated by individuals, enterprises, and related organizations within the jurisdiction area of a country. The connotation of data sovereignty is mainly reflected in the three aspects: data control rights, independent development rights of data industry and data technology, and data legislative rights.

First, data control rights. Cyberspace is composed of data. It can be said that data sovereignty is the core of cyberspace sovereignty. With the development of human society, following territorial land, sea, air, and space, cyberspace has gradually become a new territory for the development of all countries. Whoever can control the data can take the initiative in cyberspace. In the era of big data, data ownership will become a key factor for sovereign countries to have a voice in the international arena. In future, a country without data sovereignty will have difficulty in controlling the data resources of its domestic society, and it will be extremely vulnerable to violation, control or attack by other countries with data powers. The data security issue therefore may even threaten the security of national sovereignty.

Second, the independent development rights of data industry and data technology. With the development of big data, a new hegemonism probably engenders, that is, data hegemony. Developed countries have always controlled the high-end information technology (including software products, chips, etc.) by, which developing countries have depended on. For instance, China-US trade war reflects China's dependence on US chip technology. In the era of big data, data developing countries are also likely to rely on data products from data developed countries. And data developed countries will continue to strengthen this dependence, thereby turning data developing

countries into data colonies and implementing data hegemony. Therefore, the power to independent development in the data technology and data industry is a manifestation of a national data sovereignty, which belongs to the internal affairs of a country.

Third, data legislative power. The state, with the control of data, must protect the data security of the country by formulating corresponding laws and regulations in the data field. This is the data legislative power which represents a country's independent data management, which means that a country can, without interference from external powers, formulate its own data development strategy and data regulations and systems, and decide relevant matters in sovereign data field. Within the scope of international law treaties, the power of being free from any state's restraint and interference and taking the complete control over the domestic data management is an important manifestation of national sovereignty in the era of big data.

B. DATA SOVEREIGNTY AND NATIONAL SECURITY

Human beings are entering a digital age. In the fields of human economic development, social life, scientific research, even national defense and military, etc., the new generation information technologies, such as big data, cloud computing, and artificial intelligence, have been widely used. As a key factor, data has become the same as natural resources such as electricity and land. To become an important strategic resource of a country, the focus of national competition is also shifting from traditional resource competition to data resource competition. The volume of the data and the application capabilities will become an important manifestation of the competitiveness of the country in future. "The new round of powerful countries competition is largely to enhance the influence on and dominance over the world situation through big data" (Miao 2015).

With the development of big data, the game between countries around data control and utilization is becoming increasingly fierce. Many countries and regions have made big data development and application as a national strategy, and have launched big data development strategic plans to seize data resources, such as the *US Big Data Research and Development Plan*, the *EU Open Data Strategy*, the *Japanese Declaration of Building the Most Advanced IT Country*, and the *Australian Public Service Big Data Strategy*. In addition,

many countries and regions have implemented data localization policies and launched a data defense war. For example, countries such as India and Iran require domestic data to be stored within the country, and not to be permitted to cross the border. Russia requires localization of electronic communication and social network data of its citizens. The relevant data protection laws and regulations of the EU stipulate that data may be sent to countries or regions outside the EU provided that it is protected by local laws or contracts.

As data sovereignty becomes a new element of national sovereignty, data security has become a new focus of national security. Especially in the context of increasingly fierce data competition between countries, data sovereignty maintenance and data security protection are the content extremely important for national security. The "Prism Gate" incident fully exposed the fact that the United States used the core technology to commit network theft. With the help of big data and other means, the United States has upgraded its surveillance system over global data. Other countries are facing threat to national information infrastructures and important institutions which contain huge amount of data, such as water, electricity, transportation, banking, finance, health, commerce, and military.

In the face of data security threats caused by the lack of data control rights, many countries and regions have continuously enhanced their data security capabilities through various measures. At the same time, the establishment of data sovereignty is the fundamental way to improve data security capabilities, and the fundamental guarantee for preventing and reducing the attack on the national secrets, trade secrets and citizen privacy by external forces. Security is the bottom line of national sovereignty. In the era of big data, data sovereignty is fundamental to national security, economic development and social stability. In national sovereignty, data sovereignty should be placed in an important strategic position. Therefore, sovereign states should improve their data control capabilities as soon as possible and guarantee national security in the era of big data.

C. PONDERING THE SYSTEM OF DATA SOVEREIGNTY

National data sovereignty is a comprehensive system featured by multi-relation, democracy and diversity. In terms of digital features, there are multiple subjects of interests at the same time, which is an intrinsic feature

of digitization. From the perspective of digital functions, the efficiency improvement brought by digitization is effective and urgently needed for all aspects of human society, and consequently its function must be diversified. Therefore, when formulating the data sovereignty system, we should take a comprehensive approach in dealing with data security issues, and analyze them from a multi-dimensional perspective.

Conflicts, especially the conflicts between "free flow of data" and "data localization," exist in data sovereignty in the aspect of cross-border data flow. For instance, in July 2016, the EU and the United States resolved the disputes in cross-border data transmission regulation through the *EU-US Privacy Shield Agreement*, but in the end, the problem was solved only with temporary reconciliation but not settled fundamentally at all. The following year, the European Commission issued the *A Proposal for a New Regulation on the Free Flow of Non-personal Data*, requiring the countries which are involved in the trade to provide adequate privacy protection standards. In May 2018, the *General Data Protection Regulations* (GDPR) issued by the European Union went into effect. The act made strict regulations on cross-border data transmission. Different countries have different policy direction for cross-border data transmission. Compared with the "free data flow" tendency of the United States and the European Union, countries such as India, Iran, Russia, and Australia are more inclined to "data localization." Therefore, when formulating the data sovereignty system, we should also take into full consideration the conflicts existing in the current cross-border data flow.

At present, although China has no specific laws and regulations protecting the sovereignty of national data yet, the *Cybersecurity Law of the People's Republic of China* promulgated in November, 2016, has unprecedentedly proposed the concept of cyberspace sovereignty. It enriches the scope of sovereignty enjoyed by China and takes cyberspace sovereignty as the natural extension and performance of China's national sovereignty in cyberspace. Raising the concept of cyberspace to the level of national sovereignty is more conducive to safeguarding the legitimate rights and interests of our country from the violation of other countries or foreign organizations. Any acts, including illegal intrusion, theft, destruction of computers and other service equipment or the provision of related technologies in the field of cyberspace in China will be deemed as infringement of our national sovereignty. Although the *Cybersecurity Law of the People's Republic of China* does not

mention national data sovereignty, it clarifies the cyberspace sovereignty. In the cyberspace, data is the only "thing" that exists. In this sense, cyberspace sovereignty and data sovereignty are consistent. Before the establishment of the national data sovereignty system, the continuous improvement of the *Cybersecurity Law of the People's Republic of China* can maintain national data sovereignty legally in a more timely and effective manner.

Essence of data rights: A shared right

The technical structure and networking features of the digital society determine its internal characteristics – decentralization and borderlessness, that is, openness, equality, collaboration and sharing. Such distinctions also set the ecological base of the era, that is, "people first," as well as the core features of our time – "sharing." "Sharing" is exactly the fundamental distinction between data rights and property rights.

A. FROM "ONE OWNERSHIP FOR ONE OBJECT" TO "MULTIPLE OWNERSHIPS FOR ONE DATA"

The principle of "one ownership for one object" is a fundamental feature of the property rights. With more advancing technologies, more diversified forms of objects begin to surface, so is the case of the categories of rights *in rem*, which also indicates the ever-increasing complexity of differentiation between rights and functions of ownership. In reality, the traditional principle of "one ownership for one object" is challenged by "multiple ownerships for one object" and "one ownership for multiple objects," which have also been indirectly acknowledged or obscurely recognized by law to some extent in adjudication practices. The unique features of data, such as reproducibility, inexhaustibility and special publicness, make "multiple ownerships for one data" possible. Thus, allowing any subject of data to have absolute control over such data violates the principal of sharing. With the transformation of the era and technological advancement, when the cost of things continues to decline and even drops to zero, the exclusive ownership of properties will become obsolete. This is even more true for abundant data resources with zero marginal cost. Its natural features, such as non-property object with multiple owners, determine that the essential prerequisite for "making

the best use of data" is sharing. Sharing, with "multiple ownerships for one data" as its main feature, becomes an inevitable trend. In the long run, scare resources tend to become more abundant. As a result, scarcity in resources will be replaced by trends of exchanging and sharing. "When seen through the lens of technology, few resources are truly scarce; they're mainly inaccessible" (Diamandis & Kotler 2014).

B. BORDERLESS SHARING

As the Internet breaks the limits of time and space, the borders between the virtual world and reality and between digital and material worlds are diminishing. Digital space has become a new realm and new sphere of human life. Compared with real world, digital space is more elastic, immediate and reversible in time, as well more compressible, fluid and sharing in space. The advent of digital space gave rise to a two-dimensional space structure featured by a combination of both the real and the virtual. The digital space reflects the essential power of data openness and sharing, pushing humankind to march towards a borderless future. In a borderless society, things tend to be rearranged and borders between them melted, private nature of private property rights weakens, replaced by sharing and co-ownership. Elements of production flow more quickly and innovations are more frequently seen and encountered. More elastic organic structure makes it possible for the relationship between people and organizations to evolve from the traditional exchange type to a type featured by sharing. According to Jeremy Rifkin, an economist and thinker from the United States, in the future society, we will not simply exchange value, rather, we will share value. In the past, no face value will be added to things without transactions and exchange. However, in the future, such an exchange mode will be replaced by sharing."

C. TRUST AND ALTRUISM FORM THE BASES FOR THE SHARING OF DATA RIGHTS

Openness is the premise for sharing and trust is its essence; the fundamental spirit of sharing is altruism, which originates from empathy.[3] Trust is the

3 In the Empathic Civilization, Jeremy Rifkin pointed out for the first time that: human being is a species with empathy. The core of human history is a struggle between

accumulation from concepts, regulations, laws, governance, etc., serving as lubricants and adhesives of social order and lowering the cost of social collaboration and transactions. Trust provides an indispensable basis for the sharing of data rights. Building upon universal values and consolidated trust, the sharing society will become an important social form of the future. Altruism, as a spontaneous and voluntary action of individuals to increase the benefits of others, will become the core of the future. The greatest common divisor of altruism is the integration of data rights, data utilization, data protection and data value. Altruism helps to improve people's awareness and willingness to share data rights, thus facilitating the positive interaction and transformation of sharing behaviors of people.

D. "THE RIGHT TO OWN" AND "THE RIGHT TO SHARE"

Property rights are essentially ownership rights. Property rights include the right to own, use, dispose and collect earnings from properties. The right to own property is the *de facto* control of property, which is also the most fundamental essence of ownership. Without the right to own, the right to use, dispose and collect earnings from property will all be affected. It is with the right to own, that the other three rights to property can gain grounds for their functions.

During the time of a planned economy, all things and materials shall be shared among people who are not supposed to own but only have the right to use property. In a market economy, as privatization and private ownership become more popular, individuals began to have the right to own things and ultimately possess them. In a sharing economy, ownership is no longer a matter of attention. What's more important is whether other people have the right to use things. The core of a sharing economy is, through networking, to share the right to use and to collect earnings from previously exclusive properties with other people so as to obtain economic benefit (He 2017). The transferral of the right to use things and sharing make

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empathy and entropy. "We now face the haunting prospect of approaching global empathy in a highly energy-intensive, interconnected world, riding on the back of an escalating entropy bill that now threatens catastrophic climate change and our very existence." To resolve this empathy/entropy paradox requires us to have a fundamental rethinking of our philosophical, economic and social models.

underused items useful again. The necessary premise is that the owners of underused things are willing to transfer the right to use their properties. Essentially, it is still a matter of who has the "right to possess." Therefore, the most important property right is the right to possess and the underlying rationale is the exclusiveness of properties, which determines that there cannot be two subjects of right to one property. Hence, possession is the only way to realize property rights.

The essence of data rights is the right of sharing. Unlike property rights, multiple subjects could be subject to the data rights since data has infinite reproducibility and with zero cost and zero wastage. As such, the right to possess does not affect the control and utilization of data. Even if people don't have the right to possess data, they may still have the right to use, to dispose of and to collect earnings from data. Moreover, in the era of big data, the real value of data lies in its infinite use within a permissible scope. The infinite use of data is also the basis for the development of the big data industry, the big data technology and its application. It determines that sharing is the fundamental requirement for the era of big data and the sharing right is the essential data right. If the exercise of data rights is subject to the right to own, the use of big data will face more constraints. If so, further development and wider application of big data will be out of the question. By doing so, the original intention for using data rights to protect and develop big data will be violated or even ruined.

To be shared or to be possessed, is the fundamental distinction between data rights and property rights. The rationale behind it lies in the fact that when the right to use a property is transferred from A to B, A can still preserve the right to possess and the right to control this property. In this way, the legal interests of the property owner will remain intact. Data rights cannot be preserved the same way. Once the right to use data is transferred from A to B, B acquires complete possession of the data and A loses control of it. There is no sense to protect the right to possess data. To generate and maximize value from data, we have to share data with other people. In this process, the conflict between the right to share and the right to possess will be inevitable. Thus, the right to share is important for data rights, just as the right to possess is for property rights. It is extremely true as we now shift from "exploiting the use of each item of property to a maximum degree" to "making the best use of every piece of data."

Attributes of Data Rights

Data rights, distinguished from traditional types of ownership, are a new type of ownership manifesting the diversity of ownership. Different types of data have different ownership, so does the data at different stages of their life cycle. Data rights are characterized by private right attributes, public power attributes, and sovereign attributes. To be more specific, data rights consist of sovereign rights that embody the dignity of a state, public power that represents the public interest, and data rights that highlight personal well-being. The legal attributes of data rights should be analyzed from the perspective of both private law such as individual rights and public law such as national security.

The private right attributes of data rights

The attributes of a right are determined by the basic content of the right. China lacks a centralized and systematic legal system regarding private rights or rights with the attributes of private rights; instead, it adopts a decentralized one in which different types of private rights are separately prescribed in different legal norms (Ma Rui and Li Jianhua 2014). Data are incorporeal things, and their private right attributes, as a prerequisite, need to be specified first. In the whole private rights system of ancient Rome, the theory of *res incorporales* in the property rights system proposed that our understanding of the object should not be limited to the forms of the existence of things. The intellectual property is recognized by modern laws, indicating that the property rights based on abstract things are finally established. The private right attributes of data rights which are established on the basis of "data persons" are mainly manifested by the data rights holders in defending their data rights. Data rights are a synthesis of personality rights and property rights, and the dual interest attributes of data personality rights and data property rights are endowed with economic value. Therefore, the private right attributes of data rights is specified mainly for the purpose of further demonstrating that the protection mode of personality rights or property rights should be adopted to protect data rights.

A. DATA RIGHTS: A NEW CIVIL RIGHT

Data rights value the independent personality and freedom of conduct of the individuals, which is consistent with the basic value orientation of private rights that individual interests should be protected and freedom of conduct should be enjoyed and realized by the individuals. First of all, data rights feature independent personality rights. Personality rights, as one of the civil rights prescribed in the *General Provisions of the Civil Law*, refer to a civil right enjoyed by the civil subjects in accordance with the law to protect their personal dignity against any violations. Personal data come from natural persons and are endowed with certain personality interests. Any collection, use, processing or transmission of personal data by other persons without the consent of the data subjects not only infringes upon the rights of disposal and decision making of the data subjects but also impairs their personal dignity. Secondly, personal data has property interests. The aggregation of massive data and information can generate considerably valuable information through analyses and researches. When businesses use these information for commercial purposes and the benefits are generated, profit distribution can be a big issue. The interest chain will break if the information subjects in the interest chain do not receive the due rewards. For natural persons, whose information is of commercial value, the right holders, they have the exclusive right to dispose of their personal information.

Specifying the attributes of data rights serves the purpose of fully protecting data. Nowadays, "data are of value" has become a consensus, while the frequent leakage, illegal trading and use of data on a large scale have gradually formed a black industrial chain, making the protection of personal data a top priority for future development. In terms of legislation, China has not yet directly stipulated the personal data rights. The laws and regulations regarding information security seem to have formed a certain scale in quantity, but they are still insufficient to constitute an independent, complete, systematic and well-organized system. The protection of the right to personal information is prescribed in different legal norms such as the *Constitution*, *Criminal Law*, *Criminal Procedure Law*, *Civil Procedural Law*, and *Law of the PRC on the Protection of the Rights and Interests of Consumers*. At the beginning of 2003, the State Council Information Office entrusted the Research Group on Personal Data Protection Law from the Institute of Law of the Chinese

Academy of Social Sciences to work on the project regarding the *Personal Data Protection Law*. In 2005, the recommended draft was completed, but it has not entered substantive procedures. The harassment cases caused by the leakages of personal data are proportional to the development of society, economy and information. The theft, disclosure and illegal use of personal data, ballooning in large quantities, should be regulated by private law. Without the regulation of civil law, the orderly and safe flow of personal network information cannot be guaranteed, and personal data will fail to receive effective protection. Consequently, incorporating personal data into civil rights is of immediate significance to protect the private data of citizens.

The kernel of data rights protection is how to regulate the collection, use, processing and transmission of personal data by controllers and processors of personal data. The *Cybersecurity Law of the People's Republic of China*, effective on June 1, 2017, prescribes the basic legal system regarding the protection of the right to personal information of citizens. The law serves the purpose of safeguarding the personal information security of citizens, preventing theft, disclosure and illegal use of the personal information of citizens and ensuring the orderly and safe flow of the personal network information of citizens in accordance with the law. Article 111 of the *General Provisions of the Civil Law of the People's Republic of China*, which was enacted and promulgated in the same year, prescribes that the personal information of an individual shall be protected by law. On May 25, 2018, the EU General Data Protection Regulation came into effect. Regulation mainly highlights the principle of "Data Rights the Supremacy" and greatly enriches the data rights and protection mechanisms of the data subjects. In addition, the Regulation have imposed strict restrictions on the use of personal data by data controllers and processors, increased the legal liability of data controllers and processors for personal data management, and enhanced penalties for any violations of GDPR (Wang Chunhui 2018).

B. THE PROTECTION OF DATA RIGHTS FROM THE PERSPECTIVE OF CIVIL LAW

Citizens' awakening of civil rights awareness and the continuous discussions of the attributes of data rights contribute to the improvement of the conditions of data rights protection. During that process, more and more functions of data rights are created and incorporated into the private rights system.

One rights object may have multiple values. The protection of data rights as private rights should conform to the times and bear the characteristics of openness. "Reconstructing an open and flexible private rights system" has become a new demand in the era of big data.

The relevant regulations and policies on the protection of personal information promulgated by the US government can trace back to the *Privacy Laws of the United States*. The Act prescribes in detail the collection, use, disclosure, and confidentiality of personal information by the "administrative agencies" for the purpose of regulating the federal government in processing personal information so as to ease the conflict between personal privacy and public interest. In 2012, the United States enacted and promulgated the *Consumer Privacy Act*,[4] requiring operators to protect the personal information of the consumers in accordance with the principles of transparency and purposiveness. Besides, the United States has formulated relevant federal laws regarding the protection of personal information in the areas of finance, communications, education, vehicle management, and medical care. In a word, the so-called privacy rights in American laws are relatively open and constantly enriched, and the so-called privacy refers to an individual's control over of the personal information of his own.

The development of the right to personal information in the EU can be deemed as a process in which the EU constantly adjusts its judicial system to apply the ever-changing data processing technology. The EU, as a large organization that has discretion of data, regards the respect for private life and privacy as a fundamental right. The *Privacy and Electronic Communications Directive 2002* promulgated by the EU prescribes that electronic communications, especially by Internet service providers, have the obligation to

4 On June 28, 2018, the California State Congress passed the *2018 California Consumer Privacy Act*, which took effective on January 1, 2020. It is reported that this is the "most severe and comprehensive" personal data privacy protection act in the United States so far. The act mainly involves two aspects. One is to stipulate that consumers have more control over the collection and management of their personal information; the second is to define a red line for the way companies collect and process data. The act is a milestone in the evolution of US privacy law, both for the US and the European Union. The direct response of GDPR also shows that the United States is more concerned about privacy protection, and legislators will take concrete actions to accelerate personal data governance.

protect the users' information; and individuals shall have the right to be informed and the right to consent, which means that the service providers shall inform the users of their intents of the data processing and the users have the right to refuse or withdraw the consent. In 2016, the EU drafted a new regulation on data protection, the *General Data Protection Regulation*. The *Regulation* has formulated stricter regulatory provisions and imposed more severe penalties for the protection and supervision of personal data, and thus solved the problem of unclear punishments in the *Privacy and Electronic Communications Directive 2002*. The *Regulation* came into effect in May 2018. As German scholars pointed out, the protection of personal information in the EU is characterized by intergeneration. The first-generation law on protection of personal information was formulated to respond to the emergence of electronic data processing within the government and large companies; the second-generation law centered on the personal privacy of citizens; the third-generation law focused on discretion of personal information and ensured the right to be enjoyed by the citizens; the fourth-generation law is currently under way to adjust the weak negotiating position of individuals in the exercise of their rights (Zhang & Han 2016).

Although China lacks uniform regulations on the right to personal information, relevant provisions can be found in civil law. Article 127 of the *General Provisions of the Civil Law* of People's Republic of China prescribes: "Where any laws provide for the protection of data and network virtual property, such laws shall apply." It officially acknowledges data as a legal right and for the first time explicitly incorporates data into the scope of civil rights protection. The relevant declaratory clause[5] (Article 111) provides a more authoritative guarantee for personal data and privacy, making an important step forward in legislation on the protection of personal data in China. The *General Provisions of the Civil Law* of People's Republic of China explicitly protects the right to personal information, which is of immediate

5 Article 111 of the *General Principles of the Civil Law of the People's Republic of China* provides: The personal information of natural persons is protected by law. Any organization or individual who needs to obtain personal information of others shall legally obtain the information and ensure the security of the information, and shall not illegally collect, use, process, or transmit the personal information of others, and may not illegally buy, sell, or disclose the personal information of others.

significance to protect the dignity of citizens, protect citizens from illegal intrusion, and maintain the regular public order. Network operators and other commercial organizations should strictly abide by the law. The right to personal information is a crucial civil right enjoyed by citizens in the Internet age. Any organization or individual shall not illegally collect, use, process, or transmit the personal information of others, nor illegally buy, sell, provide, or publish the personal information of others.

The core of the protection mode of personal data is to find a balance between the full protection of personal data rights and the facilitation of the commercial use of personal data. Firstly, in terms of the static protection of data, we should focus on the foundation of rights and determine that personal data and privacy rights are basic personality rights. Secondly, in the process of data flow, we should, on the basis of justice, distribute the rights and interests fairly and reasonably in the collection, use and sharing of data. In general, the "EU Model" is more inclined to the protection of personal data, while the "American Model" is more in line with the need for free circulation of data. The two models have their own advantages and disadvantages. In the legislation on data rights, China should embrace the advanced practices of various protection modes, pay attention to the connection and coordination with other relevant laws, avoid vertical repetition or horizontal crossover, and eliminate legislative contradictions and conflicts so as to formulate reasonable system design.

The public power attribute of data rights

A. FROM PRIVATE RIGHTS TO PUBLIC POWER

Rights are private in nature. Fundamental law rights, public law rights, private law rights, and social law rights are all established to manifest and protect personal interests, as opposed to public power that embodies and protects public interests. Right are inherently the interests and qualifications of individuals. The "individual" is fundamentally private, and thus the rights are private (Duan Fan, 2016).

The essence of power is public. Whether it is a political power, economic power or social power, its subjects are public institutions and social

organizations, and its object is the public interests protected by law. The power is modified by "public" rather than "private," as President Xi Jinping emphasized: "Public power is for the people, and nothing of it may be used for private purposes" (Duan Fan, 2016).

From the perspective of the social contract theory, Rousseau believes that state power is obtained through transferring "natural rights" of individuals. He holds in his famous book entitled *The Social Contract* that no state power is not premised on the delegation of the powers (rights) and recognition by the public (Xi 2008). As the French enlightenment thinker Locke puts it: "Humans, to make up for the defects of the natural state and defend their own natural rights, signed a contract to voluntarily give up part of their power, and handed it over to someone or some people who agreed to it. A state hence emerged. This is the origin of and reason for legislative and executive powers." The private rights and public power that constitute the life of human society are the unity of opposites.

The mainstream theory holds that public power and private rights are mutually reinforcing. Public power is the backup force and guarantee of private rights, while private rights are the basis and origin of public power (Wang Jianmin 2015). In the process of the exercise of public power, to suppress the abuse of it, the principles must be upheld, including that the administration shall be done in accordance with the law and subject to supervision, that a government official may not act beyond his power delegated, and that statutory obligations of the government must be performed. The ideal state which has a perfect legal system is one in which the public power and private rights are always in balance. As the main symbol of the state, public power is the fundamental premise of all functional administrative activities of the country and bears the following basic characteristics: first, the subject of public power is the public rather than individuals. In other words, commonality is the core connotation of public power, embodying a kind of publicness, sharing and intercommunity. Second, the object of public power is public affairs. The affairs related to private rights should not be interfered with by the public power; otherwise violation of private rights is committed. Third, The source and basis of public power is the public interests. Public power is delegated to the government to assume public responsibilities and serve the public interests; otherwise public power is likely to become privatized or private.

B. DATA RIGHTS HAVE THE PROPERTY OF PUBLIC POWER

Public power is featured with commonality and collectiveness. It can be defined as a kind of collective power with the state and its government as the subject and with the maximization of public interest as the value orientation, aiming at powerfully maintaining the order of participation in public affairs (Tao 2015).

The data rights have the property of public power. First, in terms of the results of data rights, in the virtual network world which is a mirror world of the real world, public power has new carrier space and can be excised in new forms. While enjoying the convenience of the network and technology, the public are unable to get rid of the worries of malicious attacks, the shackles of dark power and the fear of no place to hide in the network world. The high level of integration of virtual cyberspace and the actual physical society has made them independent from each other but meanwhile mutually influential. The result of the exercise of data rights will have impact on the public interests protected by law, so data rights have a property of public power. Second, the protection of data rights needs public power. Data rights protection should be intervened by public power and protected simultaneously by various bodies of law, such as constitutional law, criminal law, administrative law, and civil law. Therefore, to respect the data rights of public and private entities, it is necessary to clarify the procedures of law enforcement of public power subjects so as to ensure the legitimacy of their demand for data.

The idea of data rights was proposed by British Prime Minister David Cameron, who said in a speech: "The new right to data is the most exciting. It will ensure that people have the right to make claims to the government for various kinds of data for the sake of social innovation or business innovation. You will have sufficient information to understand how the government works, how the money is spent, and how effective our work is. Let's hold ourselves to account, making joint efforts to create a model of modern democracy by using and developing the data." Cameron believes that data right is a fundamental right that every citizen of the information age should have. In reality, the government, as the representative of public power, is actually the largest data controller. The introduction of data right is in line with deontology, that is, the practice of citizens making claims to

the government for data rights is a relief, prevention and negative claim, mainly to protect citizens from infringement on their private rights by public power and other large data controllers. Therefore, data rights, as a kind of public power, should be included in the list of legal rights and established as a fundamental right in the constitution.

C. SELF-EXPANSION OF DATA PUBLIC POWER

The core of the rule of law is to regulate public power and protect private rights. Public power itself is inherently mandatory and expansive and therefore should be restricted. Public power is a managerial power over the people. Once out of control, it is likely to cause detriment to the private rights of the people.

In practice, conflicts between public power and private rights occur frequently, such as the abuse of public power directly infringing on private rights, the new types of public goods provided by the government impairing the public's existing interests; government provides new public products that harm the existing interest of the public; the "supply-orientation" of government public services conflicting with the public's needs; the government's omission to act causing detriment to the public interests. The contributing factors include the inertia effect of the traditional idea of strong public power and weak private rights, the neglect of institutional design and the ineffective supervision and accountability.

In the era of big data, the absence of the data rights system and the natural self-expansion of public power lead to the abuse of public power over data, which causes detriment to private rights to varying degrees mainly in the following two aspects: First, public power is used for private purposes. In the era of big data, the flow of data between and among industries and sectors in the cyberspace involves data producers, receivers and users. Data flow involves a number of practical locations, such as the place where the data is sent, received and delivered, the destination, and the place where the service facility is provided. The boundaries of the rights and power of multiple governance subjects are blurring, so public power and private rights show mutual intrusion to a certain extent. Only when the citizens are subject to the control of data public power can they enjoy the freedom to exercise data private rights. However, in reality, data public power is often

used for private purposes, which affects the security of data private rights. Data public power is used for private purposes in two ways: one is the abuse of data public power, violating the procedures and rules of regular use of data and infringing the freedom of citizens to exercise their private rights; the other is the detriment to data private rights of citizens due to power rent-seeking or rent-setting by some platforms. Second, the center of public power shifts. In the physical world, public power is always superior to private rights, so the forceful inherent expansion of public power tends to compress the space of private rights. Such conflicts continue in cyberspace. The development of modern information technology has added weight to the information asymmetry between the government and citizens, and is heavily biased towards the party that is empowered. For example, the technology of personal identification or authentication using the inherent physiological or behavioral characteristics of the human body has made rapid progress in recent years, making the privacy of personal information more and more fragile and difficult to maintain without the protection of the legal system.

The inherent nature of self-expansion of public power makes it more likely to continuously expand its power boundaries, so that public power and private rights intrude on, compete with and counterbalance each other in cyberspace. In addition, since public power stems from private rights and the total number of private rights is fixed, the relationship between private rights and public power is a trade-off, with the two being interconnected and complementary (Ruan 2012). Civil rights are the foundation of state power while state power is the guarantee of civil rights. Rights are not the gifts from the state but the justification for the existence of state power. Consequently, it should be deemed that rights are the source of power, and power emerges to consolidate and defends rights. When data private rights conflict with data public power, public power shall have precedence over private rights. For instance, when the rights protected by the law concerning privacy and disposal principles conflict with national security, government regulation, public security, public interests, judicial procedures, and judicial independence, the latter shall take the priority. Data private rights and data public power should be strictly divided. Only by regulating data public power and preventing its abuse can data private rights be truly protected. However, regulating data public power does not mean weakening its authority. Instead, it refers to regulating the exercise of data public power

through relevant rules and procedures, which will improve the exercise of public power instead of weakening its authority.

The attribute of sovereignty of data rights

A. FROM THE NATIONAL SOVEREIGNTY TO DATA SOVEREIGNTY

The connotation of national sovereignty is increasingly expanding with the progress of society. In accordance with the classical political science theory, national sovereignty means that the state has the supreme power within the territory and has the power to independently decide its development direction and equally participate in international activities (Sun 2016). Sovereignty is the most important and fundamental right of the state. It is inherent to the state rather than being conferred by international law, and is the only power recognized and protected by the principle of national sovereignty. Sovereignty, as an inherent power of the state, is manifested in three aspects: the supreme power within the territory, the power of independence, and the power of self-defense against aggression outside of the territory.

Cyberspace has broadened the boundaries of the state. A "state" is deemed to be the spatial entity with most sovereign property that is capable of exercising jurisdiction within its territory (Sun & Zhang 2015). As history evolves, the concept of sovereignty also updates its connotation and framework in real time. In the 1990s, the Internet boom started. Network globalization made it possible for information to break through traditional territorial boundaries and freely spread across borders. Information has become an emerging productive force. Since the beginning of the twenty-first century, the era of big data has arrived, thanks to the exponential growth model driven by Moore's Law, the digitalization of everything driven by low-cost technology, the large-scale convergence of data driven by cloud computing models, and the extensive "human-machine-object" connection driven by ubiquitous mobile broadband Internet. No matter how advanced big data technology is and how great the globalization of network data is, cyberspace as a "new territory" should not be left alone without the regulation of law.

The idea that "national sovereignty is applicable to cyberspace" has become an international consensus. The United Nations established the

Governmental Experts on Developments in the Field of Information and Telecommunications in the Context of International Security (the UN GGE), successively in the periods between 2004 and 2005, 2009 and 2010, and 2012 and 2013, to "research existing and potential threats in the field of information security and possible cooperation measures against the threats" and reached important consensus on the peaceful use of cyberspace and cyberspace national sovereignty. In 2015, the UN GGE released a research report again, reaffirming and enriching the content of cyberspace national sovereignty. In 2012, the OECD conducted a systematic study on the cyber security strategies of 10 countries including the United States, the United Kingdom, Australia, Canada, Japan, the Netherlands, France and Germany. It was found that the network security policies of most countries gradually embodied a so-called "sovereignty consideration." *National Security Law of the People's Republic of China* adopted in 2015 provides for the cyberspace sovereignty for the first time. On November 7, 2016, China promulgated *the Cybersecurity Law of the PRC* mainly for the purpose of maintaining cyberspace sovereignty. In the *National Cyberspace Security Strategy* and *The International Strategy of Cooperation on Cyberspace* promulgated afterwards, "respecting and maintaining cyberspace sovereignty" is the overarching principle of cyber security, providing a fundamental guidance for China in dealing with domestic and international network affairs (Zhu 2017).

Data sovereignty is the extension and expansion of cyberspace sovereignty. As an important element of cyberspace, data has become a national basic strategic resource, which is as important as natural resources, information resources and intellectual resources. The existing information sovereignty has been unable to adapt to massive data dissemination and use in the network space under the national control and the impact thereof. Data sovereignty therefore is established, which refers to the ownership, right of control, jurisdiction and right of use of the state's domestic data and the cross-border data owned by the nationals in the context of big data and cloud computing. Data sovereignty is embodied in the highest control over data within the territory and equal and independent data processing rights outside of the territory (Sun 2016). Data is closely related to the survival of the state and is an integral part of the state. It is a requisite for the formation of the state. The state's exercise of sovereignty over the data owned by it manifests the independence and autonomy of the state.

B. NATURE OF DATA SOVEREIGNTY

Data sovereignty is an important component of national sovereignty. The basic element of cyberspace – the free flow of data – makes global data resource sharing possible. It facilitates human production and life, but at the meantime, may also pose great challenges to sovereign states in safeguarding national sovereignty. With the integration of the virtual network world and the real world, the control and use of digital resources will have an enormous impact on the national economy, politics, culture, etc. As a necessary supplement to national sovereignty, data sovereignty enriches and develops the connotation and denotation of traditional national sovereignty. It is an inevitable choice to adapt national sovereignty to modern virtual space governance and to safeguard national sovereignty.

The purpose of data sovereignty is to address security issues of large-scale data sets. Data, as a basic element used to record the real physical world in cyberspace, contains huge amount of valuable information. Some network incidents and cybercrimes that endanger national interests are actually organized and planned in both virtual network space and real physical space. Internet technology is used for the sake of convenience in collecting and appropriating data, causing severe damage to the state and putting it at a disadvantage. Attaching high importance to data ownership and jurisdiction is an inevitable requirement for solving security problems of large-scale data sets, and is of great significance for combating data terrorism and cross-border data crimes.

Data sovereignty is practiced on the basis of the change of human activity space. Virtual network space is a new field of human activity space. Compared with the physical boundary of the physical world and the tangible nature of material resources, virtual network space and data resources are open, free and intangible. The *status quo* of excessive freedom and lack of order in virtual cyberspace requires regulation of sovereignty. Claim to data sovereignty is fundamentally equivalent to the claim to national sovereignty in international economic affairs. The subject of the data activity in the virtual cyberspace and the value of the data are objectively present, and the value of the data can be realized only through data use, transaction, etc., which are also traceable. The results of data use and transactions, etc., will reflect or affect national sovereignty, and each sovereign state has a practical basis

and realistic needs for sovereignty over the aforementioned subjects and interests. The claim to national sovereignty over virtual cyberspace is rooted in the fact that cyberspace is an integral part of today's human society and national affairs. Cyberspace sovereignty is the mapping of sovereignty on the Internet. Data sovereignty is the embodiment of sovereignty in data. Data sovereignty is an important part of cyberspace sovereignty (Li 2018).

c. The protection of data sovereignty

The protection of data sovereignty should be functionally oriented towards maintaining overall national security. The seamless global network connection brings unprecedented challenges to the countries which used to have clear and relatively closed borders and the national security thereof. From a global perspective, due to the disorderly and anarchic state of cyberspace governance, the absence of physical boundaries and the cross-border nature, a bit of breakthrough towards risk and threat of cyberspace will lead to rapid spread on the whole Internet. For example, the "Prism Gate" incident reveals that the United States exercises cyber hegemonic power to illegally steal and monitor global data, and carries out cyberattacks against other sovereign countries, seriously damaging the sovereignty of other countries. With data resources becoming increasingly important, the global competition focus is shifting from the competition of physical resources to the control of data resources. Compared with the security of traditional territories and territorial seas, data sovereignty concerns the emerging security types without boundaries in a more complex virtual space. With data being the basic element of virtual space, it is necessary to develop an institutional system of national data sovereignty for the sake of national sovereignty to safeguard the overall national security against new challenges and risks.

The free and disorderly data flow in cyberspace breaks the traditional concept of absolute sovereignty. The indivisibility of data as a whole makes the flow of data across borders in virtual network space involve a wide range, leading to overlapping of multiple jurisdictions and even conflicts of data sovereignty. At the same time, because the data protection regulations between countries are not the same, network service providers can seek to evade obligations under multiple jurisdictions, which adversely affects the data security of other countries. Different from the traditional approach of

sovereignty protection, data sovereignty protection may as well shift from absolute competition to international cooperation to some extent.

Data sovereignty protection should shift from adopting traditional absolute sovereignty theory to relative sovereignty theory. Under the background of the rapid development of digital technology, the cross-border data flow has become much more common and convenient. This flat and multi-centered network space has gradually awakened the awareness of social rights and undermined the control of data sovereign countries over their own data. Small countries lack the capability of ensuring the security of their data on their own, let alone establishing absolute data sovereignty, while powerful countries can effectively exercise data sovereignty with the help of advanced science and technology, and even endanger other countries' data sovereign security (Sun & Zhang 2015). In order to solve the multi-control conflicts and the predicament of national data security due to the absolute independence of data sovereignty, presently, it is more reasonable to establish a global cyberspace governance system under the UN framework with the principle of "relative sovereignty" in the current data field. Under the theory of relative sovereignty, the rule-of-law thinking plays an important role in the realization of "relative sovereignty." Domestically, the rule of law prohibits the "absolute authority" of sovereignty from overriding the whole nation; internationally, the consensus of "legal governance" and the international cooperation practice have compelled the states to give up part of their sovereignty through bilateral or multilateral treaties. In turn, the rule of law, as an effective governance model of a state and the world, can lodge "sovereignty" from the political sphere onto the regulation of law (Xiao 2017).

Data sovereignty should be exercised and data security protected under the legal framework. An authority system of data management should be internally established, which is the highest management authority for cross-border transmission, and collection, transmission, storage, processing, utilization, and transaction of data within the jurisdiction of the state. Efforts should be made, on the basis of the Network Security Law, to establish relevant legal systems so as to perfect the prohibition rules regarding the data endangering overall national security and human life safety, including the data concerning national defense, confidential information of political parties, human genes. The control over the actions, such as collection, storage,

processing, and use of data, comply with relevant national technical standards or other legal provisions. Internationally, an authority system of data control should be established. The right to data control means that sovereign state has the right to take protective measures against the national data to keep it from being monitored, tampered, forged, damaged, stolen, leaked, etc., and to ensure the security, authenticity, integrity and confidentiality of data.

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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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CHAPTER 5

Data Rights Law and the New Order of Digital Civilization

The origin, formation and development of laws are closely related to civilization, and different laws exist as corresponding establishments to different forms of civilizations in specific times and spaces. Joseph Kohler, a Neo-Hegelian jurist in Germany, once said that for the past, the law had been a product of civilization; for the present, the law was a tool to maintain and nurture civilization; for the future, the law would be a means to promote and optimize civilization. From farming civilization to industrial civilization and then to digital civilization, the law will realize the leap and transformation from the "law of man" to the "law of things" and then to the "law of data." Digital civilization provides the cultural foundation and innovation engine for the construction of data rights law, which also provides the existence basis for the system maintenance and order promotion of the digital civilization. Therefore, the rich implication of data rights law could be viewed in a more condensed and concise means through a paradigm of order concerning digital civilization, and may become the normative basis of maintaining and promoting this civilization order. The data rights law is the product of civilization transition, and it also will be the new order of mankind in its transformation from industrial civilization to digital civilization. This leap in civilization is bound to revolutionize the whole picture of the old ecology and order, altering the existence and development of society in an upside-down manner.

Value of Data Rights Law

According to the Collingridge dilemma:

> the social consequences of a technology cannot be predicted early in the life of the technology. By the time undesirable consequences are discovered, however, the technology

> is often so much part of the whole economics and social fabric that its control is extremely difficult. (1980, p. 11)

Big data gives us insight into the future, but the particularity of the network environment brings new challenges to the protection of personal data and the protection and maintenance of data rights. Undoubtedly, the data rights law, like other laws, embodies the same value objectives like principles of equality, freedom and order of law. At the same time, as a special legal regime to regulate data ownership, protect and utilize data resources, data rights law also has its unique value. By confirming and protecting the data rights, the law of data rights regulates the order and stability of the digital society, which is the concrete embodiment of the spirit of rule of law in a country.

New coordinates of rules

Human society cannot do without rules. Rules are the norms, criteria and laws that should be obeyed by every and single member of the society. They can not only guide, restrict and regulate the behavior of people in a correct way, but also judge and measure the social value created by social members as individuals to the society. In other words, social rules embody a kind of "rational" thinking, choice and action, and a unity of self-discipline and heteronomy would be achieved through the process (Zhen 2014). Rules exist widely in all parts of society. Among them, laws rank the most important social rules. Since the beginning of our civilization, laws gradually become an important means of maintaining social order. The data rights law itself is aimed at resolving disputes and an order is expected to be maintained based upon such a function of it, under the guidance of which the society is expected to develop in a more harmonious and continuous manner.

Data rights law maintains the development order of digital economy. Engels once said that a demand had been created at very beginning of our social development: A common rule governed our daily repeated production, distribution and exchange of products, to which the individuals must be subject and accept as a common condition for their production and exchange, through which way we had our customs and conventions and then laws (Zhang 2011). Law has the function of maintaining order,

and the data rights law is an effective means to resolve disputes concerning data property. The core value of the data rights law lies in the confirmation of ownership of data resources[1] and the protection of utilizing such resources, and its function is directly reflected in the dispute resolution and the maximization of the exploitation of the resources of data. Data is recognized as a resource, and disputes can only be resolved when its ownership is confirmed. Conversely, disputes may arise if the ownership of data is unknown and the boundaries of rights are unclear or blurred. In constructing and establishing such a right concerning data, it is necessary to define the ownership of data in a comprehensive, clear and precise way, delimit the ownership boundary, and clarify the rights of data subjects to control, use, gain from and share the corresponding data, so as to prevent and reduce the occurrence of disputes. Effective data competition shall be promoted with reasonable systems and rules and accurate coordinates between law and economy shall be located, so as to realize the rational allocation of data resources.

The data rights law maintains the stability and unity of the digital society. Human society is the highest form of material movement, as well as a complex organic system. The operation of human society in orderly form requires supporting mechanisms working in an optimized way. In order to

1 Unlike traditional data resources, the data resources in the background of big data technology and digital economy carry a series of new economic characteristics, including the euryoecic of data carrier, the non-exclusiveness of data use, the high profitability of data use, the difference of data values, the diversity of mode of data use, the unpredictability of specific use of data, the externality of effect of data use. In 2017, several lawsuits involving data disputes were of particular interest. For example, HiQ vs. LinkedIn in the United States, Sina vs. Pulse in China and Hantao vs. Baidu, all of which involve the issue of whether the data collected by the operators in the course of operation can be captured by other operators, or whether the data can be used by other operators and in what way. In addition to litigation, a number of other controversies involving data disputes also touched upon realm of antitrust law in 2017. For example, Cainiao and S.F. Express, the two giant delivery companies, denied access to their data interfaces to each other, and only after the intervention of the State Post Bureau did they resume opening their data interfaces. These cases not only highlight the importance and competition for data resources in the era of digital economy, but also indicate the common legal disputes, conflicts of interests and legal concerns in the data competition.

realize the stability, order and sustainability of social development, social members as participating subjects need to have desirable expectation for their own behaviors, the premise for which is that they shall have stable property at their disposal. Before the advent of laws in the past, people tended to acquire the use of property only through possession, but such a pure possession was not stable and sustainable because of the lack of any protection mechanism. Nowadays, the data resources are becoming more and more abundant, and the law is an important tool to protect the data rights and safeguard the interests of the participating subjects of data. Confirming data rights is the means, and the resolution of dispute is the end, which is considered a fundamental method to resolve the issue. Posner, American jurist and economist, warned us that the more uncertain the law was, the more difficult for people to resolve disputes through negotiations (Feng 2010). Therefore, in order to resolve a dispute, the right and interest in dispute should first be ascertained together with fair confirmation of ownership and distribution of obligations. The data rights law is conducive to clarifying the ownership of data, protects rights and interests of data subjects as the way of protecting their property, and provides a guarantee for social stability and sustainable growth.

The data rights law is the premise for ensuring the normal, healthy and orderly flow of data within the legal framework. First of all, the data rights law defines the ownership of data with a starting point of maintaining economic order and ensuring the smooth development of data transactions. Mencius once said, "He who has a permanent property has perseverance, and he who has no permanent property has no perseverance." Seen from the perspective of the development trend of digital economy, only by defining the ownership of data and protecting the digital right to the maximum extent can the development space of digital economy be further expanded. By defining the boundaries between the nature of interests and rights concerning data and the ownership of data, the data property would be better utilized and value of data resources given full play in a maximized way on the part of the data subjects. The data rights law not only maintains the order of data property, but also promotes the optimal allocation of data resources. Under such a stable and orderly property order, the data rights law gives full play to the maximum utility of data, and helps to promote more efficient social production and growth of social wealth.

A new paradigm of governance

Governance, with its original meaning of guiding, manipulating, and controlling, derives from the ancient Greek or classical Latin word which could be comprehended as a corresponding word of "steering" and specifically refers to the exercise of authority within a certain realm of jurisdiction. Social governance is to control and guide needs of people, encourage appeals and petitions for legitimate interests, advocate the notions of rights, freedom and justice, and give full play to the subjective initiative of the subjects of social governance (governments, markets, social organizations, and citizens). On the basis of such diversified subjects, mutual game, consultation and cooperation among them should be encouraged to enhance the vitality of social development, and citizens would be encouraged to actively participate in social affairs in a bid to realize more diversified forms of social organizations, the prosperous and orderly market, the efficient and honest government, the gradual improvement of people's livelihood, the construction of smooth channels for resolving disputes, social fairness and justice, so as to make the society develop in a harmonious way (Tian 2015). The evolution of social governance reflects the history of human civilization. Social governance, in other words, records the history of human civilization. In industrial society, any significant achievement of the society could be attributed to the corresponding social governance mode featured by a heavy reliance on the rule of law. Since modern times, the means of social governance mainly depends on the law. Thus, today's achievements would not have been possible without the participation of law in social governance.

The data rights law promotes the innovation of governance means. In the process of human development, institutional development and social development is closely linked. Different institutions exert diversified impacts upon social development, and the institutional innovation is an important driving force for governance paradigm innovation. The establishment of law has been seen as a stabilizer of social governance, as well as the foundation and guarantee of innovation in aspects of social governance mode. Therefore, the innovation of social governance mode needs the support of law, and within appropriate legal track, so as to achieve new, standardized and efficient social governance modes. Human beings have past the industrial society and entered into the post-industrial society, in which the emerging

new problems and new dilemmas in society have brought severe challenges to the law. The virtual world foreseen by the Internet cannot be governed by the original substantive law, but a new path leading to the new form of legal governance shall be explored. So, we're in the middle of a transformation of social governance and a new governance mode should be constructed and vigorously promoted (Zhang 2014). In today's world, the information revolution is changing at daily pace, and the impact of the new generation of information technology, such as cloud computation, big data, artificial intelligence, etc., makes social governance more and more depends on science and technology. Such a new governance mode based upon big data and the social governance itself requires regulation of the data rights law. Under the regulation of data rights law, in combination of cloud computation, the Internet of Things, block chains and other new generation of information technology, social governance mode should be reconstructed for elevating the level and degree of it in a way that is expected to achieve more scientific, effective and intelligent goals.

The data rights law enhances the authority of institutional governance. As a law, it is closely related to the developing process of human society, which is constructed to meet the needs of the evolution of this society, and even can be said to be an inevitable choice in the process of social development. The subjects involved in social governance, including state power, local power and mass public, have the characteristics of diversification, which may influence each other within the scheme. This complex interaction needs to be regulated and adjusted, and the data rights law is one of the most effective means of regulating and adjusting. On the one hand, in the digital society, all governance actions would fall within the legal boundary of the data rights law and all actions relating to them shall be subject to a premise of respecting various regulations and rules in the data rights law. On the other hand, the implementation of the data rights law would be guaranteed by the coercive power of the state, that is, in the practice of governance, subjects' legal awareness and rule consciousness to exercise rights, perform obligations and shoulder responsibilities would be reinforced by the authoritativeness of the data rights law under the circumstance of digital economy. In this way, social governance implementation would be efficient, and social members would be accessible to corresponding social services for safeguarding their legitimate interests.

The data rights law aims at securing orderliness and predictability of governance. To achieve a sound social order requires not only the regulation of religions, customs, ethics and policies, but also the protection of the law. Laws are implemented by coercive power of the state to reconcile various intricate social interests and provide norms for maintaining social stability and controlling disorder and chaos. Data rights law is a legal system that regulates data ownerships, protects and utilizes data resources.[2] Standardizing the rules and order of the digital society is conducive to the better use of data in social governance, promoting the standardization and order of the digital society, reducing disorder and chaos, and preventing turmoil and shocks. By defining behavior norms of each data subject and indicating the responsibilities and obligations of each data subject, orderly interaction between different data subjects shall be constituted for enhancing the foreseeability and safety of various data subjects. Under the circumstance of big data, the new governance model will make the society run in a more orderly and efficient manner.

New claims of rights

Rights, a legal entitlement of subjects to obtain their interests, guarantee the subjects' scope of interests by law or ensure the subjects' qualifications of obtaining certain interests through a certain kind of behaviors. The existence of a right implies a concept and an institution that allow others to assume and perform corresponding obligation (Xia 1999). Today, there is a growing awareness among the people of protecting their own personal property, and with the explosive growth of data resources, the right of data subjects to data resources is elevated to a new category of right, making it an inevitable trend of subjecting it to the protection of state laws.[3] Data right

2 See Key Laboratory of Big Data Strategies. *Block Data 3.0: Order Internet and Sovereign Blockchain*. Beijing: CITIC Press Group, 2017: 227–228.

3 Compared with traditional physical resources, data resources have many economic characteristics, such as inhabiting multiple carriers, non-exclusive use, low cost and high return, difference in value and mode of use, difficulty in predicting future use, existence of external effects and so on. The existing legal system cannot play a conducive

is a new kind of right that emerges in the development of information and network technology. Its root lies in the gradual virtualization and digitalization of the state, enterprises and individuals under the impact of the new generation of information technology. At present, the new generation of information technology such as big data, cloud computing, and the Internet of Things are more integrated with various social and economic spectrums at deeper level. Data itself has stronger mobility and asset attributes, and data resources are gradually merged with important links of social progress and economic growth. The mobility of data is the premise of the value of big data, and the definition of data rights and its nature is the key to the question of how to realize the orderly, normal and standardized mobility of data under the framework of law. Under such circumstance, the healthy development of the digital economy will be jeopardized if the data ownerships and data mobility mechanism cannot be clearly defined. Therefore, the basic task of the data rights law is to guarantee the right to data for utilizing the data to a maximum degree and giving full play to its social benefits and economic benefits. Through the establishment of data right relationship, limited resources would be fully utilized for making maximized gains.

The legislative purpose of the data rights law is to protect the data rights. In *The Interaction of Law and Religion*, Berman points out that law is not just a set of rules, rather it is more a set of activities in which people legislate, adjudicate, enforce and negotiate. It is a living process of allocating rights and obligations, resolving disputes and creating cooperative relationships (2003, p. 11). Data is a new resource in today's world, which can bring benefits and produce value for related subjects. Data has been gradually commercialized.

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role in the arrangement of data property rights, the basic order of data behavior and the competitive rules of data behavior. Up to now, the legal system created by human beings has solved the problem of the allocation of the rights concerning various physical resources according to their different natural attributes and economic characteristics, for instance, the arrangement of tangible property rights by the property law of common law system, and the real rights law of civil law system, and the intellectual property rights arrangement on intellectual property by laws of various countries. The problem we are facing is that data, different from any other kind of physical resources, have specific physical attributes and economic attributes and requires special legal system arrangement.

At the same time, the mobility and utility of data have aroused widespread concerns in social regulatory authorities, and the determination of data ownerships and protection of data interests have become a public concern. Among them, the protection of digital rights has become one of the fundamental issues of data rights law. By establishing a usufructuary data right, data subjects may transfer their personal data to "other parties" to make the full use of the data and realize data sharing by utilizing its value, which indicates the attribute of data: "multiple ownerships for one data." Although the data rights law would not directly create wealth, when the ownership of data is clearly defined and protected by law, the data subject can make better use of data resources. The data rights law helps to exercise the rights through a set of guaranteeing mechanisms.

In the era of big data, the scale of data is huge, but the utilization rate is generally not up to our expectation. To solve this problem, we need to give full play to the data value in use and improve the utilization rate of data. The amount of data is massive, and human needs are infinite, which leads us to think the question: how to make full use of the data so as to satisfy to a maximum degree the infinite needs of mankind and at the same time to achieve the maximization of social welfare. This raises a whole new question between data and humans, namely, how can we use data more efficiently and conveniently to create value? According to the Coase Theorem II, in a world where transaction cost is greater than zero, different demarcations of rights may lead to different levels of allocations of resources in terms of efficacy. That is to say, there is certain degree of transaction cost in both the transaction of goods and the transaction of data. The transaction cost varies with the institutions of property right, so does the efficiency of resource allocation. Therefore, in order to optimize the allocation of resources and maximize gains, it is necessary to choose a reasonable institution of property rights.

The data rights law is the law defining the ownership of data. By regulating the rights and obligations of data owners, the data subject can give full play to the use of the value of data in a bid to achieve the best use of data and realize the effective allocation of data resources. The data rights law can ensure a fair protection on different data rights. Since ancient times, social justice has always been the ideal pursued by mankind, for example, the "Millennium Kingdom" of Western Christianity, Kant's "world civil society," Marx's "communism," and the "Great Harmony Society" advocated

by the Chinese Confucius school, Taoism's "small government, few exploitation" society, and so on. John Locke, a British scholar, has a famous saying which goes like, "Where there is no personal property, there is no justice." The same applies to the law of data rights. Where there are no data rights, there is no justice. Through the procedures and methods prescribed by law, the data rights law guarantees the rights of data subjects to control, use, benefit from and share their relevant data within the scope prescribed and permitted by law. In the process of data use, the establishment, alteration and revocation of any data-rights-related relationship should follow the principle of fairness so as to make the best use of data resources, create the greatest economic and social benefits, and bring the greatest data welfare to mankind.

Data Rights Law and Other Social Control Forces

The development of human society precipitate the advent and progress of civilization, and the development of the latter calls for social control efforts. The nature of social control is to maintain social order, and through a certain social coercive force to make people comply with social norms so as to maintain social order (Ji 2017). There are many types of social control, and law is one of them, others include order of power, ethics, social customs, public opinion and so on. However, with the development of political and social organizations, especially with the developed economic and social society, the law representing the strength and will of the state has become the primary and most important indicator of social control. In *Law and Morals*, Roscoe Pound made it clear that legal order had become one of the most important and effective forms of social control today, and all other forms of social control were subordinate to and operate under the scrutiny of the law (Yang 2011). Although the law has become the main tool of social control, we cannot deny the role of other forces of social control. The data rights law, as a law, works together with other social control forces, such as power order, ethics, social customs and public opinions, and plays a concerted role in the society (see Figure 4).

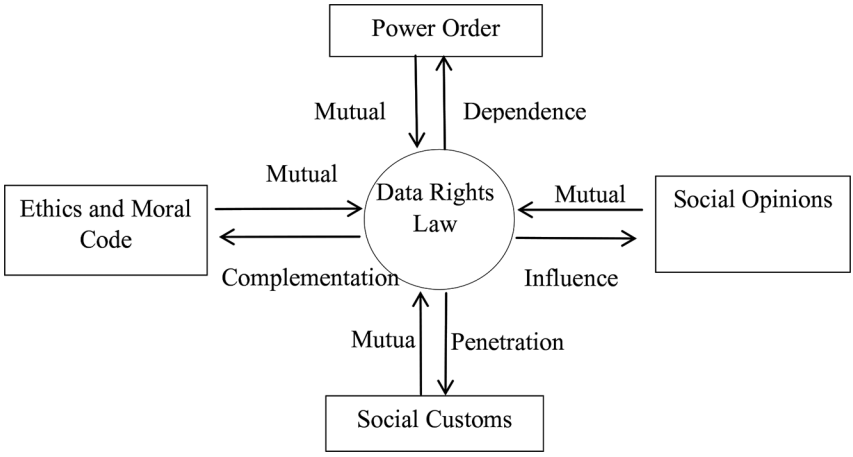

Figure 4. The Data Rights Law and Other Forces of Social Control.

Data rights law and power order

Power is an important interpersonal relationship and even social force that can be formed and exist through interpersonal coordination in the social production and cooperation of human beings on the basis of the specific social environment, conditions for production and living content of a certain society. A specific society could be understood as a specific community of cooperated production and interpersonal communication. At the same time, in a certain society, there will certainly be a variety of different powers as well as corresponding relationships in relation to power. The noumenon of all kinds of power formed and existing in human society lies in certain needs and appeal of the people. Social life in a human society requires a certain kind of order of appeal established for maintaining objective needs in an objective world, and correspondingly, a certain kind of power order shall be established and maintained as well. For a certain society, the formation or establishment of its power order often indicates that there are some different powers in the specific community of cooperated production and interpersonal communication, and a relatively definite and stable relationship of mutual integration and coordination has been achieved (Jia 2005).

Power is the foundation of the law, and the latter is the important guarantee of the existence of power. Throughout the evolution of power in human society, human beings cannot do without the existence of power in their efforts of fighting diseases, conquering the nature and the universe, and as a phenomenon of our human society, power is an ever-existing theme. Power itself is not a bad thing, but the combination of power and human desire may produce the most undesirable rampage of power. Thus, comes the pertinence of morality and order with law being a part of such a scheme and an important guarantee for existence of power, the very existence of which is aimed at curbing the rampage. Under the supremacy of law, power must be based upon the law which is accepted as the only source of power and all of which has become the truth of an era of rule of law (Huang 2005). In this sense, in the era of big data, power cannot be separated from the data rights law, and without the latter, the control of power rampage will largely be carried out at superficial level and desirable effect could hardly be achieved.

The data rights law and power are interdependent and inseparable. With ever progressing of the human civilization, their relationship is constantly changing. It is impossible for us to make an accurate judgment on how the relationship between the data rights law and power will develop in the future, but at least we can be certain at current stage that the data rights law and power are intertwined and complicated, which means that they cannot do without the other and the loss or gain of both will be at synchronized pace. As of today, power has succumbed to the law in some countries, if not a categorical phenomenon, while in other countries it still stands above the law, not categorically. This is the difference in relationship between power and law at the same time but across different regions. Similarly, at different stages of social development, the same kind of relationship may show a trend of distinction even within the same jurisdiction. In this sense, the evolution of power and the interaction between power and the data rights law will inevitably lead to the decentralization and balance of power regardless of the fact that whether the power stands above the law or vice versa.

The data rights law is a tool of power operation. There is no doubt that the operation of power through legal intermediaries has basically become a consensus in modern countries. Of course, in addition to the power channel constructed by law, there are also ethics, social customs and public opinions, etc. Because of the complexity of power in a digital society, the role of data

rights law in the process of power operation is becoming more and more important and plays an irreplaceable role. At present day, the data rights law is a tool of helping maintain digital civilization; in terms of the future, the data rights law acts as a tool to promote digital civilization. Digital civilization indicates to a maximum extent the social development of power. Therefore, fundamentally speaking, the data rights law is a tool for the operation of power. When the data rights law becomes the tool of power operation, the conflict between the data rights law and power will be inevitable, which is the inevitable result of power conflict itself.

The data rights law is rooted in social production and reflects the data right relationships in a society. The data rights law has both features of social credibility and state coercive force, which means it is formulated and recognized by different walks of the society rather than a compulsory social acceptance by power. In addition, the data rights law has not only the compulsory punishment but also compulsory implementing measures, as well as the foreseeability and guiding functions, which exerts great importance in terms of maintaining stability, settling disputes and delimiting boundaries. It is precisely because of the fatal weakness of power itself that society needs data rights law that has value judgment, can reflect social production in an objective manner, with concrete, coercive and stable regulations added into power constraints, to set boundaries for power, guide the proper exercise of power, and compensate the improper use of power in society by setting punishment and investigation mechanisms (Liu 2009).

The data rights law is the tangible existence of norms and the choice of the whole society. To supervise and restrict the power through such a law and to ensure that the power operates in accordance with the established norms, the whole society may feel the orderly operation of power that will be supervised and tested in accordance with the rules, so that the whole society will form an inertia of supervising and constraining power. The internal and external attributes of the data rights law make itself a desirable choice for regulating the data rights. Through the legalization of such a power can ensure the normal operation of it for giving full play to its strength and overcoming the disadvantages so as to bring benefit to the whole society. Seen from this perspective, the very attributes of the data rights law are of great value and significance for restricting power and overcoming its weaknesses.

The data rights law can regulate powers. As we all know, both the emergence of new things and the development of them exist for a reason and they are with their own social roots. Like the emergence and development of things, the data rights law becomes a core strength of constraining powers which is shaped by the society. The emergence and development of the data rights law has not only a profound social foundation, but also a special external form, which forms necessary attributes for it to restrict the power. The data rights law is fundamentally determined by the social material production, which is the basis for the existence and development of human society. As a kind of superstructure, the data rights law may reflect the social production in which it exists, indicating that the data rights law does not deviate from the facts and it also changes closely following the social change and development, and constantly learns from practice and experience to perfect itself.

The fundamental reason why the data rights law can guide and restrict the operation of power is that it is an advanced social consciousness and can reflect the advanced social productive strength. As an external form of law, the data rights law itself reflects the content of law, and its form is also determined by the content of law. The content of law is a kind of data right relationship, which would be defined by the economic life of human society, and reflect people's appeal for interests, which embodies not only the value connotation but also could be elevated to the level of will of the state. The data rights law is far more than a set of rules. Rather, it reflects data right relationships pertinent to various of interests behind such kind of norms. The data rights law does not favor any interested party. Rather, it represents a fair, just and easily accessible distribution of interests, and ultimately is the outcome of bargaining and negotiation among stakeholders, which is also the fundamental reason why the data rights law can represent the holistic interest but is not a mere tool availed of by interested parties in their pursuit of desirable ends, thus the data rights law can restrict the arbitrary exercise of power.

The data rights law is a special code of conduct guaranteed by coercive force of a state. Different from the general norms, the data rights law must possess cohesive force to become a tool to restrict powers. Only through coercive force to restrict power can the effect of restriction be achieved, which is the fundamental point that the data rights law can restrict power.

As a norm of conduct, the data rights law shall be not only a universal, stable and standardized one, but also interest-guiding and predictable. These characteristics are not only the inevitable requirement of the data rights law to restrict power, but also a good choice of suppressing aggressiveness and arbitrariness of power. Among them, the characteristics of universality provides the guarantee for the regulation of power; the characteristics of stability guarantees the coherence and consistency of power operation; the characteristics of normativeness define the boundary for the operation of power; and the characteristics of interest-guide requires that the operation of power should be based on the interests of society; and its characteristics of predictability requires that the power operation should have explicit goals.

Data rights law and ethics

Ethics is a form of adjustment in the system of social adjustment, and is a sum of views on norms, principles of humans, as well as on beauty and ugliness, good and evil, justice and partiality, glory and shame. As far as the needs of human order are concerned, there is no doubt that ethics is of great value, which starts from the beginning of human society and plays a very important role in maintaining social order. As an important strength of social control, ethics improves human's ethical cognition and moral consciousness with its ever-impressive persuasiveness, so as to make human abide by ethical and moral norms in a conscious way, and form a good social atmosphere of pursuing nobility and motivating the advanced and improved development.

The role of law in maintaining stability of a state is undoubtedly important. If a country or a society has no law, it may not maintain economic growth and social stability. Likewise, social stability cannot be fundamentally maintained without clear concepts of good and evil, beauty and ugliness, right and wrong, and honor and disgrace. Law and ethics belong to the same superstructure, and the relationship between them presents the holistic rather than the partial issue of legal philosophy. Rule of virtue may place its due role where the law itself fails to reach, so the rule of law cannot fundamentally replace the rule of virtue (Wang 2009). To this extent, the data rights law becomes a compilation of rules concerning morality and ethics.

It is inevitable that the data rights law would be integrated with ethics. In terms of the relationship between the data rights law and ethics, both of them belong to very important constituents of the same superstructure phenomenon, which may reflect combined feature of the society and classes, as well as the unity of subjective initiative and material restriction. The data rights law and ethics share same characteristics, in addition to which they are consistent in fundamental ways. Their similarities could be found in the guiding ideology, whereas their consistency is mainly reflected in the tasks, contents, basic principles, social nature and inner spirit of the data rights law and ethics. Therefore, in this sense, the integration of the data rights law and ethics is not only very likely to happen but also an inevitable trend to some extent.

From the perspective of historical materialism, social development does not change with the will of mankind. However, mankind may exert a sustained and far-reaching impact upon the course of social development since the society is on the track of progressing along with the development of mankind itself. In terms of the governance of social order, the data rights law and ethics are basic elements of ensuring normal implementation of social norms which could be seen as indispensable. Ethics is not only the foundation of the data rights law, but also the foundation and prerequisite of the existence and development of social order, which changes with the development of mankind. Ethics is not omnipotent because it involves a wide range of fields and has a weaker constraint on social behavior. Sometimes social order can only be properly maintained through the compulsory constraint of the data rights law.

From the perspective of regulative roles, the data rights law and ethics are the most important tools to adjust human behavior and social relationship. More specifically, the data rights law restricts human behavior through external coercion, while ethics restricts human behavior through internal conscience, both play a role in regulating human behaviors. From the point of view of origin, ethics exists since there is human society and makes its debut before the emergence of the data rights law. Behaviors required and supported by the general rules of data rights law are basically the behaviors respected and recommended by ethics. Acts prohibited and sanctioned by the general rules of data rights law are basically those prohibited and condemned by ethics. Therefore, although the scopes of the data rights law and ethics are not exactly overlapping and the overlapping part of the two

is not higher moral standards, but the basic requirement of ethics, the integration of the data rights law and ethics is an inevitable trend in the developing course of human society. The data rights law is the minimum ethics and may reflect only the basic requirements of the ethics. The noble ethics is a higher-level and deeper value concept that human society esteems. It requires the spontaneous implementation of social subjects and cannot be enforced by the data rights law.

The data rights law is guided spiritually by ethics. Throughout the whole process of normal operation of the data rights law, legislation is the first step, mainly offering solutions to cope with the problem of having a law. While following. Law enforcement and administration of justice are the follow-up activities on the basis of legislation, namely the implementation and accurate application of the established data rights law. Only when the data rights law is perfectly integrated with ethics can good law be observed, applied and implemented afterwards. Thus, the existence of good law is the foundation of operation of data rights law and also a precondition for the follow-up law abiding, law enforcement and administration of justice. From a dynamic perspective, the construction of the rule of law is the running process of the good law system. In this process, the creation of good law has the significance of logical beginning. In order to ensure that the created data rights law is a good law, we must lead the creation of the number right law with ethical value system, and strive to pursue the morality of the data rights law from superficial form to substantive content (Liu 2007).

The data rights law is guided spiritually by ethics and morality, which may be perceived from the following three aspects: first, in terms of the components, the data rights law finds its source in basic and key ethical norms. In review of the development of legal system in the human society, we discover a rule: when the ruling class begins a legislative process, the most basic and key social ethics and moral norms will be a preferred option. Second, the data rights law takes the advanced ethical and moral norms as the core value objectives. In other words, advanced ethical and moral values are the ideological guideline for the legal substitute in different social forms. Third, the evaluation of the norms of the data rights law is mainly measured through good and functional ethical standards. A good data rights law shall embody and carry forward the virtue and conscience of mankind. Generally speaking, what people should strive to achieve is the morality in a desirable

form, but the ethics that people must abide by is the morality of obligation, which is inseparable from the data rights law.

The emergence of the data rights law and ethics is originated from the specific social material conditions. However, in the complementarity, separation and crossover of social strata, the emergence and development of the data rights law and ethics are closely related to human diversity and humanity. Irrational and rational tendencies coexist in human nature which is also a mixture of the good and the evil. Ethical and moral norms play an indispensable role in the process of social adjustment, but they may not fully meet the demands of the development, consolidation and confirmation of pattern of interests in the social adjustment, while the data rights law can just meet this requirement because the data rights law possesses the adjustment means and social norms with state coercive power.

The data rights law requires the support of ethics. Law is the most important social norm, but it may not suitable to solve all problems in certain fields of the society. In the same vein, although the data rights law plays an important role and has great effect, it has certain flaws. On the one hand, the data rights law may arouse fear among people through its authority, but because the data rights law cannot truly understand the inner world of human beings, it cannot ensure that everyone has a sense of shame. Ethics has a strong ability of penetration, which plays a restraining and adjusting role in social production, human life, and the inner spiritual world of people, thus the ethics may make up flaws of the data rights law.

On the other hand, with the complexity of social affairs and the variety of human behaviors, the norms of the data rights law inevitably have some degree of ambiguity. In a normal society, the consciousness of abiding by the data rights law is directly proportional to the level of ethics and morality, the fundamental reasoning of which lies in the fact that both the data rights law and ethics are tools to safeguard social existence, and they are the manifestations of social value. Human identification and belief in the data rights law is the basis of the existence of the data rights law, just as a jurist once said that the law exists only in forms when it is not believed in. External norms of the data rights law must follow the inner voice of human heart so that it can be better complied with.

The data rights law plays a positive role in promoting ethical norms. Boden Heimer once pointed out that the principles of morality and justice

regarded as basic and necessary for social interaction are endowed with a strong compulsory nature for its strong power in all societies. The strengthening of the binding force of these moral principles is realized through transforming them into legal rules (Liao 2015). On the one hand, the data rights law has institutional advantages. Individual ethics is basically derived from the social system. According to the data rights law, it can further promote the development and perfection of ethical and moral norms, and restrict and prevent the occurrence of unethical and immoral behaviors. On the other hand, the data rights law is mandatory. When ethics and morality collide with people without moral consciousness, they often become inoperative. At this time, the coercive force of the data rights law may come along and play a positive role. That is to say, the data rights law promotes the ethical and moral norms through the legalization of ethics and morality, which helps to confirm the requirements of ethics and morality with the authority of law, and realize the implementation of ethical and moral rules. So, data rights law is conducive to the promotion of ethics and morality and universal compliance of people with laws. Essentially, the data rights law disseminates, absorbs, and protects basic ethics through a coercive approach and guarantees its development (Chen 2013).

Data rights law and social customs

Social custom is the norm of the human society at its early stage or a kind of rule and order existing objectively at all stages of human society. The so-called social customs can be generally understood as the behavioral rules, behavioral tendencies or behavioral patterns gradually formed through the interaction between people in a long period of social life under the constraints of the society they are living in (Wang 2012). Social customs are neither innate nor temporary. They are rooted in the whole process of social life and eventually accumulated through long-term life, labor and communication. In the social life of human beings, social customs have been also effectively adjusting, regulating and controlling human behaviors, playing a very similar role as the law, and occasionally even exceeding the effectiveness of the law.

Before the law comes into being, social customs help to maintain the order of the society. The emergence of social customs indicates the formation

of a system of social norms. With the further development of human economy and society, the relationship between people is becoming more and more complicated and the maintenance of order requires more than social customs. Therefore, the social custom at its very early stage cannot meet the demands of increasing development of human society and a new type of scheme is anticipated to complete the adjustment of increasingly complex social relations, thus the law which originates from the social customs comes along. Starting from this point, social customs and law have joined their hands and undertaken the important task of regulating order of people's life (Guo 2012).

The data rights law and social custom influence, penetrate into and restrict each other. Social customs often infiltrate into the field of the data rights law through indirect ways, helping to shape data rights law in a more resourceful, detailed and specific way and affecting both the format and layout of the law, and at the same time acting as a background constraint on the effectiveness of the data rights law. In a given social situation, the data rights law may absorb, accept and acquiesce in prevailing social customs in many ways and channels, but sometimes may take compromise on some of the content that it considers to be harmful. The operation and effect of the data rights law shall be constrained by norms of social customs. Where the values and behavioral ideology of the data rights law are contravening the prevailing social customs and cultural concepts, to implement such a law would be an extremely difficult task with little effect. In addition, social customs may be squeezed by the data rights law, and are changing. The data rights law not only adopts the attitudes of acquiescence and absorption to social customs, but also changes some of the traditional practice so as to shape the social customs in a way more appropriate for the need of the contemporary society and more conducive to the operation of customs.

The data rights law and social customs interact with and complement each other, which also helps resolute disputes between themselves. In this process, the data rights law and social customs fully interact with each other. The social customs rely on the coercive force of the data rights law to ensure their implementation, while the data rights law often relies on a flexible way of social customs to resolve disputes so as to ensure that it is not evaded by the public, or that the public spontaneously believe in and obey the law that is consistent with or similar with their social customs. On the micro-level,

in the operation of the data rights law, rules of the data rights law tend to be mixed with social customs to form a mixed structure of rules, that is, the data rights law and social customs respectively assume parts of "assumption, processing, consequence" of a rule. In other words, the three elements of the mixed rule, "assumption, processing, consequence," are not constituted by one kind of rules of data rights law or social customs. This proves even more strongly that neither social custom nor data rights law can be a self-contained law, and they interact with each other and complement each other.

There exist division of responsibility and competition between the data rights law and social custom. As two important social norms, the data rights law and social customs exist in the same human society and their interaction would not be limited to the scope of mutual respect or simple exclusion, but more about an intrinsic relevance. In terms of basic content and function, social customs assist and supplement the data rights law, while at the same time social customs play an independent normative role with very solid and strong local foundation. Social customs become the most convenient norm among others because of its social identity, while the data rights law is comparable to the last resort to construct the order of digital society and maintain the stability of digital society. Conventions and sentiments are contained in social customs, which can provide effective adjustment for interpersonal communication conforming to the rules of nature, and they tend to be recognized by people, and help promote order and justice in a sense. However, some of the rules contained in social customs may not be consistent with the direction of the development of human society as a whole, and social customs may show insufficiency and defects in logical structure due to their spontaneity. On the basis of social reality and through absorbing the content of social customs, the data rights law was established on rational basis to achieve the social development goals. From this perspective, the data rights law is fundamentally superior to social customs.

In real life, people's uncertainty about the concept of data rights law leads to the result that social customs tend to be more preferred in the choice of norms due to the convenience and priority, since social customs are born inside the society, reflect the habits of human behavior, and are more familiar to and relied by people. Only when the adjustment of social customs fail to obtain effective guidance and remedy, will the data rights law be regarded as the last remedy because of its authority. The relationship between the data

rights law and social custom is one of division of labor and competition. This kind of division of labor and competition is determined by the national spirit and features of thanking pattern of the realistic society. To a certain extent, the creation of the data rights law is transforming the institutional characteristics of the human society, but the transformation does not mean total abandonment of the traditional behavioral norms, reflecting a new type of social customs not totally faithful to the traditional ethics nor fully conform to the data rights law, such a new social custom plays an normative role to a certain degree, and in certain occasions, data rights law will be put in the final choice. Objectively facing the reality, we cannot exclude the competition of social customs to data rights law.

Data rights law and public opinions

Wittgenstein once said that the human eyes have the charm to give value to things. When we turn our eyes to legal phenomenon, corresponding evaluation will also come about. There will be a variety of evaluations on the basis of information feedback from certain perspective, among which social public opinions are universal existence to express such attentions (Zhao 2012). The so-called public opinion is based on the social value system deeply rooted in people's heart, which comes from the public discussion and evaluation by common people toward some social phenomenon, and is helpful to achieve the means of regulation and control of people's behavior. As one of the driving forces of social development, public opinions not only reflect the society in a rather passive way as well as the collective public consciousness, but also influence the society passively and the tendency of public collective consciousness, but also influence the society all the time and react on people's thinking activities and behaviors.

Public opinion is one of the ways of social evaluation at the social level. Professor Ouyang Kang, a famous sociologist, once pointed out that social evaluation had strong trace of relativity. Firstly, the subject of evaluation is self-related to the value facts. Secondly, the social evaluation standard itself may contain great individual difference and ambiguity. Thirdly, the difference of reasonableness in social evaluation (Zhao 2002). Generally speaking, the social conflicts, and the frictions between polarized interest

groups and confrontation of different schools of thought are the soil and background of the emergence of public opinion. Therefore, the purpose of public opinion is to exert pressure on the relevant parties or persons so as to influence their decision-making, restrict their behaviors, and ultimately achieve practical results consistent with the tendencies and requirements of public opinion. This means that public opinion has practical intention and impulse to resort to action (Zhang 1999). When legal phenomenon is a public opinion, whether the application of the law is fair or not becomes the public attention, which becomes not a sheer hot issue of social concern within the isolated circle of legal proceedings of specific organs authorized by the state any more, but is forced to collide with social judgment different with law evaluation in a passive manner.

With the popularity of modern science and technology, the power of public opinion is also expanding with the renewal of different carriers. According to the research results, in modern society, the development pattern of social public opinion related to legal phenomena shows the trend of diversification. Seen from the trend of historical development, ancient law is featured by unitary mandatory command, while a multi-faceted dialogue pattern is an emerging trend in modern times. This could be considered not only as the result of the development of social civilization, but also the symbol of the evolution of human society. In the era of big data, the concern of public opinion on the legal phenomena helps to reflect on the quality of the data rights law and make up for the deficiency of legislation (Zhao 2002).

As two cornerstones of supporting social order, the data rights law and public opinion jointly play irreplaceable roles. The applicability of the data rights law will be influenced by public opinion. Such influence comes from, on the one hand, the difference of social attributes between the two kinds of evaluations, and on the other hand, it comes from the inadaptability of human beings to the law itself. This is an era of coexistence of challenges and opportunities, modern technology featured by information technology is changing our life style in an unprecedented way and all types of social orders are embracing new impact in the Internet era, and survival in a network age has become one of the important ways to reconstruct the political structure and landscapes. If the data rights law fail to be recognized by the society, then it cannot be universally observed nor its authority be established, which may face the destiny of being eliminated. The voice of public opinion from

one side urges the legislative process of the data rights law not to "create law behind closed doors," but to pay attention to the mass public, people's livelihood, and traditional Chinese legal culture.

There are both mutual influence and interaction between the data rights law and the public opinions. The data rights law and public opinions are not only the channel of resolving social disputes, but also a window for digital civilization and democracy. The data rights law was born for achieving social fairness and justice, while the public opinion represents the morality of a society which also seeks social fairness and justice, both of which play a role in promoting justice and eliminating undesirable influence. From this perspective, we can see that the supervision by public opinion is not necessarily antagonistic to the data rights law. Rather, there is a necessary tension between them. Tension relation is the state of mutual influence and interaction between two subjects on the premise of keeping a certain distance (Guo 2010). The data rights law should absorb accurate and real supervision by the public opinions and remain immune from the interference with radical and false opinions. Therefore, supervision by the public opinion and data rights law shall, on the one hand, maintain their respective positions and, on the other hand, interact with each other. They are not mutually exclusive, and thus the positive value of supervision by public opinions should be given full paly so as to urge the public opinions to publicly and reasonably supervise the activities of the data rights law.

The data rights law and public opinions are complementary in their functions as social safety valves. In a stable society, people would reach a certain degree of consensus on the allocation of scarce resources. When the degree of consensus is dropping and social members question the legitimacy of the current mechanism of allocation, social hostility may arise. When hostility in society can be expressed in socially acceptable and permissible ways by the public to their opponents, it is accepted as means of safety valve, such as dueling and witchcraft widely seen in pre-industrial societies. Similarly, the data rights law and the public opinion are also part of the social safety valve system, with the latter acting as the primary safety valve, and the data rights law as the more advanced safety valve (Liu 2012).

The degree of social demand for safety valves is proportional to the rigidity of the social structure, that is, the higher the threshold set by a society for the expression of various opposing requirements, the greater the need for safety valves to ensure the normal operation of society. As a more

advanced social safety valve, the data rights law cannot directly alleviate the unrealistic conflicts. Individuals or a group of claimants who resort to the data rights law tend to have specific interest appeals and explicitly demand certain results, not just expressing hostility. Public opinion may reflect various types of social conflicts, including both the realistic and unrealistic conflicts because of its lower threshold and multi-faceted channels. But it is worth mentioning that in the era of digital civilization, the data rights law acts as the last safety valve to ease social realistic conflict (Liu 2012).

Data Rights Law: New Order, New Civilization

Charles Dickens, the British writer, wrote in his book *A Tale of Two Cities*, "It is the best of times, it is the worst of times." This sentence can also be used to describe the landscape of the big data age. On the one hand, big data has undoubtedly created a "best era" featured by more frequent interconnection, openness and sharing. On the other hand, it has also brought about an top-down disorder, and what we are facing may be a "worst era" with constant data security risks. Traditional rules can hardly bring about a new order, thus we have the data rights law which is the product of social development at a certain stage and will bring the whole mankind to a new era of civilization. It can be imagined that the combination of scientific and technological wisdom together with legal rationality will open a new chapter in the development of human society and lead mankind into the most brilliant new era of civilization in the history of development.

Digital intelligence society

So far, in the process of social development, the time interval between major changes has been gradually shortened, and the transformation of social situations has been accelerated. The great information theorist Von Neumann points out that "the ever-accelerating process of technology gives the appearance of approaching some essential singularity. Once this singularity is transcended, the human society as we know it now will be very

different" (Kurzweil 2015). In human society, the emergence of singularities is driven by new technology, which leads to radical changes in human society. Carlotta Peres, one of the leading figures in evolutionary economics, expressed the view that significant technological change meant not only the extraordinary rapid growth of a number of new industries, but also the rebirth of many "old" industries in the long run (Wang 2015). Due to the rapid development of big data, cloud computing, artificial intelligence and other technologies, human society will usher in an intelligent era, and human beings are embracing a new society – the digital intelligence society. In this new society, the boundary between virtuality and reality, human and machine will be increasingly blurred, and the human-to-human relationship as well as the relationship between human and society will be reconstructed.

Digital intelligence society is a society driven by data force and data relationship. Productivity and production relations are among the most important relations in human society. According to the theory of political economy, productive forces and production relations are unity of opposites, and the birth of any particular kind of production relations in history is determined by the development of productive forces. Every change in society is marked by a change in the mode of production. In the era of big data, there is no doubt also problems of data force and data relationship. Data force is the ability of human beings to use data to understand and transform nature in the context of big data era. It is not only a cognitive but also a developing ability, and its essence is a kind of data productivity. Because of the influence of this kind of power, the whole social production relationship is branded with the data relations.[4] The data force will be the most important productivity of mankind which would be unprecedented enhanced by data force. The contradiction between productive forces and production relations is the fundamental driving force to promote the development of human society. Similarly, data force and data relations will also promote the accelerated development of digital intelligence society.

Digital intelligence society is characterized by universal intelligence. After entering the industrial society, coordination and distribution of responsibilities and large-scale manufacturing help to make a substantive leap in

4 See Key Laboratory of Big Data Strategies. *Block Data 2.0: Paradigm Revolution in the Era of Big Data*. Beijing: CITIC Press Group, 2016: 193–195.

terms of manufacturing and utilizing tools. At present, a new round of intelligent industrial revolution is quietly proceeding, and the human beings are embracing a new type of economic and social formation by utilizing technologies like information and telecommunication to a maximum extent, integrating the virtual world with real world after experiencing the hunting society, farming society, industrial society and information society in the past. Electronic chips, the Internet of Things, and the holistic integration of artificial intelligence will take the mankind to the next stage of development. Digital intelligence society is a new concept and a social form on higher level. Politics, economy, culture, as well as people's way of thinking and values will undergo profound and comprehensive changes just as the way of the human society was transformed from the agricultural society to industrial society.

SHARING FEATURE

In the traditional industrial society, the material products can hardly be shared and are relatively limited in terms of the amount, which means that social struggle is inevitable due to the fact of unfair and uneven distribution of resources. However, in a digital intelligence society, the most important means of production is data. Unlike ordinary materials, data may be reached by indefinite sources and be shared by all mankind. At the same time, due to the birth of various new technologies, social material products reach a high degree of enrichment in which the struggle for resources and goods has been transformed into a state of sharing and win-win cooperating community of human society for the building of a harmonious world (Chu 2015).

CONNECTIVITY

Essentially, human society has the attribute of interaction and connection, which exists in both the stage of agricultural society and the stage of division of labor in industrial society. (Liang 2014) In the digital intelligence society, new technologies based on the Internet of Things and cloud computing will give birth to a strongly connected social system and once new connections emerge, a complex social system with coexistence of reality and virtuality will surface, which will push human society into a new era of human-computer interaction.

INTELLIGENCE

Spirit cannot be grasped through perception, nor can it be measured by quantitative method (Wang 2015). However, intelligence is precisely trying to conquer the indescribable spiritual world. The biggest difference between the digital intelligence society and the societies in the past is that the former endows all things with "intelligence" and greatly expands "intelligence" ability of the people. At present, the tide of intelligence is affecting us in a sweeping manner, intelligence of all things is the trend of social development, and intelligent technology will transform all aspects of human life with the successive advent of intelligent transportation, smart medicine, smart agriculture, smart city and so on.

LEGAL ORDER IN A DIGITAL INTELLIGENCE SOCIETY

All things are undergoing changes, from orderly state to disorderly state or in the backward direction at any time and in any place. Technological advancement drives the development of society, and the never satisfied human demand for material conditions may drive the continuous progress of technology, with every great technological change pushing mankind to a new stage of development. Human society will embrace an age of intelligence, which will not only affect the profound transformation of industry, but also affect the whole society and the life of everyone. The new generation of information technology characterized by digitalization, networking and intelligence has been widely and deeply applied, which not only improves greatly the efficiency and quality, but also brings inevitably new problems, new changes and new challenges in the aspects of production relations, organizational form and social structure, which are driven by technology too. The intelligence of robots and other new intelligent equipment and terminals continues to improve, and the progress from "personification" to "humanoid" is getting more and more rapid, which prompts new questions as to how to define human identity, how to judge human subjects and how to protect human from invasion and replacement of machines. Physical world, information space and the demarcation of human society are becoming increasingly blurred with more frequent emergence of legal blind spots and formation of a series of complex safety loopholes, and all in all, the human world is undergoing a technological tsunami and order reconstruction.

Future of law: Institutional composition of the future society

It is a slow process for the new rules to come about but they will eventually take the place of the old ones. For a society, the safer attitude to the new emergence is to interpret it by and compare it with existing institutions and rules until it develops into a completely different species and exceed the management parameter of the old rules (Hu 2013). Social progress is a process of constant changes. Law is a social product, and the developing path of each process and its choice and design of rules reflect the social structure and social order at a certain period of time and of a certain society. In the process of human development, the emergence of each new technology will have a certain impact on the law. On the one hand, the achievements brought about by the development of science and technology will inevitably broaden the scope of human activities and give birth to new social relations and right relations. On the other hand, the advancement of science and technology will certainly bring about new areas for legal regulation. As far as the construction of legal system is concerned, laws simply based on technology itself and the resulting technology-centered social norms would be not complete and may not keep up with the times. "The helplessness we experience is not a sign of personal failure, but a reflection of the helplessness of our institutions. We need to reconstruct these institutions that we once had, or create new ones" (Giddens 2000). Throughout the process of human development and the evolution of law, construction of social forms ever since the industrial revolution is closely related to the coetaneous institutional establishment or that of previous enlightenment (He 2017). The new stage of civilization requires a synchronous social institution, on the basis of which we can predict the institutional composition of the future society that consists of multiple value goals, regulation of social norms guided by morality and ethics, as well as the risk-prevention and control mechanism oriented by technology and law.

Multiple value goals with security and harmony as their core. Human beings have diversified living needs, which determines the diversification of human value goals. The value goal of law has many dimensions, among which safety and harmony are the basic value embodiment of law. Legal philosopher Luis Recasens Siches indicates that if the legal order does not represent a safe order, then it is not a law (Bodenheimer 1999). The value of law includes not only the opposition between ideal and reality, but also the unity of to-be and ought-to-be. Law is a special existence containing both

general value components and special value elements so as to realize its special legal value. The ideal value of law is always higher than its actual value, which provides impetus for the evolution of law. In the future, the value of law should not only reflect the ideal values of human beings, but also display the legalization of value in the category of philosophy. Therefore, under the guidance of the multiple value goal, the law should gradually contain special value content, namely security, harmony and innovation.

Morality and ethics as the forerunner of the social norm control system. According to the system integrity theory, elements contained in the system are inseparable. Single element in the system cannot exist alone, but needs to be related to other elements. To achieve the smooth operation of the entire system, a single element must be subordinate to the whole, and linked with other elements. In the system of social norm regulation and control, law, morality and ethics are important means of regulation and control from different angles and using different mechanisms, which may also exert influence upon various fields of a society through different methods. From a philosophical perspective, the moralization or ethicalization of law realizes the overall optimal state and the optimal cooperation between the various constituent elements of the social norm control system. Therefore, in the process of constructing the social norm control system, we should not only focus on the development and perfection of the legal system, but also pay attention to the connection and integration of law, morality and ethics.

Risk control mechanism dominated by technology and law (Wu 2017). Risk control refers to the use of a variety of means to reduce the likelihood of risk occurrence and the harm caused by risk. Risk control mechanism is the unity of social rationality and scientific rationality. It not only involves the strengthening and transformation of the traditional legal system, including the policy system with social supervision as the main component, but also covers the legal regulation of technical means. At present, the new technological revolution is on the rise, the industrial transformation and economic development continue to integrate and merge with each other. The development of new technology has brought challenges to the traditional legal system, the existing legal system and concepts fail to adapt to the fundamental requirements of the development of technological innovation. How to cope with the emerging new situation in society? Technical regulation and improvement of legal system are the basic requirements, which are not only the trend of the times, but also the internal driving force of international and

local innovation. Under such circumstance, the pursuit of a combined and comprehensive mechanism of governance featured by technical regulation and legal regulation will be the most desirable choice.

Algorithm is law

Traditionally, law is the basis of social rules, and its main function is to regulate human behavior. Generally speaking, the evolution of law is also the process of its gradual and in-depth integration into human production and life. From Code of Hammurabi to Roman law, from religious rules to Napoleonic Code, from the law of the Shang Yang to the Criminal Code of Qing Dynasty, from case law to statute law, from national law, maritime law to international law, laws become more and more omnipresent. Because the law has certain hysteresis, we can hardly on the basis of existing law foresee future situation and legal phenomenon. The rapid development of society will promote the evolution of the law, and the boundaries of the law will continue to expand. Therefore, in the rapid development of this society, the legal system would be subject to comprehensive remodeling.

With the advent of a new era of "algorithm economy," systematic methods would be employed to solve various problems. Nowadays, algorithms are having a great impact on human production and life in many ways, covering industrial development, enterprise innovation and so on. The algorithms come in a variety of forms, from traditional desktops and laptops to emerging smartphones and wearables. The algorithm can analyze thousands of pages of documents and produce results in a very short time, and it can also help people better understand the relationship between people, people and things, things and things, and even people's behavior motivation and emotional state. In the present and in the future, when big data and algorithms become assets of societies, businesses, and individuals that can hardly be overlooked, new business model will emerge (Dormehl 2016). Undoubtedly, the algorithm will become a new engine of the new economy and bring overturning impact on society. With the continuous progress of computer technology and algorithm technology, more and more objects and devices gradually become intelligent, which means that human society is entering into a new era of "algorithm economy" through the connection between big data and cloud computing.

In the future, a large number of social rules might be written into the algorithms of artificial intelligence, and the law will become a pile of algorithms. Yuval Noah Harari once pointed out that in the future artificial intelligence will gain dominance and our law will become a kind of digital rule which will regulate all human behavior except for the laws of physics (2017, p. 280–283). In the era of big data, data and algorithms have become a new network architecture. While the mass data are seemingly analyzed in an objective manner, this descriptive ergodic fact is also imposed on everyone as a normative rule (Hu 2016). The "algorithm" will bring subversive impact on our traditional mode of thinking and lead to infinite reverie in human society, and this kind of prediction has been gradually realized. The world will be quantified by algorithms, human beings will continue to improve their understanding of society and themselves through algorithms, and artificial intelligence will partially replace human beings through algorithms and massive data analysis, with the law ultimately being replaced by algorithms.

Property law and data rights law are two legal bases of digital civilization

One of the core functions of law is to maintain social harmony and stability. Whether rules, institutions or laws, they are presupposition and arrangements formulated for regulating people's interaction. Law is an important guarantee for the normal operation of society and people's harmonious life. People often say "nothing can be accomplished without norms or standards," which is a problem that needs to be faced by as high as the national governance and down to the level of people's daily life. Whether it is a society, a country, or a family, exchanges and activities between people cannot maintain a good order and people's personal safety and happiness cannot be guaranteed without laws, regulations and codes of conduct. Therefore, law is not a dispensable decoration in people's life, but a basic guarantee of people's normal work and life. Social progress is a process of constant changes, from agricultural society to industrial and then to digital civilization, from the "human rights era," "property rights era" to the "data rights era," and law will also realize the leap from "law of man" to "law of things" and then to "law of data."

Digital civilization is a more superior type of civilization after industrial civilization. Compared with the industrial civilization, which attaches great importance to the rationality and rules and has the characteristic of making maximized profits, the digital civilization is just like a storm prompting human beings to reflect on their past norms and rules. As an important part of production materials, data resources are different from the traditional production factors, which make the rule of generation, collection and use of data the core of the new system. On the premise of protecting individual dignity and freedom, it is urgent to establish scientific and reasonable rules to realize the effective circulation and use of data. With the development of digital civilization, it is an irresistible trend to make necessary modifications to the original protection rules, and most of the legal norms will be fundamentally changed. The data rights law is the product of a new civilization and it will also signify a new order during a transformation era from industrial civilization to digital civilization.

It is the belief of Marxism that the law belongs to the superstructure which will be fundamentally determined by its economic basis and serves the economic basis. Both the production and life of human society and any progress of the human civilization are inseparable from property. All kinds of social relationships among human beings are essentially property-economic relationship. Property law determines the owner of the property from the perspective of civil law, and further determines what rights the owner of the property has, emphasizing the protection of property rights, which not only is conducive to clarifying the ownership of property, but also can give full play to the effectiveness of property. The data rights law aims at defining attribution of data and setting out explicit rules for data utilization, which is the essential raw material for building a harmonious law-based society. In a society ruled by law, if there is no law, there is no order. The existing property law protects the property right of the obligee and defines the ownership of the property, while the data rights law protects the data rights of the obligee and defines the ownership of the data resources. The combination of the two delineates a vibrant, orderly and fair and shared future world for all of us. The data rights law and property law set out legal foundations for the future era, becoming the basic materials to construct a legal empire based upon rules.

Prospects of civilizations: Natural persons, robots and genetic persons

So far, human society has experienced the first industrial revolution marked by steam engine, the second industrial revolution marked by electrification and the third industrial revolution marked by computer technology. Human society is facing the advent of the fourth industrial revolution featured by multi-faceted technologies, wider scope and diversified fields. Looking back at the past three industrial revolutions and the fourth industrial revolution we are experiencing, we can find a common feature among them that machines are gradually replacing human labors. In his book *On the Citizen*, Thomas Hobbes, founder of modern political philosophy, points out that

> for as in a watch, or some such small engine, the matter, figure, and motion of the wheels, cannot well be known, except it be taken in sunder, and viewed in parts; so to make a more curious search into the rights of States, and duties of Subjects, it is necessary, (I say not to take them in sunder, but yet that) they be so considered, as if they were dissolved, (i.e.) that we rightly understand what the quality of human nature is, in what matters it is, in what not fit to make up a civil government, and how men must be agreed among themselves, that intend to grow up into a well-grounded State. (2003, p. 9)

Here, human society can be conceived as the most sophisticated machine of the time, and the relationship between human beings and machines will become increasingly closer.

Robot is the inevitable product of technology development to a certain stage. As early as in the year of 1611, the word "automata" first appeared, which was employed to refer to the use of clock gears and other technologies to produce automatic robot dolls. This kind of automata was the product of social imagination at that time, although it did not have intelligence in real sense, it provided people with the idea of artificial intelligence and made people realize that machines could simulate human brains and bodies. A robot, as defined by the Robot Institute of America, is a reprogrammable, multifunctional manipulator designed to move material, parts, tools, or specialized devices through various programmed motions for the performance of a variety of tasks. In 2013, McKinsey Global Institute in its report *Disruptive technologies: Advances that will transform life, business, and the global economy* identified twelve disruptive technologies that will drive

transformation in life, business and global economy by 2025, with advanced robotics ranking fifth. The core of social development and progress is the liberation of labor force. When the labor force is partly replaced by machines, mankind will enter the industrial era. When the labor force is completely liberated by the robots the mankind will enter the age of intelligence. At present, robot technology has made rapid progress, penetrating into every facet of human life and the popularity of robots will be a foreseeable trend in the near future.

"Gene man" will play a new role in the future society. Every revolution will create new things and every new invention will replace a certain function of mankind. The fourth industrial revolution is on the horizon, in which robots that are more powerful than humans and capable of independent thinking will emerge and "genet man" that use gene sequencing, editing, and activation technologies will emerge as well. It is likely that there are not only "natural persons," but also other species like "robots" and "gene man." Perhaps robots and genetic man have both the personality traits and mental state of a natural person. At that time, the natural persons, the robots and the genetic man will compete to survive in the game.

Past history tells us that human functions are slowly degrading with every step of technological advancement, from physical power to brain power, from being active to being passive, from the outside world to the internal world. Human beings degrade themselves by what they deliver intelligent machines. In the course of this game, the possibility of intelligent machines becoming superior to their human masters has been greatly increased (Lin 2017). Essentially, the development of robots and "gene man" originated from the needs of human beings. In the near future, if robots acquire the ability of self-learning, self-improvement and self-innovation, and are equipped with abilities that the human beings lack, and if genetic technology makes it possible for the creation of "gene man" with the same abilities as human beings, we will have to redefine the concept of "human," and human centralism will be rewritten. Thus, human beings will face a series of problems. How to define the relationship between natural person, robot and "gene human"? How to distinguish the attributes of the three? What changes will take place in human society? Will robots and "gene man" overtake or even control humans? All these questions are awaiting answers, and our world view, our outlook on life, and our values will be immensely affected.

Integration of civilizations

In ancient times, early civilizations moved only slowly within a relatively narrow scope. With the emergence of commodity production and exchange, civilizations began to merge. From the perspective of the vast sea of world history, the integration of civilizations becomes a normal, inevitable and necessary state (Shang 2014). The so-called integration of civilizations refers to the process in which different civilizations make contact and communicate with each other, and make constant innovations and develop their cultural identity. Integration embodies the tendency of seeking balance from reciprocity and complementarity among civilizations and is an indispensable link in the evolution of civilizations (Guang 2009). Throughout the history of world civilization, the trend of integration has made the world a more civilized and colorful place. Whether in the past or in the present, any kind of civilization, regardless of their original region, state, and social conditions, has been undergoing a process of integration and evolution to its current state (Lu 2017).

The purpose of integration of civilizations is to innovate and inherit previous civilizations in a critical manner, rather than to integrate them into a simple successive civilization. According to the norms of content, civilization can be categorized into three levels, namely, material civilization, spiritual civilization and institutional civilization. Integration of civilizations reflects the exchange between and penetration into each other. The process of integration of civilizations is the process of different civilizations acquiring from each other, and the final result is that the weaker civilization gradually approaches the stronger one (Guang 2009). For example, with the rise of a new round of scientific and technological revolution, big data, artificial intelligence and other new generation of information technology are widely spread and used, making people with different civilization background become closer in terms of their production means and ways of living.

The data rights law helps to elevate human society to a digital-intelligence sharing society characterized by the integration of civilizations. Sharing is an irresistible trend in the process of integration and development of human civilizations, penetrating into every corner of our lives online or offline. The so-called sharing originates from ancient times and it is embedded in the idea of Confucius' Great Harmony Society, Plato's "Utopia," Sun

Yat-sen's ideal of "the world as one community," and Mao Zedong's propaganda of "Serving the People" (Lu 2017). In the era of big data, sharing is a significant achievement in the convergence and development of digital civilization. In this era, data is infinitely replicable, and data owners can have real, direct control over the data replicated. Therefore, people urgently need to change the social form and promote data sharing. The data rights law advocates data sharing, which is a kind of ethical consciousness of digital society determined by legal means, and its ultimate goal is to make it possible that every member of the digital society may fully enjoy the wonderful life brought by the new generation of digital technology. At present, the social form against the backdrop of big data technology is changing from the society of private rights to the organic society featuring sharing (Wu 2016). At the same time, the data rights law promotes human society to a higher form characterized by digital and intelligence sharing and the integration of civilizations.

The data rights law is a product of integrated development of civilization in the era of big data. With the continuous development of economic integration, integration of civilizations becomes a worldwide trend, in which we see the integration of Eastern and Western legal theories and jurisprudences with an emerging tide of the integration of the civil law system and common law system. The so-called civil law system and common law system are two parallel legal traditions which have the most far-reaching impact on the world today. Although these two legal traditions have different characteristics in terms of the legislative systems, judicial systems, legal concepts and practices, these two legal systems are developing in an ever-integrating manner. As the era of big data is ushered in, the process of the integration between various civilizations across the world is speeding up. The trend of the integration of legal theories and jurisprudences as represented by the civil law system and common law system in many aspects becomes more and more evident. The development of the new generation of information technology, such as big data, makes the data rights law a point of convergence between legal theories and practices of the East and West in this era. The data rights law becomes an integrated point of advantages of civil law system and common law system to the maximum extent. In a certain sense, it marks the development trend of the integration of eastern and Western legal theories and jurisprudence.

Future civilizations

The evolution and progress of human society is a long historical process. At the beginning of its birth, the human beings directly obtain food and construct shelters from their natural environment. Gradually, they become unsatisfied with the original nurturing of the nature and begin to study from and explore the organisms and plants in the nature to better meet the needs of their own, and they use the limited technological resources to transform the natural materials they acquire. The world has undergone drastic changes from industrial civilization and information civilization to the intelligent age of this day. Human beings have begun to explore the intrinsic logic of nature and society, and to build advanced intelligence systems.

> Humankind is facing unprecedented revolutions, all our old stories are crumbling, and no new story has so far emerged to replace them. Of course, humans could never predict the future with accuracy. But today it is more difficult than ever before, because once technology enables us to engineer bodies, brains and minds, we can no longer be certain about anything – including things that previously seemed fixed and eternal. (Harari 2017)

What will the future of human society look like? Admittedly, we can use our wildest imagination to draw a picture of the future in our mind. With the advent of artificial intelligence, the Internet of Things and other technologies, the future of human society will not only belong to the natural person, but also to the robots, gene man, perhaps even the singularity man and biochemical man, which will make the human society more complex and interesting. For human beings, the nature contains abundant resources, including not only the biological gene pool, but also the cultural gene pool, and these resources will bring constant inspirations to human progress. Mankind uses advanced technology to study the resources acquired in nature, and in the meanwhile constantly returning to nature to create a natural kingdom and man-made kingdom of unity. The line between living creatures and machines will gradually become opaque. Biological creatures become mechanized, and remain no longer living creatures in traditional sense, but transformed living creatures by non-biological logic. Machines

become biologicalized and are no longer the original machines, but human-invented creatures with biological logic and possessing autonomous and adaptive capabilities, so the original order would be ultimately transformed. As Stephen Kotler said:

> Life is tricky sport – and that's the emotional core of this story, the real reason we can't put Pandora back in the box. When you strip everything else away, technology is nothing more than the promise of an easier tomorrow. It's the promise of hope. And how do you stop hope? (Kotler 2016)

In the future, with the emergence of various biological forms and the development of diverse biological functions, the birth of robots, gene man, singularity man[5] and biochemical man will bring about many problems in terms of legal regulation and ethics, which may exert a huge impact on the entire legal system of human society. The advent of the data rights law will create a better social environment for the harmonious coexistence of humans, robots and gene man, in a bid to realize the perfect coexistence of the man-made and the natural creatures and push the human society into a brand-new civilization era – the era of digital civilization. Every advancement in civilization has enriched the reserve of knowledge of the human beings, promoted the improvement of productivity, and pushed forward the pace of progress of mankind. The era of digital civilization promoted by digitalization, technicalization and intelligentization is knocking the door, which is a new civilization form succeeding the civilization of the stone age, the civilization of the agricultural age and the civilization of the industrial age, and is being expected to chart a new chapter of human society development and usher in a most splendid new era of civilization in the course of history of human development!

5 According to the new theories introduced by the American futurologist Raymond Kurzweil, by 2045, humans will usher in a technological singularity that is expected to create a new species of "singularity man" that may surpass and obsolete humans. "Singularity" refers to the fusion of human and other species (objects). "Singularity Man" is a new species formed after the fusion of computer intelligence and human brain intelligence.

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Postscript

On March 26, 2017, Professor Lian Yuming, director of the Big Data Strategy Key Laboratory, first proposed the "Data Rights Law" at the second reading meeting in Guiyang, officially publicizing the systematical explanations for the concepts of "data rights," "data rights system" and "digital rights law." On May 22, Comrade Chen Gang, then member of the Standing Committee of the Guizhou Provincial Party Committee and secretary of the Guiyang Municipal Party Committee, exchanged views with Professor Lian Yuming and put forward a series of important views, and requested the Big Data Strategy Key Laboratory to speed up cooperating with the China University of Political Science and Law. On June 6, the Guiyang Municipal People's Government signed an agreement with the China University of Political Science and Law establishing the Strategic Research Laboratory for Big Data at China University of Political Science and Law. On July 6, China University of Political Science and Law approved the establishment of China's first research center for data rights law.

Subsequently, the Key Laboratory of Big Data Strategy successively released a series of major theoretical achievements. "Data Rights Law" became an important issue. Among them, *Block Data 3.0: Order Internet and Sovereign Blockchain*, proposes that from data to data rights, it is the inevitable outcome for human society heads towards digital civilization. Like human rights and property rights, we also have the data right. When the Internet, big data, blockchain and law are married, the world is really different. In the book, *Redefining Big Data: Ten Driving Forces that Will Change the Future*, the author proposes a major judgment on data rights law that from farming civilization to industrial civilization and to today's digital civilization. human beings head towards the era of "data rights" from "human rights" and "property rights," and the law completed a major transition from the "human law" and "physical law" to the "digital law." *Blue Book of Big Data: Annual Report on Development of Big Data in China No. 1* explains the legitimacy and possibility of data rights law from the perspective of jurisprudence, and then points out that in China's existing legislative

system, big data is in the "grey zone" of law and supervision. This stems from the weakness of the legal basis of data rights, especially the lack of dynamic interpretation towards the background of data rights, the lack of systematic construction towards the data rights theory system and the lack of legislation on the data rights value order. *Blue Book of Big Data: Annual Report on Development of Big Data in China No. 2* explores the theoretical basis of data right, initially puts forward the basic concept of data rights system, further proposes the vision and prospect of the legislative framework of data rights law and proposes the sharing rights definite a new life of the remixing era and the data rights law reconstructs a new order of digital civilization. *Block Data 4.0: Activating Data Science in the Age of Artificial Intelligence* combines the theory of activation data science to discuss the importance of data rights law for the era of cloud-brain. The data rights law has become the legal basis for constructing the community of human destiny in cyberspace. On the basis of the continuous systematic research of the data rights law, China National Committee for Terms in Sciences and Technologies first approved the "Top Ten New Terms of Big Data" at the 2017 China International Big Data Industry Expo, and the "data rights law" was selected. Since then, the term "data rights law" has been officially recognized, entered the official vocabulary and quickly became popular.

Data Rights Law 1.0: The Theoretical Basis contains a comprehensive discussion of the data rights, focuses on the theoretical logic, value logic and legal logic of data rights law, which is also the legal philosophy of the data right. This book attaches the main thread of data rights, data rights system and data rights law, under the context of "re-mixing theory" discusses the theoretical basis of data rights with reference to "human rights theory" and "property rights theory," through the comparison with human rights and property rights reveals the legitimacy basis of data rights law in legal philosophy, thus demonstrates the possibility, necessity and inevitability of the creation of data rights system. This book believes that the data right is the right that everyone shares data to maximize value, and its essence is the sharing right. From the legal characteristics, the data rights are a combination of personal rights and property rights. The subject of data rights is the specific right holder, and the object is a specific data set. The data rights break through the limitations of "one ownership for one object" and "properties are tangible," often manifested as "multiple ownerships for one data." The

data rights have private right attributes, public right attribute and sovereign attribute. The data rights system mainly includes the statutory system of data rights, data ownership system, system of data usufruct, system of data rights for public interests and sharing system. The data rights law is a legal system that regulates data ownership, right, use and protection. The marriage of data and law opens a new order in the era of digital civilization. The digital civilization provides the origin of value and the driving force of innovation for the creation of data rights law. The data rights law also provides an existing basis for the system maintenance and order promotion of digital civilization. The data rights law is the product of civilization transition, and will also be the new order of human beings reform from industrial civilization to digital civilization. Together with the property law, it constitutes the two legal foundations of the era of digital civilization.

This book is another major innovation outcome that was launched on the basis of block data theory study. The Key Laboratory of Big Data Strategy organized experts and scholars in the field of big data and researchers of data rights theory to conduct discussion, in-depth research and centralized writing. In the study and writing process of this book, Lian Yuming put forward the overall idea and core view, and carried out the overall design of the framework system. Wu Jianzhong, Song Xixian, Long Rongyuan, Hu Jing refine outline and theme thoughts, mainly Lian Yuming, Zhu Yinghui, Wu Jianzhong, Zhang Tao, Song Qing, Hu Hairong, Song Xixian, Long Rongyuan, Zhang Junli, Hu Jing, Zhang Longxiang, Zou Tao, Chen Xi, Luo Liping, Zhai Bin, Yang Guanhua, Wang Qianru, Tian Run, Luo Rong, Zheng Ting, Chen Wei were responsible for writing. Chen Gang put forward many important forward-looking and guiding points for this book. He believes that the data rights are a new object of rights, a new type of rights, a new right attribute and a new power and function of rights. These four "new" lay a theoretical foundation for the book, and further enrich the book's ideology and theoretical system. Yan Aoshuang, deputy director of the Standing Committee of the Beijing Municipal People's Congress, Li Zaiyong, member of the Standing Committee of the Guizhou Provincial Party Committee, executive deputy governor of Guizhou, Zhao Deming, member of the Guizhou Provincial Party Committee, deputy secretary of the Guiyang Municipal Party Committee, Chen Yan, deputy secretary of the Guiyang Municipal Committee, mayor of Guiyang, Li Zhong, the Standing

Committee of the Guiyang Municipal People's Congress, Nie Xuesong, member of the Standing Committee of Guiyang Municipal Committee, Secretary of the Municipal Party Committee, Minister of the United Front Work Department of the Municipal Party Committee, Xu Hao, member of the Standing Committee of the Guiyang Municipal Committee, Executive Vice Mayor of the Municipal People's Government, Professor Li Zheng, director of the Research Department of China University of Political Science and Law, Professor Ben Shenglin, dean of the Academy of Internet Finance (AIF) of Zhejiang University, Professor Wang Jijun and Professor Sun Shuyun of Shanxi University Law School contributed a lot of forward-looking thoughts and opinions to this book. In particular, Dr. Liu Shengguo, partner and lawyer of Tianchi Juntai Law Firm, carefully reviewed the book and put forward many professional suggestions and opinions.

On June 30, 2018, hosted by China University of Political Science and Law, Global City Development Corporation Council, Beijing, Guiyang Innovation-Driven Development Strategy Research Institute, sponsored by Key Laboratory of Big Data Strategy Research Base at China University of Political Science and Law, "the first seminar of Digital China Think Tank Forum on Data Rights Law" was held at the China University of Political Science and Law. Professor Li Zheng, director of the Research Department of China University of Political Science and Law, presided over the meeting. Jin Chengbo, professor of the Party School of the Central Committee of the Communist Party of China, Xie Haiding, researcher of the Institute of Law of the Chinese Academy of Social Sciences, Cheng Xiao, deputy secretary of the Party Committee of Law School of Tsinghua University, Zhang Jianwei, professor at the Law School of Tsinghua University, Chen Yongsheng, professor of the Law School of Peking University, Professor Yin Fei, dean of the School of Law of Central University of Finance and Economics, Professor Long Weiqiu, dean of Law School of Beijing University of Aeronautics and Astronautics, Wu Changhai, vice president and professor of the Capital Economic Research Institute of China University of Political Science and Law, Chen Huabin, professor at the School of Law of Central University of Finance and Economics, Professor Chen Jingshan, deputy editor of the *Journal of China University of Political Science and Law*, Xue Kepeng, professor of Civil and Commercial Economics Law School of China University of Political Science and Law, Professor Zhao Hongmei, director of the Institute

of Social Law of China University of Political Science and Law, Associate Professor Zhu Wei, director of the Center for Communication Law of China University of Political Science and Law and Li Min, associate professor of the Law School of China University of Political Science and Law, attended the meeting and proposed many constructive opinions of farsightedness. Experts unanimously believe that this book creatively put forward the concept of "data rights law," which is the first book in China and even the world to be named after data rights law, with data rights as the research object, and the meaning of which is extraordinary, and has epoch-making significance.

On July 19, 2018, sponsored by Academy of Internet Finance (AIF) of Zhejiang University, Global City Development Corporation Council, Beijing, Guiyang Innovation-Driven Development Strategy Research Institute hosted by Key Laboratory of Big Data Strategy Research Base at Zhejiang University, Research Center for Prospect of Big Data Financial Risk Prevention of Zhejiang, the Second Seminar of Digital China Think Tank Forum on Data Rights Law was held at Zhejiang University. Professor Li Youxing, deputy dean of the Academy of Internet Finance (AIF) and Guanghua Law School of Zhejiang University, presided over the meeting. Professor Zhong Ruiqing from Guanghua Law School of Zhejiang University, Huang Zhongdong, associate professor of the Computer Science and Technology College of Zhejiang University, deputy director of Joint Research Center of Frontier Technology of Alibaba-Zhejiang University, Zhang Jin, deputy director of the Legislative Affairs Office of Zhejiang Provincial People's Government, Wang Yuwei, senior partner of Beijing GuanTao and Shanghai ZhongMao Law Firm, Zhang Yongliang, associate professor at the School of Law of the Zhejiang Agriculture and Forestry University, Qi Xinyu, data expert of Ant Financial Research Institute, Dong Wang, associate professor at the School of Management of Zhejiang University, Liang Cai, director of Wind Control of Shanghai Data Exchange Center, Zhu Yue, Ph.D. candidate from Guanghua Law School of Zhejiang University, Zhou Lingrong, general manager of ZhuJi Bushenglian Health Industry Group, attended the meeting and delivered a speech. Experts agree that the concept of "data rights law" will certainly become an innovation and breakthrough in the field of law. It can be said that this book is a pioneer in the field of data rights law. For data rights, whether acknowledged or rejected, it has been integrated into our lives. Data rights, the data rights system and

data rights law are still a new thing for us, there are many problems needing to be discussed and resolved, but the future prospects are bright.

On July 31, 2018, sponsored by China National Committee for Terms in Sciences and Technologies, Global City Development Corporation Council, Beijing and Guiyang Innovation-Driven Development Strategy Research Institute, hosted by the Key Laboratory of Big Data Strategy Research Base at China National Committee for Terms in Sciences and Technologies, the third seminar of Digital China Think Tank Forum on Data Rights Law was held in Beijing. Liu Qing, the former full-time deputy director of China National Committee for Terms in Sciences and Technologies, presided over the meeting. Wen Kui, former president and professor of Capital University of Economics and Business, Zhang Qingxi, deputy director of Beijing Philosophy and Social Science Planning Office, Duan Xia, director and professor of Beijing Key Laboratory of Urban Group System Evolution and Sustainable Development Decision-making Simulation of Capital University of Economics and Business, Liu Rui, director and editor of Intellectual Property Publishing of the Social Knowledge Certification Platform Operation Center, Deng Pan, assistant dean of the Beijing University of Big Data Research, and Chang Baobao, associate professor of the School of Information Science and Technology, Peking University attended the meeting and delivered speeches. Experts fully affirmed and highly appraised the proposal of data rights law. It is unanimously believed that the study of data rights law focuses on the reality and more on the future; pays more attention to the physical space and more to the virtual space, which is of great significance to the era of re-mixing that is or is about to come. In particular, experts have put forward many constructive opinions on the major issues such as the "data person" hypothesis, the protection of data rights and the sharing rights proposed in this book.

The future has already come, yet we are facing the laws of the twentieth century and the reality of the twenty-first century. The legal response in the digital age is bound to become a legal proposition that keeps pace with times and grand narrative. The study of data rights law is a groundbreaking and epoch-making work. It is a major social or academic issue that future generations cannot bypass in any way. Even if we don't touch it now, future generations must study it. We are only one step ahead and willing to be the first person to "eat crabs." Here, special thanks go to the leaders and editors of the

Social Sciences Academic Press President Xie Shouguang highly affirmed and provide support of publishing for this book with forward-thinking, unique vision and superhuman courage and director Deng Yonghong, personally organized a number of editors to carefully plan, edit and design, therefore, the book can meet with readers as scheduled. Of course, this is only the first step in our study. We will continue to introduce the *Data Rights Law 2.0: System Design of Data Rights, Data Rights Law 3.0: Legislative Foresight, Data Rights Law 4.0: Right to Share and Right to Privacy, Data Rights Law 5.0: Data Rights Theory and New Ethics*, in order to further perfect the theoretical system of data rights law. The work we are doing now is only a theoretical exploration, which only provides scholars with a possible legal proposition or some research resources. A small book of 300-page can not answer everyone's question, but it is more important to let people think than to give an answer. In the process of editing, we try our best to collect the latest literature and absorb the latest ideas to enrich the content of this book. Despite this, due to the limited capacity and academic ability, there are inevitable omissions in the book. In particular, if there is any regrettable omission on the cited literature and sources, we hope you can criticize and correct.

Key Laboratory of Big Data Strategy
August 2018 in Guiyang

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