

Challenges and Countermeasures to Data Sharing in the Context of Intellectual Property Rights

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Abstract: In the context of the digital economy era, data sharing has brought great value to the economic operation of the whole society. Due to factors such as diversification of subjects and types, infringement problems in data sharing and data circulation occur from time to time, and these problems need to be solved urgently. Through the literature analysis method and comparative analysis method, the current problems in data sharing are sorted out. China has carried out many explorations for solving the intellectual property rights problems in data sharing, but there are still problems such as insufficient existing legislation, data sharing and protection are not yet balanced, the attribution of rights is not yet clear, and it is easy to be leaked illegally. In view of the current problems faced by China's data sharing in the field of intellectual property rights, corresponding suggestions and measures are put forward, and the future research direction is envisioned.

Keywords: Data Sharing; Intellectual Property Rights; Data Rights.

1. Introduction

In the process of the rapid development of the global digital economy, data sharing has driven innovation and development in science and technology. The term "big data" was first introduced in China in the 2014 Government Work Report. The Fifth Plenary Session of the 18th CPC Central Committee made the development of big data a national strategy. Data sharing, as an important part of big data, has been closely scrutinized. Data sharing will touch on many risks in the field of intellectual property, and the significance of trying to avoid these risks, i.e., the necessity of intellectual property protection in the process of data sharing, lies in the protection of data security, respect for the contribution of laborers, and the maintenance of market order. Therefore, in the current increasingly serious background, clarifying the intellectual property rights of data sharing is urgent and important, this paper takes this as an entry point, analyzes the existing problems and tries to seek solution paths on the basis of existing academic discussions, and extends and prospects the development direction of data sharing in the field of intellectual property rights in the future, which is of great significance for the safe operation and sound development of China's digital economy. This is of great significance for the safe operation and sound development of China's digital economy.

2. Overview of Data Sharing in the Digital Economy

Data sharing refers to the process of data transmission and interoperability, so that data can be circulated and applied among different subjects. This process can effectively avoid the phenomenon of data islands, so that data resources can be effectively utilized, giving full play to the property and value of data. The process of data sharing includes the collection, organization and application of data, and the processed data resources can provide more powerful support for the decision-making of different subjects. Data sharing can be applied in different fields and industries, such as medical care, education, transportation, financial services and urban planning, etc.,

stimulating a more powerful vitality of the market.

In the era of digital economy, a large number of data resources continue to emerge, and how to process and effectively utilize these data resources is essentially the process of data sharing. Through data sharing, more participants can utilize existing data resources for research or decision-making purposes, largely reducing the cost of information and data collection and enabling them to focus on developing new applications and integrating systems. However, the quality and format of the data varies due to the different sources and the inability to verify the accuracy of the data, which brings a great impact on the sharing of data. There are many legal risks in the process of data sharing, among which intellectual property risk should be the first problem to be solved. The act of data sharing needs intellectual property protection to safeguard the legal rights and interests, which will be conducive to the joint realization of the public interests of the data sharing participants and the society, which is of great significance to the construction of China's intellectual property rights strong country.

3. The Need for Data Sharing in Relation to Intellectual Property Protection

(1)Rationale for data sharing in relation to intellectual property protection

The intellectual property system has continuously responded to the new institutional needs brought about by the changes in the factors of production of successive scientific and technological revolutions, and has played an important role in facilitating the upgrading of the allocation of innovation resources. The sharing of data promotes the continuous expansion of the boundaries of the application of the intellectual property system, and intellectual property rights also promote the sharing of data and the establishment of data factor markets. Data sharing and intellectual property system have dialectical unity in theoretical logic, historical logic and realistic logic, and data sharing and intellectual property system are deeply coupled. First of all, from the theoretical logic, intellectual property rights help the data

sharing market attributes to give full play to the construction of data sharing behavioral norms and the realization of the goal of data sharing and common use. Secondly, from the perspective of historical logic, the coupling of data sharing and intellectual property system originates from the historical requirement of original data becoming a factor of production, and is also the inheritance and development of the historical experience of expanding the boundary of intellectual property protection. Finally, from the perspective of practical logic, intellectual property rights have already played a role of institutional support and pioneering role of innovation and exploration in the standardization of data sharing.

The construction of the data-sharing-related system can give full play to the role of the intellectual property system in the construction of the data-sharing system on the basis of the principles of labor rights, balance of interests and clarity of responsibilities[1]. In terms of the specific path of system construction, data sharing can be included in the intellectual property system through broadening the scope of adjustment of intellectual property rights and expanding the objects of adjustment of intellectual property rights for system construction. In terms of specific construction ideas, a personal information data property right system can be gradually constructed with the main goal of protecting the user's right of disposal in accordance with the essential characteristics of the development of the digital economy. The system can first focus on key rights such as the right to hold data sharing results, the right to use data sharing processing, and the right to operate data sharing; with the continuous development of the data sharing market and the gradual deepening of the knowledge of data sharing, the system will be enriched by refining the relevant consensus and practical experience, so as to continuously improve the system of property rights for data sharing with Chinese characteristics.

(2) Rationale for data sharing in relation to intellectual property protection

This year, the China Academy of Information and Communications Technology (CAICT) released the Research Report on the Institutional Construction of Data Elements under the Perspective of Intellectual Property Rights (2023). The white paper revisits and explores the institutional construction of data sharing from the perspective of intellectual property rights, with a view to providing useful reference for accelerating the release of China's data sharing dividend and boosting the development of China's digital economy.

Since the 18th National Congress of the Communist Party of China (CPC), China has carried out in-depth planning and implementation of the development of the digital economy, implemented the national big data strategy, the digital economy development strategy, and issued the digital economy development plan. Over the past decades, China has made efforts to integrate digitization and industrialization, resulting in a steady growth of the digital economy, with an excellent overall performance, which has played an important role in the development of the data-sharing industry, thus highlighting its driving and supporting role in economic and social development.

The 20th Party Congress emphasized the need to make further plans for accelerating the construction of a digital China. General Secretary Xi proposed to give full play to the quantitative advantages of data sharing, fully grasp the data as a factor of production, fully shared in the applicable scenarios, so that the digital technology and the real economy

are deeply integrated with each other, to promote the traditional industries to continue to turn to upgrade, to drive the traditional industries to new digital industry output of new economic forms and new economic models, and to continue to strengthen, optimize and expand China's digital economy. The National Development and Reform Commission will also lead the establishment of an inter-ministerial joint conference system for the development of the digital economy, and earnestly implement the relevant work for the development of the digital economy[2].

To sustain the development of the digital economy and grasp the path of data sharing, it is necessary to accelerate the development of the data sharing process, grasp the innovative features of the digital economy, fully promote industrialization and digitalization to shift to upgrading, accelerate the establishment of a digital government and a digital society, create a good data environment and build a civilized country of data sharing.

4. The Dilemma of Intellectual Property Protection for Data Sharing in China

(1) Inadequate regulation by existing legislation and lack of integrated design of the system

The Opinions on Building a More Complete Institutional Mechanism for the Market-based Allocation of Factors, issued on March 30, 2020, emphasized the need to continue to build the data factor market, promote government data sharing, gradually increase the value of social data sharing, do a good job of integrating data sharing resources, and strengthen the protection of data sharing. The development of data sharing is vibrant, its potential is constantly being developed, and the scale of the data sharing industry continues to expand. The fruits of data-sharing are the basic elements of the emerging means of production and the necessary factors for the generation of new industries.

Despite the consensus on the important value of data sharing, there is a lack of protection for the fruits of data sharing[3]. Article 127 of the Civil Code provides that the protection of data shall be regulated by other laws, and the Data Security Law, which will come into force on September 1, 2021, mainly regulates the security protection of data carriers, but there is still no special law or regulation on the protection of property rights in the results of data sharing. The existing legal system can hardly meet the needs of the adjustment of economic interests in data resources, and a new type of intellectual property rights mechanism for the protection of data sharing should be established separately, and the intellectual property rights protection of data sharing should be planned in an integrated manner and implemented step by step.

(2) Data sharing and protection are not yet balanced, and disclosure may be a disadvantage

The value brought by data sharing is increasing day by day, but the infringements caused by data sharing are also increasing accordingly. Infringement not only discourages data processors, but also disrupts the order of the market economy and hinders the development of the digital economy. Intellectual property rights often represent the exclusive power of knowledge, but data sharing strengthens the transparency and openness of information and becomes a public right, so there is a big conflict between intellectual property rights and data sharing[4].

There are various contradictions between data sharing and the use of intellectual property rights for protection, such as the contradiction between the two models, the fact that data sharing has no boundaries while intellectual property rights have limitations, and the fact that data sharing is updated in a timely manner while intellectual property rights tend to have a lagging effect[5]. However, both intellectual property protection and data sharing can contribute to the development of society and can enhance the value space for the public interest of society. When intellectual property protection is applied to the results of data sharing, it can also further enhance the motivation of data producers. Due to the continuous updating of data sharing, it promotes the improvement and updating of the intellectual property system, which also shows that there are not only a lot of contradictions and conflicts between data sharing and intellectual property rights, but also has the role of mutual promotion. Therefore, how to solve the contradictions and conflicts between the two, and how to strengthen the role of mutual promotion between the two, has become an urgent problem.

(3) Uncertainty about the ownership of data sharing and lack of a unified and standardized platform

Since the establishment of China's first data registry, the Zhongguancun Data Asset Evaluation Center, in 2015, various regions have introduced management methods and established data management platforms[6]. As data sharing requires the support of Internet technology, there is no restriction on geography and subject matter, thus causing the problem of serious homogenization and information disconnection, and the root of the problem lies in the lack of a unified normative platform and the formulation of uniform standards for the standardized management of shared data[7]. From the viewpoint of local practice, it is still extremely difficult to establish registration procedures for data sharing, because of the diversity of subjects and types of data sharing, and the difficulty of establishing the right to data sharing alone in the case of a mixture of rights has increased accordingly. In addition, in the data factor market, there is no clear demarcation between the ownership of data sharing results and the right to use them, which has led to a large number of data sharing results having unclear ownership, and at present, the classification of data sharing results and the determination of the right to use them are still at the exploratory stage, and relevant policies have not been uniformly issued.

Over the past few years, there has been a lack of uniform and clear national laws and regulations on the establishment of rights and registration procedures for the results of data sharing, so that theory and practice cannot be adapted to the actual problems encountered. Comparing the practice of different regions, it can be found that the rules for data sharing vary from region to region, and there are differences in the protection, authorization, scope of protection and mode of data sharing, which makes it difficult to determine a national standard.

(4) Illegal reverse engineering occurs from time to time, and the shared results are vulnerable to illegal leakage.

Data sharing reverse engineering refers to the act of analyzing data sharing structures and data and performing processes such as decompiling or disassembling them in order to obtain core technology or trade secrets. This behavior can lead to the illegal disclosure of data sharing results, enabling competitors to copy and mimic the process design of data sharing. As a platform used to store and share data, a data

sharing system breaks down data barriers between organizations, establishes a unified data sharing mechanism, and accelerates the flow of data resources within or across organizations, in which a large amount of important information, such as customer data and trade secrets, is stored. Once the data sharing system is hacked or leaked by insiders, it will cause serious consequences. For example, in 2013, the data sharing system of the US retail giant Target Corporation was hacked, resulting in the theft of credit card information of more than 40 million customers. This kind of data sharing system leakage will not only bring huge economic losses to the enterprise, but also damage its reputation.

In the age of the Internet, it has become exceptionally easy to copy and distribute data in shared systems. There is a high probability that data in a data sharing system will be copied, used or disseminated by third parties, who are often unauthorized, thereby infringing the intellectual property rights of the database. For example, an e-commerce company's merchandise information data sharing system may be illegally accessed by a competitor, leading to unfair competition in the market. Therefore, while ensuring the legitimate circulation of data-sharing results, how to solve the problem of reverse engineering due to illegal access to data-sharing results has become a major challenge to data-sharing.

5. Pathways to Intellectual Property Protection for Data Sharing

(1) Legal Construction of Intellectual Property Protection for Data Sharing

Actively promoting the research, drafting and argumentation of intellectual property rights legislation on data sharing should respect the openness and inclusiveness brought about by technological changes, and effectively balance the interests of individuals, the public and the State, based on the unique attributes of data sharing, on the premise of meeting the requirements of legal stability. The explanatory power of the established system should be fully utilized. For the space that can be accommodated or can be applied by the existing legal rules of intellectual property, judicial interpretation should be actively given under the principle of legislation. In constructing the right system of data sharing intellectual property rights, if it is not possible to solve all the problems through a single legislation, then it is necessary to carefully seek evidence and fully explore the adaptability of the existing system to respond to the real needs as soon as possible.

It is important to clarify the boundaries of intellectual property rights for data sharing and to identify the boundaries between the act of exercising rights and the act of monopolization. Space should be reserved for the state's data sharing rights. The fruits of the state's data sharing should be the distribution and limitation of benefits in public law, and should not be understood as possession in private law. When data sharing involves energy supply, social security and other areas of national livelihood and vital national interests, intellectual property rights must give way to the government's public management function of data sharing.

In April 2022, the State Intellectual Property Office (SIPO) stated that it will maximize respect for data processors to put in creative labor, and recognize and protect the reasonable and legitimate gains of laborers. The Twenty Articles on Data propose to provide normative guidance on the circulation and use of data throughout its life cycle. Data sharing products

under the intellectual property rights perspective are significantly different from those protected by traditional intellectual property rights laws. Data itself is confidential, and data sharing may be considered a trade secret for protection, but this does not seem to be a straight path. It is likely to exacerbate data monopoly and data silos, and data sharing and circulation will be hindered, which is contrary to the state's goal of encouraging the industrialization of data elements. It is recommended to draw on the theoretical basis and rules of traditional intellectual property law and formulate a special law to protect data sharing intellectual property rights in light of the characteristics of data sharing. However, due to the unique characteristics of data sharing, which carries a huge amount of information and resources, it is very difficult to attribute the rights to all data sharing results, therefore, the system should still be explored in various aspects in the future exploration, so as to ensure the completion of a more comprehensive and perfect national system construction.

(2) Balancing data sharing and protection with blockchain as technology support

The Data XX of 2022 proposes the establishment of a reasonable system to escort the full circulation and trading of data elements, so as to make them compliant and efficient, and to realize the combination of on- and off-site. It appropriately reduces the access requirements of the data factor market so as to facilitate access to the results of data sharing by relevant subjects, thus putting data sharing into production and forming new industries under new models, thereby promoting and incentivizing innovation.

Data sharing is based on massive data, and mining the value of data through analytical techniques and algorithmic models can provide society with smarter decision-making support and services. Blockchain, on the other hand, is a distributed ledger technology that realizes efficient transmission and guarantee of trust through decentralization and tampering. The fusion of data sharing and blockchain will produce a series of revolutionary changes that will completely disrupt people's knowledge and practice of business models.

The data in data sharing is large in scale and has five main characteristics: highly quantitative, complex and diverse, value can be mined, fast processing speed, and multidimensional correlation. While blockchain is the use of distributed ledger, data sharing can store data in multiple different blocks, each block is technically connected through passwords, tamper-proof, and decentralized. The connection between data sharing and blockchain is that blockchain technology can ensure that data is not tampered with by means of data hashing (Hash: hashing, hashing), while big data can be mined for its value by processing the results of data sharing in the blockchain. The application of blockchain provides a reliable infrastructure for ensuring data security and trust mechanisms. The convergence of data sharing and blockchain will make businesses more open and transparent, helping to break the rigidity of traditional business models and for the transformation of the Internet economy.

The fusion of data sharing and blockchain will break down data barriers and realize data sharing and interoperability with security and efficiency. In traditional business models, data sharing is limited within enterprises, while the convergence of data sharing and blockchain takes data sharing between enterprises to a whole new level, thus realizing true data sharing and interoperability. This will lead to a trend towards greater mobility and collaboration of data elements and fuel

the development of digital technology.

(3) Government-led, improved data-sharing and rights registration procedures

After the output of data sharing, the first to the relevant departments for registration, to determine the attribution of rights, which is a kind of protection for the rights holders, thus making the circulation of data sharing more reasonable and legitimate, registration can prove its quantity and quality, if infringement occurs, but also easier to defend their rights[8]. To improve the data rights registration process, the ownership, collection and organization, input and output of data sharing results should be managed separately. Existing data sharing rights registration methods have achieved initial results, but are still insufficient in terms of comprehensiveness and convenience. The right to confirm the results of data sharing should pay attention to the principle of proportionality, the cost of confirming the right to register should be proportional to the benefits, each place chooses a different way of confirming the right to register, in order to adapt to local conditions, but this also causes data sharing in the transaction of geographic barriers, and each place has a different standard of confirming the right to register is also detrimental to the credibility of the data sharing, so we should set up a unified platform for confirming the right to share the data, and formulate a unified policy for the national circulation and sharing of data. Therefore, a unified national platform should be set up to verify the rights of shared data, and a unified policy should be formulated for the circulation and sharing of data nationwide.

The practical experience of various regions in the past can be used as a basis for the State to formulate a unified rights registration scheme, gradually develop and improve the data-sharing rights registration system in the various processes of opening up, using and confirming rights, promote the creation of a national registration platform in a coordinated manner, make clear the platform's management responsibilities and legal liabilities, and gradually increase its authority in the eyes of the public. It is necessary to continuously improve the data sharing rights and laws and regulations, and build a fair and reasonable integrated management platform, so that the complicated massive data resources can be categorized and graded for unified management in the sharing. Only by clarifying the subjects and categories of data sharing, and forming a certain scale in the registration of rights, can the development of the data sharing rights registration system be more promoted.

Article 20 of the Data Act mentions the requirement that data be available but not visible, and in building a unified data rights registration platform, relevant technologies, such as blockchain technology, can be adopted to make data sharing available but not visible, which can incentivize the willingness of original authors to register their data sharing rights and effectively reduce the occurrence of infringement of data sharing, and also make it easy for users to obtain data to share and put it into production to obtain economic benefits. The data sharing registry can also effectively reduce the occurrence of data sharing infringement, and allow users to easily access the data to put into production for economic benefits. Security in the construction of the data sharing rights registration platform can make data sharing and circulation more legitimate and effective, which greatly strengthens the enthusiasm of market players.

(4) Enhance access control to data-sharing systems to reduce the risk of leakage

From a public interest perspective, the protection of intellectual property rights is to incentivize right holders to create more intellectual products. And restrictions on intellectual property rights are also intended to balance the relationship between right holders and the public. Therefore, when the rights enjoyed by data sharing right holders are contrary to the public interest of the society, it is necessary to impose necessary restrictions on the rights of data sharing right holders. From the perspective of prohibiting the abuse of rights, if the data sharing rights holders exercise their rights in an uncontrolled manner, data sharing will be difficult to realize, and in the long run, it is very easy to form "data barriers" and "data islands", and it is difficult to effectively safeguard social fairness. Dworkin once said that the important reason for limiting rights is to prevent conflicts of rights. The essence of a conflict of rights is a conflict of interests, so when there is a conflict between the exclusive right to share data and the relevant interests, the special interests of the right holder should be taken into account on the basis of the hierarchy of value of the interests.

Security measures for data-sharing systems should be strengthened, including the use of strong passwords, regular updating of data-sharing system software and restriction of access rights. In addition, encryption of sensitive data, backing up of data-sharing systems and monitoring of data-sharing system access activities are also necessary measures. Strict data-sharing access control mechanisms should be established to restrict access to databases to authorized users only. In addition, data in data-sharing systems can be tagged using digital watermarking techniques to trace and prove the origin of the data. Access control to data-sharing systems should be strengthened by restricting reverse engineering of data-sharing systems to authorized personnel only. In addition, data in data-sharing systems can be encrypted in multiple layers to enhance storage confidentiality, thereby increasing the difficulty of reverse engineering data-sharing systems.

The protection of intellectual property rights for data sharing is an important issue that cannot be ignored. By strengthening security measures for data-sharing systems, establishing strict access control mechanisms for data-sharing systems and adopting encryption technologies, intellectual property rights for data-sharing can be effectively protected and potential risks and losses can be reduced. At the same time, the Government and relevant organizations should also strengthen the formulation and enforcement of laws and regulations on the protection of intellectual property rights in data sharing, so as to provide better legal protection for data sharing.

6. Conclusion

China's intellectual property policy on data sharing should follow the idea of the rule of law of socialism with Chinese characteristics under the leadership of the Party and follow the path of Chinese-style modernization. It is necessary to adhere to the people's orientation, taking fully into account that data sharing is not only the domination of elements and the release of resources, but also relates to national security

and social interests. It is necessary to adhere to the sharing of all people, and while encouraging the creation in data sharing and adopting data protection, it is necessary to actively promote the common governance and sharing of data sharing benefits.

At the initial stage of the development of the data-sharing market, relevant policies should prioritize the resolution of the issue of the actual rights to the results of data-sharing and clarify the rights and obligations of all parties. On this basis, the trading, circulation and interoperability of data-sharing results should be actively promoted, and the implementation and transformation rates of data-sharing intellectual property rights should be increased. After the data sharing market matures, the risk of industry monopolization will also be elevated, and the policy focus at that stage should be shifted to the establishment of a market policy of strong regulation and promotion of fairness. In short, IP-related authorities should make timely policy adjustments according to the life cycle of the data sharing market, and scientifically design a cooperative and synergistic regulatory system for all parties in order to avoid security risks. In order to strengthen the protection of intellectual property rights in data sharing, we need to further improve the relevant laws and regulations, establish a more scientific and effective regulatory mechanism, and clarify the responsibilities and obligations of network platforms, so as to curb all kinds of infringing behaviors, and protect the security and stability of data sharing.

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