



Reflection and Correction of the Data Portability Mechanism of the Internet of Things from the Perspective of Interest Balance

Shen Xie¹, Cheng Chen²(✉), and Liang Jiaquan¹

¹ Department of Marine Culture and Law, Jimei University, Xiamen 361021, Fujian, China

² Law School, Fuzhou University, Fuzhou 350108, Fujian, China

chengchen_cy@yeah.net

Abstract. With the advent of the Internet of Things era, the Internet of Things data has increasingly become an important wealth. Data portability of the Internet of Things plays an increasingly important role as a right to distribute data benefits and safeguard personal dignity and freedom. However, in the application of the data portability of the Internet of Things, the imbalance of the interests of the users and the data controllers may occur due to the possible excessive attention on the protection of the interests of the Internet of Things. Therefore, from the perspective of balancing the interests of users and data controllers, the advantages of Internet of Things providers over Internet of Things users should be comprehensively considered, and the interests should be balanced through the game between Internet of Things users and Internet of Things providers, so as to better play the value of Internet of Things data in the era of Internet of Things.

Keywords: Internet of Things Data · Data Portability · User · Data Controller · Balance of Interests

1 Introduction

In March 2020, the CPC Central Committee and The State Council issued the Opinions on Building a More Perfect System and Mechanism for Market-based Allocation of Factors, in which it juxtaposed “data” with traditional production factors such as land, labor, capital and technology, becoming the fifth largest factor of production. It can be seen that data has increasingly become an important wealth, an important source of economic growth and value creation, and is increasingly playing an increasingly prominent role in production and life.

Article 45, Paragraph 3 of China’s Personal Information Protection Law has formally established the mechanism of “data portability right”, which means that the data portability right has been formally incorporated into the legal system of personal information protection in China. As an important right to empower users to strengthen the protection of personal data, data portability has the function of “delegating” to individuals and “loosening” competition, which lays the legal foundation and institutional support for the realization of data transfer in transactions.

2 The Real Dilemma of the Data Portability Mechanism of the Internet of Things

From the current legislation, it can be seen that by giving the right of portable data to enhance the personal control in at least the following aspects: first, the right to obtain a copy of the Internet of Things data; second, the right to select a new Internet of Things provider and make them master their own Internet of Things data; third, when the service of the original Internet of Things provider is not satisfied, the user can change the service provider and make the original Internet of Things provider no longer master the data of their people. In other words, when a user has the portable right, he has the right to transfer his personal data from one and the Internet of Things to another Internet of Things. There is no denying that the Internet of Things data accessibility was originally created to enhance users' control of personal data. However, this system has a practical dilemma and a value bias.

2.1 The Scope of the Data Portability of the Internet of Things

The scope of personal data in the transfer was not clearly defined. The scope of portable personal data should be relatively narrow, not including data from anonymized and desensitized and derived data; the reason is that if the range of portable IoT data is too wide, it may violate the labor results of IoT providers. At present, the complexity and technology of data portability are not mature, and it is difficult to clearly divide the boundary and scope of portable data. Therefore, the careless operation of Internet of Things data accessibility will infringe the due interests of Internet of Things providers. In addition, with the development of digital economy and digital trading market, supplemented by increasingly complete legal protection, users' right of discourse in data circulation will increase day by day, and individual users may have malicious application for transfer and frequent repeated application, which will affect the stable operation of Internet of Things providers.

2.2 The Practical Dilemma of the Portable Data of the Internet of Things

Even though the accessibility of Internet of Things data is created to enhance the control of Internet of Things users over their individual Internet data, it has also unbalanced the interests of Internet of Things users and Internet of Things business. Therefore, we should reflect on the current shortcomings of Internet of Things users in the application of Internet of Things data portability.

Data can be carried not to get rid of the dependence on the carrier. In the context of the Internet of Things, the object of portable power is the user data generated by the Internet of Things. On the one hand, the user data of the Internet of Things comes from individual behavior, and their rights certainly belong to the individuals who provide IoT data; on the other hand, the production of IoT data is an important link in digital transaction, and the subsequent collection, use and sharing of other IoT data are based on this premise. However, it is worth noting that the data of the Internet of Things is the product of the development of information network technology, which is mainly

manifested in the bit form composed of 0 and 1 on the basis of computer binary, and cannot exist without the carrier. The circulation of Internet of Things data must also be attached to the overall transaction process of technical and legal relationships such as platforms, codes, service agreements and transaction contracts, and cannot be completed independently. Therefore, even if the Internet of Things users have the right to carry data, they still cannot get rid of the dependence on the carrier, namely the Internet of Things business platform. The Internet of Things providers have invested a lot of manpower and financial resources to digitally record the object and form the machine-readable original Internet of Things data. If the IoT users directly grant the copy of the IoT data to another Internet of Things provider, it will infringe the interests of the former Internet of Things provider, and such a transaction is obviously unfair.

It is difficult for users to complete the data transfer alone. The Internet of Things data portability requirements, the Internet of things business platform technology is feasible, operable and interconnected. In other words, it is difficult to achieve the Internet of Things users alone without the technical support of the Internet of Things business. Therefore, the role of the Internet of Things business in the data transfer of the Internet of Things cannot be ignored. In short, according to the application of the current Internet of Things users in the Internet of Things data access rights, it is difficult for the Internet of Things users to achieve digital transfer alone, cannot stop unfair competition, and cannot provide sufficient carrier support for the Internet of Things data. Therefore, we hope to coordinate and cushion the role of the —— Internet of Things business, another important subject in digital transactions.

2.3 The Value Bias Dilemma of the Data Portability System

At present, it is also worth discussing to overemphasize the protection of user information interests and add obligations and responsibilities to IoT providers on this basis. As long as the users meet the relevant conditions stipulated by the National Internet and Information Department, the Internet of Things business should bring personal data to the users. Although the state Internet information office in the network Internet of things data security management regulations (draft) in “make” request transfer personal information times beyond the reasonable range, data processors can charge reasonable fees “ regulations, however, in terms of total rights and obligations, the current environment to the requirements of the Internet of things business more stringent.

In the EU, which is at the forefront of digital economy legislation, it has been a trend in recent years to put pressure on the Internet of things business. GDPR regulation, when the data meet the consent or agreement, in automated way, by sorting, common use, machine readable conditions, the user has the right to pass such data from the data controller to another data controller, namely for the conditions of Internet data, the user can arbitrarily decision without considering the Internet of things [1]. In 2020, the European Commission issued the Data Markets Act, namely the DMA Act. Article 6 (h) requires digital platform “gatekeepers”, especially large platform companies, to ensure the portability of user data, providing end users with tools to assist them in exercising data accessibility. In addition, the bill also requires large platform companies to improve their interoperability with third-party service platforms, forcing large platform companies to improve the portability of IoT data. The eu enacted the bill, is in order to further

limit the technology giant anticompetitive behavior, may make the companies in the eu operations, including selling part of the business even bear hundreds of millions of dollars of fines, and to be defined as the “gatekeeper” Internet companies will bear additional responsibility. It can be seen that the EU’s current attitude towards data controllers is strict punishment and heavy responsibility. Similarly, in June 2018, California issued the California Consumer Privacy Act of 2018, which strengthened the protection of user privacy and data security, but it also increased the burden on enterprises. Some countries run the “notification-consent mechanism” throughout the whole process of personal information processing activities, pointing to a set of mandatory norms and behavior patterns in the rule practice.

In conclusion, in the practical path, due to the lack of the scope of the Internet of things, the temporal relationship between the users and the users and the Internet of Things cannot be eliminated. In the favor of the users, it will cause another “one size fits all” situation. When the market is mature enough, it will go to the other extreme. With the Internet era changing with each passing day, our system design should be forward-looking to cope with the forthcoming challenges and difficulties. In view of this, while reflecting on the shortcomings of the current data portability system, this paper explores the feasible path of Internet of Things providers to solve this contradiction, and balances the balance of interests of Internet of Things users and IoT providers by means of empowerment and power restriction.

Data portable cannot stop unfair competition. The establishment of the data portable right system is to enable the data subject to obtain the subjectivity status due to the legal empowerment in the digital life. It is generally believed that data portability increases the opportunity for users to choose other service providers, and improves the opportunity for small and medium-sized companies to obtain more data, thus giving them the ability to compete with large companies [2]. In addition, the portability of data, a legal means to adjust market relations, can effectively balance the relationship between large companies and small and medium-sized companies and promote fair and more open market competition. Therefore, the empowerment of data portable users is conducive to promoting fair market competition to some extent. However, as the user in the digital transactions, users malicious carry situation may happen, this will make the Internet of things business on unstable factors, further destroy the Internet of things between users and the Internet “trust chain”, reduce the operational efficiency of the Internet of things, make it cannot focus more on derivative Internet of things data more meaningful business activities. At the same time, part of the Internet of things business may take lower product price, “price war”, provide more preferential services to win the trust of users, even on the one hand, this makes consumers get more benefits, but on the other hand also intensified the competition between the Internet of things, especially unfavorable to the development of small and medium-sized enterprises, may produce new unfair competition. And the cost of competition between companies will eventually shift to consumers. It can be seen that data, portable power empowerment users can not completely stop unfair competition.

Data portability may bring great costs. Take the “number-carrying network” as an example. From the point of view of users, “number transfer network” is an important embodiment of data portability, but for operators, “number transfer network” is more of

a test and pay, and small and medium-sized enterprises pay higher costs and financial and material resources, which may inhibit innovation to some extent. In order to provide better services to attract users, major operators will lower communication rates or invest more in products and services and technologies. For example, after the introduction of the number portability policy, the monthly contract phone rates in the UK fell by 3%, and all mobile phone charges including prepaid services fell by nearly 5%. T-Mobile also lowered the price of a business package by 33%, generating \$20 billion in four years, with maintenance costs alone at \$500 million per year. The above not only increases the cost and burden of telecom operators, but also is not conducive to the healthy development of the whole industry. Another survey shows that in 2019, the General Data Protection Regulation (GDPR) resulted in an annual increase of 16.3 billion euros, with an average increase cost ranging from 565 euros to 2,049 euros.

3 The Prerequisite for the Establishment of the Internet of Things Data Transfer

3.1 The Premise of the Internet of Things Data Portability

Effectively ensure the data security of the Internet of Things. The Internet of Things data portability, the first consideration is the data security issue. Although the current data transfer right is given to the data subject, namely the user, in contrast, the data controller has the technology and the carrier, which can effectively ensure the data security. Therefore, the Internet of Things data transfer not only depends on the decision of users, but also needs to ensure the premise of data security.

First of all, the application of Internet of Things data portability will greatly aggravate the hidden danger of Internet of Things data security. Internet of things data portable rights gives Internet users with the freedom of the Internet data, make, the Internet of things data transfer become very easy and frequent, and frequent transfer of data provide opportunities for malicious attacks, virtually increased the potential attack, for malicious attackers use the Internet of things data or inject error code to create more opportunities. However, this may not only threaten the security of personal data, but also may affect the national security. When the number accumulates to a certain extent and forms an Internet of Things data set, criminals may use algorithms, large Internet of Things data and other technologies to calculate the country's economic conditions and national preferences, thus posing threats to the country's economic and cultural security from all parties.

Secondly, the own defects of IoT users make it difficult for them to guarantee the security of IoT data. On the one hand, Internet of Things users lack the Internet of Things data security system of the Internet of Things have. The protection of personal data often requires encryption means or using algorithms, blockchain and other technologies to protect it, while the Internet of Things users rarely have the corresponding ability. On the other hand, due to the current digital economy in the rise, users' awareness of personal information protection is not mature enough. Although the IoT data in the hands of IoT users gives them "bargaining power", the psychology of IoT users may be vulnerable to low cost or high price, which causes them to "sell" their Internet data for short-term benefits.

Finally, the Internet of Things providers can provide a strong technical guarantee for the Internet of Things data security. Highly organized IoT vendors have the ability to process personal information on a large scale and continuous basis. For a mature enterprise, in the face of the increasingly serious problem of data security of the Internet of Things, whether in the system regulation or encryption, anonymity and other technical protection, will usually build a system of the Internet of Things data security system. At the same time, with the occurrence of Google and Twitter leaking users' personal privacy incidents in recent years, countries have continued to strengthen the supervision of the Internet of Things providers to strengthen user privacy protection, prompting the Internet of Things providers to continuously assume their responsibilities in the security protection of the Internet of Things data in order to comply with the regulatory requirements and maintain their own reputation. It can also be seen that IoT users and IoT developers are actually a community of interests. Of course, the deficiency in the US is that the guarantee of the Internet of Things providers for the data security of the Internet of Things is mainly for the situation of external hackers. For the behavior of the Internet of the Internet of Things providers, the Internet of Things providers themselves should also be regulated, which is also a big embodiment of the balance of interests that we should pay attention to.

It can be seen from the above, the application of portable Internet of Things data will inevitably cause the security risks of Internet of Things data. The small power of Internet of Things users is difficult to guarantee the data security of Internet of Things data, and the advantages of Internet of Things providers in it are particularly important.

To better leverage the role of market players in technological innovation. First, technological innovation is the development trend of The Times. At present, the digital economy is the main engine of economic development, and it is the "hot word of The Times". How to promote enterprise technology innovation and innovation has always been the reality of our government to be solved, is also the enterprise in the process of seeking their own survival and development facing major problems, especially in today's rapid information age, if there is no technological innovation, it is difficult to gain competitiveness, not develop for a long time, therefore, technological innovation is leading the core of the development of economic quality, for contemporary enterprises and society is very necessary and urgent. Second, enterprises, especially start-ups and small and medium-sized enterprises, are the main force of technological innovation. The Internet of Things business is that most enterprises have human resources, material resources, financial resources, technology, capital, management experience and other innovative production factors, to provide a good foundation for every technological innovation. In addition, in order to attract users, enhance their strength, and become bigger and stronger, there is often competition among the IoT providers, which will stimulate the IoT merchants to innovate, and further promote market competition and re-innovation. At the same time, the Internet of Things companies, namely enterprises, are for profit, and they are one of the subjects closest to the market. Their keen "sense of smell" is conducive to them to follow the market trends and constantly stimulate vitality and creativity. Based on the Internet of things data discussed in this article, Internet of things data portable rights is to protect the rights of a networking data, at first glance seems has nothing to do with the Internet of things to promote technology innovation, however, we know,

through the continuous development of technology, we can solve the current Internet of things data portable problems existing in the application of operation technology. This is also one of the capabilities that IoT users do not have. Therefore, technological innovation is essential both for the use of data portability of the Internet of Things and for the development of the digital economy, and the Internet of Things providers have a natural advantage in it. To sum up, the Internet of Things providers can maximize the commercial value of the Internet of Things data, effectively guarantee the security of the Internet of Things and the security of the Internet of Things data and better play the technological innovation role of market players. These advantages can greatly make up for the lack of Internet of Things users, which is also the reason why we consider the imbalance of the interests of the Internet of Things data.

3.2 Further Establish Hierarchical Operability Standards

At present, the Internet of Things data portable rights in the Internet of Things business in a wide range of applications, almost covering all the Internet of things business, whether large enterprises or small and medium-sized enterprises. In order to achieve the unified operability standard stipulated by the data portability right of the Internet of Things, the compliance pressure of enterprises increases, especially for small and medium-sized enterprises. Therefore, we can establish a hierarchical operability standard, according to the different enterprise capital chain circulation, technical level within a certain range to reduce the small and medium-sized enterprises, compliance standards to keep up with the pace of the market time, and can supplement with fair reward or reward, this practice not only directly ease the Internet of things in large enterprises and small and medium-sized enterprises, also indirectly balance the relationship between the Internet of things users and the Internet of things. At the same time, we can support the initial exemption mechanism for the compliance failure of small and medium-sized enterprises. The relevant departments regularly conduct spot checks on the enterprises that fail to meet the requirements of the technology of the Internet of Things. If they are found that they do not meet the requirements, they will be given an opportunity of exemption and ask them to speed up the rectification.

In terms of the hierarchical operability standard, China now has a preliminary prototype. In 2021, the State Administration for Market Regulation issued the Guidelines on The Classification and Grading of Internet Platforms (Draft for Comments), which divides Internet platforms into super platforms, large platforms and small and medium-sized platforms. In particular, super large platform operators shall establish and improve the Internet data security review and internal control mechanism, involving the user's personal information processing, Internet of things data cross-border flow, involving the national and social public interests of the Internet data development behavior, must be strictly in accordance with the law in accordance with the rules, to ensure the security of the Internet data. Among them, what is related to the data transfer of the Internet of Things is that: without the consent of users, the Internet platform operators shall not combine the individual networked data obtained through the platform services with the individual networked data from their own other services or third-party services. All these can be verified in practice.

4 Protection with the Rights and Interests of the Internet of Things Business

The right to empower the data of the Internet of Things, control their individuals and maintain the freedom and dignity of individuals is an important part of the personal information protection rights and interests system and plays an incomparable role in the protection of personal information [3]. No matter how the society develops, we should pay attention to the status and role of people. Therefore, on the basis of not changing the original intention of the Internet of Things data portable right legislation, the following will seek the balance of interests in the game between the Internet of Things users and the Internet of Things business through power restriction and empowerment.

4.1 Maximum Protection of the Business Interests of the Internet of Things Providers

First, the Internet of Things data contains a rich property value. The Internet of Things data is the carrier and knowledge source of information recording, which is called the “oil” of the future by the US government. As a right with both property right and personality right attribute, the IoT data right also has property value in addition to the human dignity and freedom contained in it. As a new factor of production, data has a great impact on the reform of the traditional mode of production. The digital economy is highly innovative, highly permeable and widely covered. It is not only a new economic growth point, but also a fulcrum for the transformation and upgrading of traditional industries. It can become an important engine for the construction of a modern economic system. On the one hand, the IoT data has use value, and its application process can meet people’s daily production and life needs; on the other hand, the IoT data also has exchange value, and people gain from trading the IoT data and its derivatives.

Second, the value of the Internet of Things data needs to be brought into full play through the collection, processing and circulation. The concept of Internet of Things data has a variety of theories, such as content, form and stratification. If the data of the Internet of Things is placed under the regulatory scope of the property law, the data content of the Internet of Things can better fit the normative purpose of clarifying the property confirmation and promoting the transaction circulation. In other words, the commercial value of Internet of Things data is mainly reflected in the content level rather than the formal level. The electronic symbol of information in the way of bits does not have any economic value before being combined with the specific information content. In order to make the data of the Internet of Things really play its value, algorithms, models and other technical means are also needed to create the value of the Internet of Things data with labor. What’s more, IoT data trading has developed into an industry.

Third, IoT providers have a strong technology and foundation. Some scholars once said that one of the driving forces of enterprise investment is the data monopoly of the Internet of Things. With the further development of the digital economy, the competition between companies and other market players has gradually shifted from the competition between users to the competition between Internet of Things data. Although the platform cannot claim ownership of the evaluated IoT data, the platform can use technical means to achieve factual control of the evaluated IoT data and become the de facto “owner”.

Only after the labor of Internet of Things data collectors and the scale of Internet of Things data reach a certain degree, their property value and transaction value gradually emerge, and they are further enhanced through the processing and analysis of Internet of Things data. This also shows that the digital economy is shared, altruistic and public. IoT data is only valuable for in-depth development. This also requires promoting the sharing and circulation of the Internet of Things data among market players.

Compared with the users of the Internet of Things, individuals can promote the transaction and circulation of the Internet of Things data, and enterprises are the backbone of supporting the development and application of the Internet of Things data. Driven by the interests of the Internet of Things data, enterprises are willing to give full play to their inherent capital and technology, invest a lot of capital and human resources, improve various data activities of the Internet of Things, straighten out all kinds of Internet of Things data, relationship, and achieve the Internet of Things data prosperity and economic efficiency [4]. In addition, technological innovation and technology empowerment also need to be based on the strong information Internet of Things database and information collection and use ability, which is also one of the natural advantages of the Internet of Things providers.

In short, IoT data has rich property values, which need to be created through labor to generate and exert greater value. In fact, whether focusing on the Internet of Things data portability discussed at the core of this article or from the development of the entire digital economy, the advantage of the Internet of Things business in stimulating the value of the Internet of Things data is incomparable. As the value of IoT data continues to realize, a more mature digital market will follow, in which the protection of personal information follows naturally.

4.2 Build Charge Mechanism and Negative List Mechanism for Data Portability

A certain conversion costs can encourage investment in new technology businesses and can be efficient in the long run. Therefore, we can ask IoT users to pay a certain amount of transfer fee for each IoT data transfer to IoT provider. The appropriate reference value shall be jointly determined by the Internet and information department and the market supervision and administration department, and the Internet of Things provider and the Internet of Things users may sign an agreement within a reasonable range of the reference value. In addition, we can develop a “negative list” for IoT providers to participate in IoT data portability. In line with the “negative list” on the project, the Internet of things business must be free, Internet of things users provide Internet data with services, such as Internet, the Internet of things users leakage of personal privacy behavior or damage, the Internet of things users in need to use is closely related to personal health of medical Internet data such as emergency.

5 Strengthen the Fiduciary Obligation of IoT Business Before Transfer

For a long time, the relationship between the Internet of Things users and the Internet of Things business is relatively fragile, but the Internet of Things users have a certain dependence on the Internet of Things business. So we can impose faith duty for the

Internet of things, allow between the Internet of things and IoT users according to the request of the trust law signed a written contract, strengthen the Internet of things for a Internet of Internet data entrusted duties, make up for the Internet of things users in privacy management and Internet of things data security ability. At the same time, the relevant departments should strengthen supervision to ensure the legal compliance of each transaction link. As an Internet of things provider, facing the Internet of things users, it is necessary to continuously strengthen and improve the code of conduct and security strategies in the data aspect, so as to realize the fiduciary obligation that the Internet of things provider should undertake to the users.

6 Conclusion

In the creation of individual rights, we should not only consider the value and significance of the protected rights to the individual, but also always put the individual rights in the balance and coordination with the interests of others and social interests, so that the creation of such rights can really play a role [5]. The original intention of the Internet of Things data portable right is not to simply give the right to the Internet of Things users to enhance the protection of their Internet data, but to achieve the ultimate happiness of the Internet of Things users as its ultimate goal. So in the process of achieving this goal, combined with the current reality of strong protection of the Internet of Things users, through the interests of the game between the Internet of Things users and the Internet of things business and tend to balance. The same situation treats the same and different situations treat different, which is the rational basis that contemporary society needs to follow to achieve substantive equity. Only on the basis of the construction and Internet of Things data, formulate different compliance standards for employers in different industries and different sizes, and allocate the appropriate rights and obligations to the appropriate subjects, can we seek the goal of win-win situation with all parties to the greatest extent, guarantee free competition and accelerate the pace of social innovation. In a word, the Internet of Things data can be carried as a form of benefit distribution of the Internet of Things data, what we hope to achieve is to eliminate the opposition between IoT providers and users and form consensus, so as to promote the healthy and high-quality development of China's digital economy.

Acknowledgements. This work was supported by Fujian Province Science and Technology Innovation Strategic Research Project (No. 2024R0049).

References

1. Rubinfeld, D.L., Gal, M.S.: Access Barriers to Big Data. 59 *Arizona Law Review* **339**, 350 (2017)
2. Guggenberger, N.: Essential Platforms". 24 *Stanford Technology Law Review* **237**, 335 (2020–2021)
3. Hondagneu-Messner, S.: Data Portability: A Guide and a Roadmap. 47 *Rutgers Computer and Technology Law Journal* **240**, 256 (2021)

4. Nicholas, G.: Taking It With You: Platform Barriers to Entry and the Limits of Data Portability. 27 *Michigan Technology Law Review* **263**, 287–292 (2020–2021)
5. Nicola, F.G., Pollicino, O.: The Balkanization of Data Privacy Regulation. 123 *West Virginia Law Review* **61**, 110 (2020–2021)