APPLICATION OF PROPERTY LAW TO DATA AS PROPERTY

Tetsuo Morishita*

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* Tetsuo Morishita, Professor of Law, Sophia University, Tokyo..

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Abstract

This article argues for the importance of developing property law rules for data that could be commonly applied to both personal and non-personal information. The basic argument of this article is that the rules of property law should be applied to transactions of data like those of other properties. However, instead of focusing on ownership as the exclusive right to data, as the conventional arguments about data ownership suggest, this article considers the content of property law that is more suited to the nature of data. First, the concept of data, information and data carrier will be examined. When considering the application of property law to data, it is important to distinguish these three concepts. Then, this article examines conventional opinions on the application of property law to data. Different from the conventional views, this article argues for applying property law rules to data transactions with some modifications reflecting the nature of data transactions. Considering that multiple parties are closely related to data, it is appropriate to focus on co-ownership in which multiple parties have rights to the same property at the same time, rather than focusing on ownership in which a single party has exclusive rights, and to consider the content of property rights that is suitable for the nature of data. Finally, the appropriateness of the application of property law rules is evaluated in some typical cases.

I. INTRODUCTION

The development of methods for collecting, storing, managing, and processing data has led to a significant increase in the value of the data economy. The use of data has become a major issue for society. For example, in Japan, the Basic Act on the Advancement of Public and Private Sector Data Utilization (Act No. 103 of December 14, 2016) was enacted in December 2016.[1] Under the Act, the Japanese government published the Declaration on the Creation of the World's Most Advanced Digital Nation and Basic Plan for the Promotion of Public-Private Data Utilization in July 2020.[2] Also in Europe, the European Commission published "A European strategy for data" in February 2020,[3] and

[1] Kanmin Data Katsuyo Suishin Kihon Ho (官民データ推進基本法) [Basic Act on the Advancement of Public and Private Sector Data Utilization] (effective Dec. 14, 2016), Japanese Law Translation by Ministry of Justice, http://www.japaneselawtranslation.go.jp/?re=02 (Dec. 26, 2022 last visited).

[2] Sekai Saisentan Digital Kokka Souzou Sengen・Kanmin Data Katsuyo Suishin Kihon Keikaku (世界最先端デジタル国家創造宣言・官民データ活用推進基本計画) [Declaration on the Creation of the World's Most Advanced Digital Nation and Basic Plan for the Promotion of Public-Private Data Utilization] (The Cabinet Decision on July 17, 2020), Prime Minister's Office of Japan, https://www.e-gov.go.jp/digital-government/it-strategy.html.

[3] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee on the Regions: A European strategy for data, (effective Feb.

"Europe aims to capture the benefits of better use of data, including greater productivity and competitive markets, but also improvements in health and well-being, environment, transparent governance and convenient public services."[4]

However, according to the report by the Data Distribution and Utilization Working Group of the Public-Private Data Utilization Promotion Basic Plan Task Force, both public/consumer side and business side have concerns that could hinder the utilization of data. On the public/consumer side, there has been (i) anxiety due to the inability to understand and control how one's data is shared and utilized among businesses, (ii) frustration and a sense of unfairness due to the inability to realize the benefits of data utilization, and (iii) […] due to the inability to utilize data collectively, considering that information is stored in incompatible forms by various businesses. On the business side, due to customer concerns about privacy protection, lack of public understanding of the usage and benefits of data, and reputational risks, many companies are hesitant to make use of data across companies and industries.[5]

In this context, consumers and businesses are increasingly concerned about the control of "my data" and "my company's data". For example, a survey conducted by Japan Fair Trade Commission shows that many customers of banks feel it unreasonable that they must pay a fee to access the information about their own account.[6] Also, in a discussion about the sharing of customer information among banks at a working group in Japan Financial Services Agency, it is pointed out by the representative of Japan Business Federation that business corporations would like to control their own information.[7] Though in Japan there has been no governmental initiative regarding legislation on the ownership of data, in the U.S., the bill of "Own your Own Data Act" was introduced to the Congress in 2019.[8] The bill treats each individual as an owner of his or her personal data on social media and intends to provide each individual with an exclusive property right to the data.[9] In Europe, however, there seems to be

19, 2020), COM/2020/66 final, European Commission, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0066.

[4] *Id.*, at art. 1.

[5] Kanmin De-Ta Katuyou Suisin Kihon Keikaku Zikkou Iinkai · De-Ta Ryuutuu · Katuyou Wa-Kingu Guru-Pu (官民データ活用推進基本計画実行委員会・データ流通・活用ワーキンググループ, 第2次取りまとめ) [Data Distribution and Utilization Working Group of the Public-Private Data Utilization Promotion Basic Plan Task Force 2nd Report] (effective June 2019), at art. 4, https://www.kantei.go.jp/jp/singi/it2/detakatuyo_wg/pdf/report.pdf.

[6] Kakeibo Service to nikansuru Jittaichosa Houkokusyo (家計簿サービス等に関する実態調査報告書) [The Survey Report on Household Accounting Service, etc.], Japan Fair Trade Commission (Apr. 2020), at 5. https://www.jftc.go.jp/houdou/pressrelease/2020/apr/chouseika/200421_houkokusyo_1.pdf

[7] Comment by Ms. Naomi Matsuoka, The minute of the 8th Meeting of 金融審議会市場制度ワーキンググループ [the Working Group on Capital Market Regulations under the Financial System Council], Japan Financial Services Agency (Apr. 15, 2021), https://www.fsa.go.jp/singi/singi_kinyu/market-system/gijiroku/20210415.html.

[8] S. 806 (116th): Own Your Own Data Act. The bill is available at https://www.govinfo.gov/content/pkg/BILLS-116s806is/pdf/BILLS-116s806is.pdf. (last visited Dec. 26, 2022). The bill has not been voted.

[9] *Id.*, at art. 1.

a more negative attitude towards data ownership in general. For example, according to a study on data ownership published by the European Commission,[10] with non-personal data in B2B in mind, many of the stakeholders said that they prefer to be able to decide who can access their data and how, but they do not like the idea of data ownership, and that it is important to make access to data orderly.[11]

With the increasing importance of data in economic activities, transactions related to data have also increased, and the need for contracts related to data transactions has grown significantly. To respond to such reality, Japan's Ministry of Economy, Trade and Industry (METI) published "Contract Guidelines on Utilization of AI and Data" in 2018.[12] This guideline classifies data-related contracts into three categories, namely data provision type, data generation type and data sharing type (platform type), and examines legal issues in each category.

At a time when the economic value of data is increasing, there is a growing interest in who owns data and how it may be utilized, and transactions of data are flourishing. Thus, it is important to develop a legal framework to establish data as a kind of property. In the past, the prevailing view in many countries was that the rules of property law do not apply to intangible objects such as information and data. While it is true that there are many differences between data and movable property, thanks to technological development, it has become possible to record, trade, and dispose of certain types of data in the same way as other movable properties. In addition, as more and more individuals and businesses consider data to be their property and conduct transactions with it, recognizing data as property and applying the existing property law rules with necessary modifications would fit the general sense of members of our society.

This article argues for the importance of developing property law rules for data that could be commonly applied to both personal and non-personal information. The basic argument of this article is that the rules of property law should be applied to transactions of data like those of other properties. However, instead of focusing on ownership as the exclusive right to data, as the

[10] Wauters, P., Siede, A., Cocoru, D., et al., Study on emerging issues of data ownership, interoperability, (re-)usability and access to data, and liability: final report, PUBLICATIONS OFFICE OF THE EUROPEAN UNION (2018,) https://data.
europa.eu/doi/10.2759/781960 (last visited Dec. 26, 2022).

[11] European Commission, Communication: Towards a common European data space, COM (2018) 232 final, at 9,
https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A52018DC0232 (last visited Dec. 26, 2022).

[12] Ministry of Economy, Trade and Industry, Contact Guidelines on Utilization of AI and Data, English Translation (2018) (hereinafter referred to as "METI Guideline"), https://www.meti.go.jp/press/2019/04/
20190404001/
20190404001-1.pdf (last visited Dec. 26, 2022). This is the English translation of the Japanese version. The Japanese version is available at https://www.meti.go.jp/press/2019/12/20191209001/20191209001-2.pdf The Japanese version was updated in December 2019 to reflect the amendment of Unfair Competition Prohibition Acts introducing new rules on the shared data with limited access (regarding the amendment, see infra note 40-44 and accompanying text).

conventional arguments about data ownership suggest, this article considers the content of property law that is more suited to the nature of data. First, the concept of data, information and data carrier will be examined. When considering the application of property law to data, it is important to distinguish these three concepts. Then, this article examines conventional opinions on the application of property law to data. Different from the conventional views, this article argues for applying property law rules to data transactions with some modifications reflecting the nature of data transactions. Considering that multiple parties are closely related to data, it is appropriate to focus on co-ownership in which multiple parties have rights to the same property at the same time, rather than focusing on ownership in which a single party has exclusive rights, and to consider the content of property rights that is suitable for the nature of data. Finally, the appropriateness of the application of property law rules is evaluated in some typical cases.

The focus of this article is on Japanese law. However, the arguments here should also be useful in other jurisdictions because difficult legal issues that arise with respect to the legal nature of data and transactions of data are often common to many countries.

II. DATA AS PROPERTY

A. What is Data: Distinguish between Data and Information

The first point to be clarified is the concept of "data" when referring to "data" as property. This is one of the most difficult parts of the legal discussion. There are a variety of views about the concept of data and the relationship between data and information[13], and this can lead to confusion because the discussion may be based on different concepts about data and information.

For example, ISO/IEC 2382:2015, which is a joint product of ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) aimed to stipulate the standard for vocabularies relating to information technology, defines "data" as "reinterpretable representation of information in a formalized manner suitable for communication, interpretation, or processing."[14] As another example, Article 3(1)(a) of the Final Council Draft of the ALI-ELI Principles for a Data Economy, which is a joint project by the American Law Institute and the European Law Institute[15],

[13] Stuart Mills, *Who Owns the Future? Data Trust, Data Commons, and the Future of Data Ownership*, MANCHESTER METROPOLITAN UNIVERSITY, FUTURE ECONOMIES RESEARCH AND POLICY PAPER #7, 8-10 (2020).

[14] ISO/IEC 2382:2015 (en) Information technology - Vocabulary, https://www.iso.org/obp/ui/#iso:std:iso-iec:2382:ed-1:v1:en) (last visited Dec. 26, 2022)

[15] ALI-ELI Principles for a Data Economy - Data Transactions and Data Rights (ELI Final Council Draft), https://principlesforadataeconomy.org/fileadmin/user_upload/p_principlesforadataeconomy/Files/Principles_for_a_Data_Economy_ELI_Final_Council_Draft.pdf (last visited Dec. 26, 2021). About the project, Christiane Wendehorst, *The ALI-ELI Principles for a Data Economy*, in ALBERTO DE FRANCESCHI AND REINER SCHULZE *ED.*, DIGITAL REVOLUTION - NEW CHALLENGES FOR LAW: DATA PROTECTION, ARTIFICIAL

stipulates that "'Data' means information recorded in any machine-readable format suitable for automated processing, stored in any medium or as it is being transmitted." The commonalities between the two definitions are that they both distinguish data from information in general, and define data as information recorded in a certain format suitable for data processing, etc.

In this article, I would like to define "data" as "a record representing information that is stored and can be processed and/or transferred by using a certain technology." In relation to such data, information is something that is represented by the data and can be extracted and recognized from such data. When considering the application of property law to information and data, as the definitions by ISO/IEC and AI-ELI Principles indicate, it is important to distinguish data from information in general.[16] In order to distinguish between data and information, it would be useful to consider data as a kind of vehicle that conveys various types of information. The data is a record of text, number, image, etc., that is stored in some medium suitable for processing and/or transferring, such as USBs, hard disk and cloud servers (such medium that stores data could be called "data carriers"). The data itself in this context is value-neutral, while the type of information that the data represents is quite diverse. Some information may relate to the lives of individuals and/or transactions between individuals and businesses; others may relate to the conditions of businesses and transactions between businesses; still others may relate to simpler financial assets. Depending on the type of information, the information may be subject to various rules such as privacy protection, corporate unfair competition prevention, and financial regulations.

B. Data, Information and Applicable Laws

Regardless of the type of information, however, there should be some basic rules that generally apply to determine the rights of relevant parties to data itself. This could be considered analogous to rules regulating negotiable instruments or security certificates. Negotiable instruments and security certificates could represent various types of rights. While different rules are applied to such rights depending on the nature of rights, there are similar rules that are commonly applied to the proprietary aspects of instruments and certificates, such as belongings and transfers of papers. At the same time, applicable laws to information, such as protection of personal information, may affect the attribution,

INTELLIGENCE, SMART PRODUCTS, BLOCKCHAIN TECHNOLOGY AND VIRTUAL CURRENCIES 42 (Nomos Verlagsges. MBH + Co., 2019).

[16] DATA NO HORITSU TO KEIYAKU DAI 2 HAN SHINNOSUKE FUKUOKA AND HIDETOSHI MATSUMURA (データの法律と契約 第2版) [LAW AND CONTRACT OF DATA] 5-6 (Shojihoumu, 2nd edition, 2021). It points out that while laws such as the Act on the Protection of Personal Information protect the content of information regardless of the form of expression of the information (paper or electronic media), the Act on Prohibition of Unauthorized Computer Access prohibiting unauthorized access to data protect what takes the form of expression of data regardless of the content of the data, and argues that laws often distinguish between meaning content and form of expression, and there is affinity in thinking of data and information as being on different levels.

transferability or disposition of data under the property law rules. This is similar to the way that the transfer or disposal of movable properties is subject to restrictions depending on the type of movable properties.

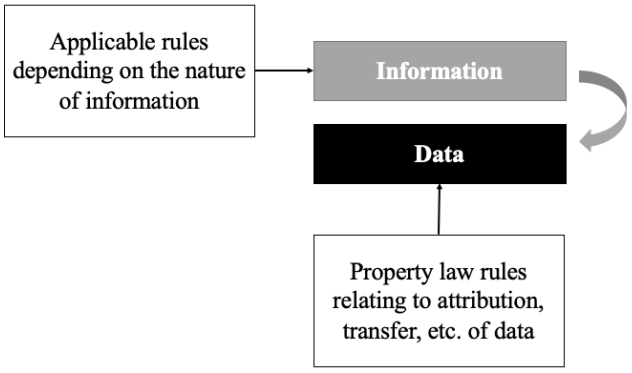

FIGURE 1. THE DEFINITION AND CONCEPTUAL FRAMEWORK

In the author's view, the above definition and conceptual framework would be useful to deal with various kinds of data and information that are stored and processed in the same way but whose content and value could be quite different in a more coordinated manner. In a situation where data containing various types of information is widely traded, it is necessary to establish common basic rules for the attribution, acquisition, transfer, and disposition of data, regardless of the content of the information represented by the data. It is desirable that such rules be developed on the same basis as the rules for the transfer of other goods, while being modified to reflect the unique characteristics of information as a good. This is like the rules for the transfer of securities, which are slightly modified from the rules for the transfer of movable property in general, with an emphasis on the importance of liquidity.

At the same time, property law rules for data need not resolve all issues relating to data. For example, privacy issues could be resolved by laws on privacy that would be applied to the information that is relevant to individuals. Even though a person may not have any property right to data, that person may have some other rights conferred by other areas of law, such as protection of privacy, intellectual property law, competition law, etc. Confusing the data itself with the information represented by it may result in losing sight of the essence of data transactions.

The above analysis on information and data does not cover all information and data. However, information is extremely diverse. To enable the smooth transaction of certain data that plays an important role in the data economy, it is not appropriate to wait until a legal theory that can be applied to information in general is formed, and we should have clear rules as to how data as property

should be handled within the framework of property law.[17] The development of legal theories about data in specific situations as above would contribute not only to the data economy, but also to the formation of future legal theories about information in more general settings.

C. Changing Circumstances Regarding Data

It is true that information and data, in general, have different characteristics from real estate, movable properties, or personal claims that have been recognized as property by conventional jurisprudence. In light of such differences, in some respects, it is difficult to deal with them in the same manner as real estate or movable properties. However, beyond those differences, there are now enough commonalities to justify legally treating them similarly.

For example, one argument against making information the object of property rights suggests that there are some differences that cannot be overlooked: the scope of property rights coincides with the physical boundaries, while information has no physical boundaries; it is difficult to determine identity and similarity as found in litigations relating to intellectual properties; and once information is published, it is available to everyone indefinitely.[18] However, with the recent development of technology, it has become possible to create exclusivity on a certain type of data so that only specific people can access certain information and/or to make it factually clear to whom certain data belongs. Also, different from intellectual products subject to the protection of copyright law whose identity and similarity are sometimes difficult to determine, there are various kinds of information whose identity and similarity could be easily determined. In addition, with the development of technology, it has become possible to prevent unallowed copying of data or to delete data remotely. Therefore, at least with regard to the "data" that this paper focuses on, it should be noted that there has been a change in the circumstances that conventional theories have assumed when considering whether data should be subject to ownership or not.

In addition, with the development of the data economy, individuals and businesses have started to understand that some information and data has the same value as or more value than other conventional properties and have increased their interest in their own information and data. Such data has become the objects of various transactions such as sales, lending, custody, etc. In such a situation where the understanding and perception of information and data among individuals and businesses have changed, applying the same rules as other properties to a certain type of data would be consistent with the perception and common sense of ordinary members of society. It should be stressed that

[17] Andreas Boerding, et.al., Data Ownership- A Property Rights Approach From a European Perspective, 11 JOURNAL OF CIVIL LAW STUDIES 323, 336 (2018).

[18] Taro Suitsu, *Minpo Taikei to Butsu Gainen* (民法体系と物概念) [*Civil law framework and the concept of objects*] in Katsumi Yoshida & Naoya Katayama *eds*, Zai no Tayoka to Minpogaku (財の多様化と民法学) [Diversification of Property and Civil Law Studies] 77 (Shojihoumu 2014).

such perception and common sense of ordinary people and businesses are important in considering legal issues. For example, when individuals and corporations enter into various contracts regarding data, the intention of the parties is the basis of the contract, and contracts should be interpreted based on the common intention of the parties. If there is a significant difference between the nature and treatment of data as understood by ordinary people and the nature and treatment of data as considered by legal experts, it may cause confusion in the interpretation of contracts. Although legal theories need to ensure consistency and theoretical validity within a legal system, it is also necessary to ensure that legal theories are not far from the common sense of ordinary people. As mentioned in the introduction of this article, individuals and businesses feel that they want to control their own data. Therefore, treating a particular type of data as property would conform to such sense of ordinary people.

III. PROPERTY LAW AND DATA

A. Conventional Views about Property Rights

The current Japanese Civil Code limits "things" that could be subject to property rights such as ownership to tangible things (Article 85 of the Civil Code).[19] In addition to being tangible, controllability, specificity, and independence are the conditions that objects of property rights must satisfy.[20] So, according to the dominant opinion, there is no room to recognize property right on intangible things, because property right is a right concerning tangible objects.[21] However, considering the treatment of energy as property, there are views that "tangible object" should be interpreted as those with exclusive controllability in law.[22] Also, Japanese Civil Code itself has some provisions about property right of intangibles,[23] and there is a view that it is too narrow to limit

[19] Minpou (民法) [Civil Code] (promulgated by Minister of Justice, effective Apr. 27, 1896, revised Apr. 1, 2020), https://www.trans-lex.org/602400/_/japanese-civil-code-2020%3Cbr-%3Eact-no-89-of-1896%3Cbr-%3Eamendment-of-act-no-44-of-2017/ (Dec. 26, 2022 last visited), art. 85. Art. 85 stipulates "[T]he term 'things' as used in this Code means tangible objects."

[20] Masaaki Yasunaga, Kogi Bukken Tanpobukken Ho Dai 3 Han (講義物権・担保物権法第3版) [Lecture on Property Law and Security Interest, 3rd edition] 11-13 (Yuhikaku, 2019); Kazuo Shinomiya & Yoshihisa Noumi, Minpo Sousoku Dai 9 Han (民法総則第9版) [Civil Law General Provisions, 9th edition] 182-88 (Koubundo, 2020).

[21] Akio Yamanome, Bukken Ho Dai 5 Han (物権法第5版) [Property Law, 5th edition] 1 (Nihon Hyoronsya, 2012).

[22] On such view, *see* Hiroki Morita, Zai no Mutaika to Zai no Ho (財の無体化と財の法) [Dematerialization of Property and Law of Property] in KATSUMI YOSHIDA AND NAOYA KATAYAMA *EDS.*, 財の多様化と民法学 [DIVERSIFICATION OF PROPERTIES AND CIVIL LAW] 87 (ShojiHomu, 2014).

[23] For example, art. 364 is the provision on the creation of pledge over a claim and stipulates "[t]he creation of a pledge over a claim (including a pledge over a claim which has not yet arisen) may not be duly asserted against a third party obligor and other third parties unless notice of the creation of the pledge is given to that third party obligor in accordance with the provisions of art. 467 [note: this article stipulates that the notice to the obligor or the obligor's consent is necessary to assert the assignment of claim to the obligor and third parties], or unless that third party obligors gives consent to the same." Also, art. 205 stipulates the provisions

the subject matter of property rights to tangible objects, referring to such clauses.[24] Furthermore, there is a view arguing that instead of regarding property rights as a bundle of rights related to the usefulness of things, we should view them as a relationship of exclusive belonging of property to people, and aim to establish rules for the belonging and transfer of property that encompass property rights and claims.[25]

B. Property Law and Data

Movable property would disappear from one's hands when one gives it to someone else. It would often take time and money to duplicate movable properties. However, they are easy to duplicate, and we do not lose our own information and data even if they are stolen. On the other hand, data is non-rivalrous.[26] In addition, the same information or data is often created by or related to more than one person.[27] For example, information about a transaction between a business entity and its customer includes the information about the customer created by the customer and, at the same time, the information about the business entity created by the business entity. For such information, it is difficult to establish an exclusive link between the information and one party. Due to such unique nature, many countries do not recognize ownership of information and data in general.[28] The situation is the same in Japan. The dominant view in Japan denies ownership of information.[29] It is also pointed out that, even if the concept of "thing" is not limited to tangible objects but includes intangible objects, information cannot be an object of ownership because it has "ubiquity", namely, it can exist everywhere at the same time, cannot be "possessed" unless kept secret, and is a "public good" that is difficult to recognize exclusive rights.[30]

There are some Japanese court cases where ownership of data was disputed. These judgments denied ownership of data. The judgment of Tokyo District Court on December 5, 2019 is a case in which a certified public accountant demanded return of the data that it delivered to its client based on its ownership

on possessory right (note: one of the property rights that is provided to a person who possesses a thing with the intention to do so on one's own behalf) "apply mutatis mutandis if a person exercises their property rights with the intention to do so on their own behalf." Art. 264 stipulates provisions on co-ownership "apply mutatis mutandis if two or more persons share property rights other than ownership." Concerning these provisions on property rights that relate to property other than tangible objects, there are minority views arguing that it is too narrow to limit the object of the property right to tangible objects or that the rule on tangible objects should be applied in analogy.

[24] On these views, see Morita, *supra* note 25, at 89 (n.12).

[25] Morita, *Id.*, at 107-122.

[26] *Data ownership, rights and controls: Reaching a common understanding, Discussions at a British Academy*, ROYAL SOCIETY AND TECHUK (hereinafter referred to as "British Academy") SEMINAR 5 (Oct. 3, 2018); Suitsu, *supra* note 18, at 77.

[27] *Id.*, at 5.

[28] *Id.*, at 5.; Wendehorst, *supra* note 15, at 49.

[29] Suitsu, *supra* note 18, at 76-81.

[30] Morita, *supra* note 25, at 92-93.; METI Guideline, *supra* note 12, at 8.

rights to the data.[31] The accountant claimed that the client had threatened the accountant to perform the data transfer procedure, and demanded the client to return the electronic data, which the accountant had ownership of. However, the judgment rejected the accountant's claim on the ground that there was no basis for the claim because the electronic data that the accountant sought to be returned was not tangible and therefore not subject to ownership. In the judgment of Osaka District Court on January 12, 2017,[32] a publisher asked a printing company to print a book. In the process of printing the book, data for printing was produced and recorded on a storage medium held by the printing company. When a third party used the data for printing to publish another publication, the publisher claimed that the ownership of the data belonged to the publisher and sought damages in tort, claiming that the third party's act constituted an infringement of its ownership right. The court rejected the claim of the publisher, ruling that the "thing" that is the object of ownership under the Civil Code is limited to "tangible objects" (Article 85 of the Civil Code), and that the data for printing in this case cannot be the object of ownership because it is digitalized information and is intangible.

As shown above, both academia and court cases in Japan refuse to apply property law to data or find ownership on data. In the past, it might be difficult to consider intangibles that could be controlled exclusively. However, as already mentioned above in section 2(3), the development of technology has made it possible to control, identify, and recognize independence on a certain type of data. If that is the case, it would be outdated to exclude such data from objects of property rights simply because it is not tangible.[33] In this respect, the discussion about the legal nature of cryptoassets should be used as a reference. For example, the recent English judgment, AA v Persons Unknown[34] [2020] 4 W.L.R. 35, recognized bitcoin as property and granted proprietary injunction on the stolen bitcoin. In reaching the conclusion, the judgment relied on the Legal Statement on cryptoassets and smart contracts published by UK Jurisdiction Task Force in November 2019.[35] The statement opines that "[t]he fundamental proprietary relationship is ownership: the owner of a thing is, broadly, entitled to control and enjoy it to the exclusion of anyone else. However, ownership is just one kind of property right: property is a comprehensive term and can be used to describe many different kinds of relationship between a person and a thing," and that "before a right or an interest could be admitted into the category of property, it must be definable, identifiable by third parties, capable

[31] Judgement of Tokyo District Court on December 5, 2019 (Case No. 15831, 2019, claiming compensation for damages and restitution of copyrighted works, etc.)

[32] Judgement of Osaka District Court on January 12, 2017 (Case No. 2015 (wa) 718).

[33] It is pointed out that at least English law no longer holds to a sharp divide between tangible assets and intangible asset (British Academy, *supra* note 7, at 12).

[34] AA v Persons Unknown & Ors, Re Bitcoin, [2019] EWHC 3556 (Comm).

[35] UK Jurisdictional Taskforce, Legal Statement on cryptoassests and smart contracts (Nov. 2019) https://35z8e83m1ih83drye280o9d1-wpengine.netdna-ssl.com/wp-content/uploads/2019/11/6.6056_JO_Cryptocurrencies_Statement_FINAL_WEB_111119-1.pdf (last visited Dec. 26, 2022).

in its nature of assumption by third parties, and have some degree of permanence or stability. Certainty, exclusivity, control and assignability have also been identified in case law as characteristic of property rights." It concludes that cryptoassets possess all the characteristics of property as set out in the authorities. Also in Japan, in the context of the discussion about the legal nature of cryptoassets, some scholars and practitioners, including the author, argue that cryptoassets should be recognized as an object of property rights even though they are intangible.[36] Although cryptographic assets are not tangible, they are recognized as having property value, and there are mechanisms to identify them and control their attribution and transfer. In author's view, such items are property worthy of legal protection under private law, and the rules of attribution and transfer of tangible goods and money should be applied or analogically applied to the attribution and transfer of such items.[37]

The same should apply not only to data concerning relatively simple information such as cryptoassets, but also to other data representing more complicated information. There is no difference between cryptoassets and the data on other information that is managed in a format suitable for transferring and processing as long as such data is definable, identifiable by third parties, capable in its nature of assumption by third parties, and have some degree of permanence or stability.

Some caution is required regarding exclusivity. In the case of movable property, duplication is difficult, and if the owner transfers the asset to someone else, the original owner would in principle lose exclusive authority over the asset. On this point, the above Legal Statement by UK Jurisdictional Taskforce opines[38] that "[o]ne of the principal difficulties in recognising information in general as property is that it is not in its nature exclusive. It can be easily duplicated, with the duplicate indistinguishable from the original and, usually, of equivalent commercial value. Once disseminated, information can be used simultaneously by different people," and concludes that cryptoassets do not raise those difficulties, because the transaction ledger and consensus mechanisms used in cryptoasset can ensure that the asset cannot be under the simultaneous control of different persons, and "cryptoassets have the characteristics of certainty, exclusivity, control, assignability and permanence that information generally lacks." On the other hand, in the case of data, although technical

[36] There is a hot debate if property law should be applied to bitcoin in many countries. In Japan, there is a lower court case that denied the applicability because bitcoin is not tangible and not subject to exclusive control. On this point, see Stacey Steele and Tetsuo Morishita, *Lessons from Mt Gox: practical considerations for a virtual currency insolvency*, in at 490. DOUGLAS ARNER, WAI YEE WAN, ANDREW GODWIN, WEI SHEN AND EVAN GIBSON ED., RESEARCH HANDBOOK ON ASIAN FINANCIAL LAW 490-493 (Edward Elgar, 2020).

[37] Steele and Morishita, *Id.*, at 493. The author analyzed this issue in more detail in Tetsuo Morishita, *FinTech Jidai no Kinnyu Ho no Arikata ni kansuru Josetsuteki Kento* (フィンテック時代の金融法のあり方に関する序説的検討) [*Introductory examination on the state of Financial Law in the FinTech era*] in ETSURO KURONUMA & TOMOTAKA FUJITA EDS, KIGYO HO NO SHINRO (企業法の進路) [THE PATH OF BUSINESS LAW] 798-809 (Shojihoumu, 2017).

[38] UK Jurisdiction Taskforce, *supra* note 35.

restrictions are possible, duplication itself is not difficult, and it is easy for the original owner to provide the same data to others while retaining the data. For this reason, one could argue that data cannot be considered exclusive. However, there is a big difference between the state of being freely available to an unspecified number of people and the state of being available only to a specific number of people. Even if the data can be easily duplicated and transferred to others while remaining in the hands of the original owner, as long as the rights to the data are limited to a specific number of persons, the data could still be said to be exclusive. In this respect, a modification to the concept of exclusivity is necessary to reflect the characteristics of the data, but there is no need to say that it is difficult to apply the rules of property rights to data because of lack of exclusivity. As far as the access to the data is controlled by some practical means such as passwords or secret keys, the data should be considered to have the exclusivity. In this regard, the recent amendment of the Japanese Unfair Competition Prohibition Act in 2018 should be referred to. [39] The amendment introduced new rules to protect "shared data with limited access". The shared data with limited access is the data not protected by intellectual property law and trade secret law, but protected by a management system (e.g., ID and password managing method) and provided to limited users.[40] According to the new law, unauthorized access to the data, wrongful transfer of the data and use of the data for the purpose of illicit gain or causing injury are deemed as unfair competition.[41] A person whose business interests have been infringed on or are

[39] The English summary of the amendment by METI is available at https://www.meti.go.jp/english/policy/economy/
chizai/chiteki/pdf/english_2018rev.pdf (Dec. 26, 2022 last visited).

[40] *Supra* note 39, at art. 2(7) of the Unfair Trade Practice Act stipulates, "The term shared data with limited access as used in this Act means technical or business information that is accumulated to a significant extent and is managed by electronic or magnetic means (meaning an electronic form, magnetic form, or any other form that is impossible to perceive through the human senses alone; the same applies in the following paragraph) as information to be provided to specific persons on a regular basis (excluding information that is kept a secret)."

[41] *Supra* note 39, at art. 2(2) (xi)-(xvi). The Unfair Trade Practice Act lists the following act relating to the shared data with limited access as unfair trade practice:
(i) the act of acquiring shared data with limited access by theft, by fraud, by duress, or by other wrongful means; or the act of using or disclosing shared data with limited access acquired through an act of wrongful acquisition of shared data with limited access;
(ii) the act of acquiring shared data with limited access with the knowledge that there has been an intervening act of wrongful acquisition of shared data with limited access, or the act of using or disclosing shared data with limited access acquired in such a way;
(iii) the act of disclosing shared data with limited access after having acquired it and learning that there had been an intervening act of wrongful acquisition of shared data with limited access;
(iv) the act of using or disclosing shared data with limited access disclosed by an undertaking holding that data, for the purpose of wrongful gain or causing damage to that holder of shared data with limited access;
(v) the act of acquiring shared data with limited access with the knowledge that the disclosure of that data is an act of improper disclosure of shared data with limited access or that there has been an intervening act of improper disclosure of shared data with limited access with regard to the relevant shared data with limited access, or the act of using or disclosing shared data with limited access acquired in such a way; and

likely to be infringed on through unfair competition may make a claim to suspend or prevent that infringement against the person that infringed or is likely to infringe on those business interests.[42] In addition, the person may claim to have things that constitute the act of infringement destroyed or other actions necessary for suspending or preventing the infringement (Article 3 of Unfair Competition Prohibition Act).[43] Also, the person may claim damages.[44] Though this new protection is introduced as a part of unfair competition prohibition law, the concrete remedies are similar to owners of properties under property law[45] These provisions of the Unfair Competition Prevention Law should support the rationality of applying the property law rules to data with limited access, as in the case of movable property with exclusive controllability.

C. Data Ownership

Regarding the application of property law rules to data, the concept of data ownership has already been advocated. Though there is no commonly accepted definition of "data ownership,"[46] the main background of the data ownership concept is to protect the privacy of the individual who is the subject of the data,[47] and to allow the individuals who are the subjects of the data to enjoy the economic benefits of the data[48] The responses to the "data ownership" concept by the legal profession have not been favorable. The opponents to data ownership argue that it is problematic to consider ownership in light of the

(vi) the act of disclosing shared data with limited access after having acquired that data and learning that the relevant acquisition falls under an act of improper disclosure of shared data with limited access or that there had been an intervening act of improper disclosure of shared data with limited access.

[42] *Supra* note 39, at art. 3 (1).

[43] *Id*, at art. 3 (2).

[44] *Id*, at art. 4.

[45] Under Japanese law, owners of properties have three proprietary claims, claim for recovery, claim for exclusion of obstruction, and claim for prevention of obstruction. Yasunaga, *supra* note 20, at 16-17.

[46] *E.g.*, METI Guideline, *supra* note 12, at 9. As a matter of Japanese law, METI Guideline argues "there is currently no legal definition for this term and it is not the case that it is necessarily used with an implied meaning that "data is able to be conceived as being subject to ownership." On the contrary, aside from the cases where data is subject to direct protection by intellectual property rights, etc., it is considered that the term "data ownership" is generally used to refer to the de facto position of being able to access and control data, or a contractual status in cases where an undertaking has been entered into by contract regarding the authority to use data".

[47] Wauters, P., Siede, A., Cocoru, D., *et al.*, *supra* note 10, at 223.

[48] Teresa Scassa, *Data Ownership*, 187 CIGI PAPERS 4 (Sept. 4, 2018), https://papers.ssrn.com/sol3/papers.cfm?
abstract_id=3251542 (last visited Dec. 26, 2022) points out that making individuals able to commercialize their data and get revenue and protection of privacy with market mechanism are backgrounds of the concept of Data ownership.

characteristics of data as property,[49] that data ownership does not help protect privacy,[50] and that the occupation of the economic value of data by specific individuals could be an impediment to the utilization of data.[51]

In author's view, the problem of the data ownership argument is that it focuses on "ownership" and it tries to use "ownership" to protect privacy or achieve other goals. As already mentioned, data can easily be used by multiple people at the same time, and it is necessary to consider the relationship between multiple parties involved such as the subject of the data as well as the creator of the data. Therefore, it is desirable to consider the specific contents of property rights that fit the characteristics of data, rather than just using the concept of property rights that has been developed with tangible objects in mind. In addition, the application of the law of property rights to data is useful not only in relation to the attribution of data but also in relation to the transfer of data, etc., and it is not appropriate to focus the discussion only on ownership. Privacy and other specific concerns in relation to data could be well addressed by special statutes for such specific purposes.

IV. SOME ISSUES REGARDING APPLICATION OF PROPERTY LAW RULES TO DATA

A. Attribution of Property Rights to Data

When applying property law rules to data, the first question to be addressed is who should own the data. There are various parties relevant to certain data, such as the person who has collected and input information into the recording device, the person who has created the data, the person who is the subject of the data, and the person who holds the storage device of data.[52] On this issue, there

[49] *E.g.*, Singapore Academy of Law lists (i) Non-rivalrous nature of data, (ii) Non-excludability of data, (iii) Inability to alienate the data, (iv) Expansibility of data, (v) Raising the barriers to entry over data, and (vi) Disruption to existing legal framework as the reason not to introduce data ownership. Singapore Academy of Law, Law Reform Committee, *Rethinking Database Rights and Data Ownership in an AI World* 45-47 (July 2020), https://www.sal.org.sg/sites/default/files/SAL-LawReform-Pdf/2020-09/2020%20Rethinking%20Database%20Rights%20and%20Data%20Ownership%20in%20an%20AI%20World_ebook_0_1.pdf (last visited Dec. 26, 2022).

[50] Josef Drexl, *Legal Challenges of the Changing Role of Personal and Non-Personal Data in the Data Economy*, in Alberto De Franceschi and Reiner Schulze *eds.*, Digital Revolution - New Challenges for Law: Data Protection, Artificial Intelligence, Smart Products, Blockchain Technology and Virtual Currencies 35-36 (Nomos Verlagsges.MBH + Co, 2019).

[51] *Id.*, at 30.

[52] Hirotaka Harada, ドイツの「データ所有権」論争に関する序説的考察ーデータの法的帰属・保護に関する現代的規律の必要性を検討する手掛かりとしてー（1）～（3）(An Introductory Study of the German "Data Ownership" Debate: A Clue to the Need for a Modern Discipline of Legal Ownership and Protection of Data (1)~(3)), 395 Ritsumeikan Hogaku 240, 396 Ritsumeikan Hogaku 236, 397 Ritsumeikan Hogaku 132 (2021) reviews academic debate on data ownership in Germany, and introduces the view that data should be attributed to those who perform the data-generating act of writing to the recording device, and the view that data should be attributed to those who incur the economic costs of generating and managing the data.

is a view that "a data ownership must be tied to the legal subject who primarily initiate the process of data recording and processing by economical, technical, and informational means,"[53] while there is another view that granting property right as an incentive to data producer is unnecessary because data producers have produced massive amounts of digital data even without such incentives.[54]

In author's view, when considering the application of property law to data, it is important to consider the unique character of data. From that point of view, when considering property rights over data, it is not necessary to consider rights such as ownership over real estate or movable property. The holder of ownership rights has total control over the property and is said to have full control over the value of the property.[55] However, with regard to data, the persons who are the subjects of the data, the persons who created the data, and the persons who want to use the data have different kinds of relationships with the data. In addition, transaction data between a business and a customer is created with the involvement of both the business and the customer, and it is not something that needs to be exclusively attributed to either party. It would be better to have more than one person who can be granted rights to specific data depending on the degree of involvement in the creation of such data and who the information relates to, so that we can come up with rules that are more in line with the reality of the data as a kind of property, appropriately reflect the interests of the parties involved, and are well-balanced.

Regarding the data about individuals and/or corporations, since the data cannot exist without the individuals or companies who are the subjects of the data (it is the individuals or companies who provide the essential components of the data), in principle, such individuals and/or companies should be owners of the data. In case of data about transactions between an individual and a company, both the individual and the company should be the owners of the data. However, the subjects of the data are not the only parties that could be owners. The person who collected information and processed the data is also essential to the existence of the data. Therefore, such person could also be an owner of the data. Conventional property law rules have the concept of co-ownership and allow a single piece of property to be shared by multiple persons.[56] So, there is no obstacle to consider that there are multiple owners of data. In addition, when considering ownership rights to data, in light of the nature of information and data as property, instead of considering a package of rights including the right to transfer, the right to use, the right to dispose, etc., as in the case of ownership rights to movable property, the issue of who should have such rights should be considered from each of the following three angles: (1) the right to decide who

[53] Boerding *et.al*., *supra* note 17, 358.

[54] K.K.E.C.T. (Kon) Swinnen, *Ownership of Data: Four Recommendations for Future Research*, 5 Journal of Law, Property, and Society 139, 167-168 (2021).

[55] Yasunaga, *supra* note 20, 134.

[56] *Supra* note 19, at art. 249. Art. 249 of the Japanese Civil Code stipulates, "Each co-owner may use the entire property in co-ownership in proportion to each co-owner's interest."

should have access to the data, (2) the right to use the data for one's own benefit, and (3) the right to change or erase the data.[57] Attribution of such rights should be determined based on the degree of involvement of the parties and the agreement among them.

In this regard, it is important that ALI-ELI Principles for Data Economy has introduced the concept of "co-generated data" to appropriately address the unique character of data.[58] Article 18 of the Principle lists the following elements to be considered in determining if certain data can be treated as co-generated data: (i) the extent to which that party is the subject of the information coded in the data, or is the owner or operator of an asset that is the subject of that information; (ii) the extent to which the data was produced by an activity of that party, or by use of a product or service owned or operated by that party; (iii) the extent to which the data was collected or assembled by that party in a way that creates something of a new quality; and (iv) the extent to which the data was generated by use of a computer program or other relevant element of a product or service, which that party has produced or developed. The specific data rights (the right to access the data, the right to request that the use of the data be discontinued, the right to request that the data be corrected, the right to request that the economic benefits derived from the data be distributed) that each party has will be determined by the extent of the contribution to the generation of the data, the extent of the specific interest, etc.[59] The concept of "co-generated data" proposed in the ALI-ELI Principles should be evaluated as a better reflection of the nature of the data.

B. Processing

Regarding the processing of properties, under Japanese law, the person who provides the material has the right to the processed property. However, if the processor provides part of the material, the processor acquires ownership when the value created by the processing exceeds the value of the material provided by others.[60] According to this rule, if data is processed by someone and the value created by such processing exceeds the value of the original data, the person who processed the data would be the owner of the processed data. In such cases where data about individuals or companies is processed to become

[57] Art. 16 of the ALI-ELI Principles for Data Economy (*supra* note 15) lists (i) right to be provided access to data by means that may, in appropriate circumstances; (ii) right to require the controller to desist from data activities; (iii) right to require the controller to correct data; and (iv) right to receive an economic share in profits derived from the use of data as the example of elements of data right.

[58] Wendehorst, *supra* note 15, 51-52.

[59] ALI-ELI Principles, *supra* note 15, at art. 19-23.

[60] Minpou, *supra* note 19, at art. 246. Art. 246 stipulates, "(1) If a person (hereinafter in this Article referred to as "processor") adds labor to another person's movables, the ownership of the processed thing belongs to the owner of the material; provided, however, that if the value derived from the work significantly exceeds the value of the material, the processor acquires ownership of the processed thing. (2) In the cases prescribed in the preceding paragraph, if the processor provides a portion of the materials, the processor acquires ownership of the processed thing only if the value of provided materials added to the value derived from the labor exceeds the value of the other person's materials."

a part of the big data, usually the new value of the data as big data exceeds the value of the original data, and the creators of the big data would be considered to be the owners of the big data.

There is an example that supports the reasonableness of the above framework regarding co-ownership and processing of data. The Review into Open Banking[61], which was published in 2017 and served as the theoretical basis for the Consumer Data Right Act enacted in Australia (which gives a customer of a business entity such as a bank the right to request that the business transfers its information to a third party in accordance with the customer's instructions), is the evidence for the reasonableness of the argument in this paper, though the Review itself does not touch on the issue of data ownership. The Review divides the information about customers that is handled in banking transactions into four categories and examines whether either the bank or the customer has rights in each of these categories of information. The four categories are as follows.[62]

(a) Customer-provided data: Information provided by the customer to the bank, such as the customer's contact information and information about the customer's financial assets, belongs to the customer, and the bank is obliged to share it with other parties with certain qualifications at the customer's direction.

(b) Transaction data: Transaction records between a customer and a bank are not the exclusive property of the customer. The bank also contributes to the generation of this data, and both the customer and the bank should be allowed to use it, subject to privacy protection and other restrictions.

(c) Value-added customer data: This refers to data that has been created by the data holder through the application of insight, analysis, or transformation of a customer's transaction data to enhance its usability and value (ex., credit analysis of customers by a bank). The value of the data has largely been generated by the actions of the data holder (a bank), and the obligation to share this information with third parties would harm intellectual property rights. Therefore, banks are under no obligation to share with third parties at the direction of their customers.

(d) Aggregated data set: Data that is created when banks use multiple customers' data to produce de-identified, aggregated, or averaged data across customer groups or subsets. The consumer data right does not apply to the data in this category.

The above description of the transaction data is analogous to the idea of co-ownership over data about the transaction between an individual and a company. In addition, the description of the value-added customer data results in the same conclusion as what has been discussed relating to the processed data with a new value.

[61] Scott Farrell, Review into Open Banking: giving customers choice, convenience and confidence (2017).
[62] *Id.*, at 33.

C. Transfer and Bankruptcy

Unlike movable property, it is pointed out that information cannot be alienated. If A gives information to B, then A does not lose the data and both A and B know it. Therefore, it has been said that information cannot be transferred but only transmitted.[63] The same could be said to data, so property law rules on data need to be modified to reflect such character of data. The method of data transfer depends on the content of the data and the form of storage. However, the general rules for the transfer of property, such as bona fide acquisition, also apply to data transfer transactions. In fact, under the rules regarding shared data with limited access in Japan's Unfair Trade Practice Act, the act of acquiring shared data with limited access in good faith is not treated as an unfair trade practice.[64]

Issues such as whether one can demand the return of data in the event of data theft, or whether one can demand the return of data from a third party managing one's data in the event of bankruptcy of that third party,[65] could also be appropriately addressed by considering data as property and applying property law rules to data.

V. Role of Contacts and Property Law Rules

In cases of co-ownership, processing and transfer of data, there is often a contractual arrangement among the parties involved in the co-ownership relationship or between the original owner and the processor. In such cases, the contract will determine what rights each party has.[66]

Even though the rules of property law could provide a basis for considering various legal issues in data transactions, there are various unclear problems when applying property law rules to data, unlike property law rules for real estate and movable property for which specific rules have already been established.

In order to address these unclarity, as well as to make specific adjustments that are necessary to address the unique feature of data as property and to clarify the rights and obligations of the parties in each transaction, it is desirable that well-drafted contracts between parties specifically stipulate the details of rights and obligations of each party and the relevant legal issues. From this perspective, the ALI-ELI Principles for a Data Economy and the Contract Guidelines for AI on Utilization of AI and Data published by the Ministry of Economy, Trade and Industry (METI) in Japan are of great value. For example, the METI guidelines classify data-related contracts into the following three categories and examine legal issues in each category[67]

(a) data provision type: This is a "contract which, on the premise that there is no dispute between parties with respect to the factual state that only one party

[63] UK Jurisdiction Taskforce, *supra* note 35, at 17.
[64] See *supra* note 41.
[65] These issues are examined in Boerding, *et.al*, *supra* note 17, 346-349.
[66] Yasunaga, *supra* note 20, at 160, 165.
[67] METI Guideline, *supra* note 12, at 5.

(data provider) retains data which is the subject of the transaction, is executed when a data provider provides data to the other party to determine the utilization rights of the other party and any other conditions of the data provision with respect to such data."[68]

(b) data generation type: This is a "contract which, on the premise that data that had not existed before is newly generated with the participation of multiple parties, is executed between the parties involved in the creation of the data to determine the utilization rights."[69]

(c) data sharing type (platform type): This is a "contract which is executed when multiple business operators provide data to a platform, which aggregates, stores, processes or analyzes the data, to share such data through the platform."[70]

The METI Guidelines also have examples of major contractual provisions to be used in the above three types of data contracts, such as the definitions, method of provision of data, permission of the utilization of data, payment, warranty, limitation of liability, management of data, distribution of profit, duty to mitigate damage, confidentiality, handling of derived data, effective period, force majeure, and termination.[71]

A similar categorization of data contracts is made by the ALI-ELI Principles for a Data Economy[72] The ALI-ELI Principles list 9 types of data contracts: contracts for the transfer of data, contracts for simple access to data, contracts for exploitation of a data source, contracts for authorization to access, contracts for data pooling, contracts for the processing of data, data trust contracts, data escrow contracts and data marketplace contracts.

Categorizing major types of data contracts, listing key legal issues to be considered, and showing principles and guidelines to be applied to such contracts and issues are very useful ways to promote more effective and well-ordered data transactions. In addition, in the process of considering the details of the specifics of property law rules on data, these guidelines, principles, and typical contractual arrangements for data contracts could be used as a reference to learn the common sense on data as property and develop the details of property law rules for data.

On the other hand, contracts cannot be binding on third parties, and there may be cases in which it is difficult to conclude a contract for every piece of data concerning many people, or in which the counterparty is unknown. In addition, if the legal rules for the data as property are clear, they can be used to fill the gaps in the contract or as a starting point for contract negotiations. Therefore, apart from developing the practice and theories of contracting for data

[68] *Ibid.* For details of this type, *Id.*, at 19-37.
[69] *Ibid.* For details of this type, *Id.*, at 38-43.
[70] *Ibid.* For details of this type, Id., at 55-87.
[71] *Ibid.*, at 88-120.
[72] Wendehorst, *supra* note 15, at 46-48.

transactions, it is also necessary to develop the property law rules for data as property as discussed in this article.[73]

VI. CONCLUSION

Data has a variety of characteristics that differentiate it from other goods. In addition, various aspects such as privacy protection and competition law need to be considered when considering a legal system that can appropriately achieve the balance between protecting the interests of the parties concerned and appropriately utilizing data for economic benefits. However, it is not appropriate to be overly concerned about such differences, to lose sight of the similarities between data transactions and other property transactions, and to create legal norms for data that are unnecessarily complex and disconnected from the common sense of ordinary people.

From such a perspective, this article examined the possibility of treating certain data in the same way as other property and applying property law rules to it. Even though there are some points that need to be adjusted in light of the unique character of data, property law rules can provide appropriate guidance on various legal issues that arise in data transactions.

With the advancement of technology, the old dogma that property law can be applied only to tangible assets should be abandoned as soon as possible. Using the existing property law rules makes it unnecessary to wait for new legislation or establishment of legal theories for data that would take considerable amount of time. In addition, property law rules could be used as gap fillers even after some new rules on data are established, because it is impossible for new rules to cover all legal questions, and there should be gaps to be filled by other legal theories.

[73] Fukuoka & Matsumura, *supra* note 12, at 10 points out that technological measure, such as password and encryption as well as legal and contractual measures could play important roles to protect one's interest in data.