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Designing a Smarter Law that Enables Smart Contracts that are Useful in Everyday Life

Shinto Teramoto[1]

I. Demand for Smart Contracts

A. General concept of a smart contract

A smart contract is a means of replacing human to human communication and negotiation of contracts by using an automatic computerized process[2].

There are various ways of concluding contracts. In some cases, as we experience at a supermarket, a possible party to a contract offers to provide a good or service with prefixed conditions including the price and packaging, etc., and the expected contract is concluded if the other party accepts the conditions, and it is not concluded otherwise. However, in other cases, a wide scope of conditions may be acceptable to both possible parties to a contract, and the final conditions agreed by them fall within the scope that is acceptable to both parties, and deemed by each of them as not the most advantageous to it but also not the least advantageous to it. Such contracts are finalized through often lengthy communications and negotiations between the parties or their attorneys.

Likewise, a smart contract may include from a very simple either-or contracting procedure to a very complex but flexible procedure. It seems very easy to implement a smart contract in a simple contracting process, as being partly realized by automatic registers at supermarkets. However, we will face various problems when we try to implement smart contracts in complex contracts involving lengthy negotiations.

B. Smart contracts in the medical and healthcare field

We can envisage various areas where the application of smart contracts can be expected. For example, smart contracts can be utilized to realize a convenient but precise way for patients to control the access of physicians or healthcare advisors to their medical or health records.

Nowadays, the medical or health records (hereinafter, "HR") of a citizen (including patients and those who deems themselves healthy) are often stored in an EHR (an Electronic Health Record)[3]. Also, the market of PHR (a Personal Healthcare Record) services is also growing rapidly[4]. The quality of medical care or healthcare advice provided by physicians or healthcare advisors to their patients and clients is likely to be improved if they can access the records of diseases, medical diagnoses, medical care, prescriptions, dosing, and everyday health conditions of their patients and clients stored

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[2] *See, e.g.,* "Smart Contracts" by Nick Szabo, available at http://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo.best.vwh.net/smart.contracts.html

[3] According to the survey by JAHIS (Japanese Association of Healthcare Information Systems Industry) as of April 1, 2017, 76.3% of Japanese hospitals with more than 400 beds use EHR (https://www.jahis.jp/action/id=57?contents_type=23).

[4] According to the survey by Yano Research Institute Ltd., the size of the PHR service market was 12.5 billion Japanese yen in 2016 (an increase from 2015 of 8.7%), and is estimated to be 14.5 billion Japanese yen in 2017 (https://www.yano.co.jp/press-release/show/press_id/1752).

in an EHR and/or a PHR (hereinafter, "HR"). Also, it is expected that redundant medical examination can be avoided, which will result in medical cost savings for citizens, governments and social and private insurance, if physicians and healthcare advisors can access the HR of their patients and clients.

For such purposes, some jurisdictions may enact laws that authorize physicians or healthcare advisors to access specific types or classes of HR of their patients or clients irrespective of the individual intentions of patients[5]. However, such laws are unlikely to guarantee the physicians and healthcare advisors full access to the HR of their patients or clients. And some jurisdictions may guarantee no access to the HR of patients or clients to physicians and healthcare advisors. Moreover, it is possible that a part of a citizen's HR may have been produced and recorded in one jurisdiction, while the physicians or healthcare advisors who access such part are practicing in another jurisdiction.

Considering of such situations, each citizen has to autonomously give their physicians and healthcare advisors the authority to access his/her HR within the scope that they deem appropriate or necessary. However, it is not practical or plausible for patients or consultees to give their physicians and healthcare advisors such authorisation to access their HR upon individual occasions of medical care or healthcare consulting. The following are examples of the reasons why such individual authorisation may be difficult:

- Patients cannot express their intention if they have lost consciousness or are otherwise incapacitated;
- It is difficult to expect patients to make diligent and quick decisions if their condition is a medical emergency;
- Patients can hardly be expected to make appropriate decisions while sick or injured; and/or
- Patients and consultees are likely to deem it very cumbersome if they have to give their physician or healthcare advisor individual authorization to access their HR.

National governments, research institutes and pharmaceutical companies are likely to try to access the HR of citizens for the purpose of statistics, public health, medical research and drug developments. Depending on the purpose, HR may be used that has been anonymized, anonymized but is identifiable, or without any anonymization. If HR is used without anonymization, citizens are likely to expect to maintain autonomous control of access to their HR. In some jurisdictions, such use of anonymized HR may be legally authorized without being subject to the consent of the individual citizens[6]. However, not a few citizens are likely to know how and for what a purpose their HR is used and how it contributes to social welfare, irrespective of whether HR is anonymized for such purpose. We can expect that satisfying such demand of citizens will contribute to enhancing their understanding and cooperation for such use of HR. However, as pointed out above concerning the relationship between patients or clients and physicians or healthcare advisors, citizens are likely to deem it very cumbersome if they have to individually authorize access to their HR.

Considering these conditions, it would be reasonable to provide citizens with a tool to give their physicians and healthcare advisors or governments, research institutes and pharmaceutical

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[5] See *e.g.*, "Overview of the national laws on electronic health records in the EU Member States" (https://ec.europa.eu/health/ehealth/projects/nationallaws_electronichealthrecords_en).

[6] For example, the Act regarding Anonymized Medical Information for the purpose of Contributing to Medical Research and Development (Law No. 28 of 2017) was enacted in Japan for such purpose.

companies authorization to access their HR with minimum effort, but without impeding their autonomy.

In order to attain the said purpose, the following method may offer a solution:

a) Each citizen provides authority to others in advance to access their respective HR. In order to enable the relevant citizen to easily prefix such authority, several options are provided and respective citizens can choose their preference from among such options. For example, such options may include the following instructions:

i) to authorize the primary care doctor of the relevant citizen to access any and all information recorded in their HR;

ii) to authorize any and all physicians, paramedics, hospitals and clinics to access any and all information recorded in their HR during specific years (for example, 5 years) before the relevant care contemplated by them for the purpose of providing them with medical care. However, the said limitation of the period is not applicable if they acquire permission from the primary care doctor of the citizen;

iii) to authorize any and all physicians, paramedics, hospitals and clinics to access any and all information recorded in their HR for the purpose of saving their life in case they can't communicate with them;

iv) to authorize the physicians and paramedics belonging to a DMAT (Disaster Medical Assistance Team) to access any and all information recorded in their HR for the purpose of providing them with medical care in an emergency; and

v) to authorize public agencies, research institutes and pharmaceutical development companies to access the records in HR for the purposes of compiling statistics, improving public health, academic research, or drug discovery only after the records are anonymized by a trusted third party.

b) It is possible to have those who want to access HR observe such terms prefixed by the data subject by employing the following means, which can be deemed as a simple form of smart contract:

i) Affixing an information tag to each of the records in HR that represents the terms prefixed by the data subject;

ii) Also, physicians, paramedics, hospitals and clinics could have a digital method of showing its attributes and the purpose of accessing the HR; and

iii) To the extent such attributes and purpose fall within the terms prefixed by the data subject, such physician, etc. is permitted to access the HR.

However, there is no guarantee that the results of the said procedure will satisfy both the citizens and the physicians, etc. The following illustrate several situations that may cause frustration to either or both of such parties:

- Presumably, the terms prefixed by a citizen would be very abstract and have some scope of allowance. This is because it is almost impossible to predetermine detailed terms by predicting future individual situations. As a result, such prefixed terms may include the conditions most preferred by the citizen to those least preferred.
- On the other hand, those who want to access HR may provide very abstract or formulaic information concerning their attributes and purposes of use.
- Under such situation, the terms and conditions of the contract to be executed between a citizen and a person who wants to access the citizen's HR are likely to have multiple alternatives. The

finally decided terms are just one chosen from multiple possibilities. It would be difficult for such terms to fully satisfy both parties.

In light of these considerations, a smart contract that simply implements an either-or contracting procedure will not be able to meet the requirements of either citizens or physicians, etc. A flexible procedure from which terms can be chosen from among the considerably wide scope of alternatives and satisfy both parties to reasonable degree must be implemented in the smart contract to realize efficient but secure access to the HR of citizens.

C. Smart contracts in energy supply

Smart contracts can also be used to realize an ad-hoc and instant contract and its performance between the user of an energy demanding device (such as an electric vehicle) and an energy supplier on an energy supply network. The terms of such contract must meet the preferences of both the supplier and the consumer. It would be very useful if we could utilize a smart contract platform when an electricity supply contract is executed between a consumer and an electric power supply company to charge an electric vehicle (hereinafter, "EV").

The following describes an example of a scenario where a smart contract is useful in such contracting process:

- Contact-free energy transmission can be used to charge EVs. By using contact-free energy transmission devices, we can quickly charge EVs at parking lots, at the roadside, or even while driving on roads. Each of such energy transmission devices may supply electricity generated from different energy resources such as thermal power using fossil fuels, nuclear power, solar power, wind power, geothermal heat, or a combination of multiple resources. Also, the respective energy transmission devices may be operated by different electric power supply companies. Naturally, each of these energy transmission devices may supply electricity under different terms and conditions.
- Such situation is not much different from the situation we experience when we put fuel into our vehicles that utilize gasoline or diesel engines. We consider whether the terms and conditions offered by the respective gas stations are acceptable and contract with the most competitive station operators to fuel our vehicles. However, it is too hasty to conclude that we will experience no problems charging EVs in light of our consumer experience at gas stations.
- One of the major reasons we use contact-free energy transmission to charge EVs is to minimize human labor. However, if a human has to consider and confirm the terms and conditions of the electricity supply before charging an EV, a substantial reduction in human labor cannot be expected. Also, it would be dangerous for drivers to consider and approve the terms and conditions offered by electricity suppliers while driving on or stopping alongside the road. Moreover, if driverless vehicles become popular, it is likely that nobody in the vehicles will have authority to approve the terms and conditions to purchase the electricity.
- Considering these circumstances, we expect that the implementation of smart contracts will be useful in realizing the efficient and safe charging of EVs.

However, the contract will not necessarily be so simple as an either-or process, because the acceptable terms and preferences will vary greatly depending on the individual consumer. Moreover, consumers will not necessarily make an either-or choice. Rather, the scope of terms acceptable to each consumer can be very wide and include the most preferable one to the least preferable one. For example, the preference of a specific consumer can be the result of the consideration of multiple factors ore preferences such as the following:

- preference for electricity generated from carbon neutral energy resources, although the decision on whether a specific resource is deemed to be carbon neutral may be affected by the scientific and/or social knowledge of the same consumer from time to time;
- preference for electricity generated from an energy resource other than nuclear power;
- preference for electricity generated from an energy resource available locally; or
- preference for cheap electricity.

Here, again, flexible procedures that allow the choice of terms from among very wide scope of alternatives that satisfy both parties to a reasonable degree must be implemented in the smart contract to realize an ad hoc and instant contract and its performance between the user of an energy demanding device and an energy supplier on an energy supply network.

D. Smart contracts for telecom services

Smart contracts can be used to realize an ad hoc and instant contract and its performance between the user of a communication device (such as a smartphone or a tablet) and a telecommunication service provider on a telecommunication network. The terms of such contract must meet the preferences of both the supplier and the consumer.

Many people carry smartphones and tablets with them and use cell-phone network services and public wireless network services to connect themselves with other terminals and servers to communicate, use map and navigation services, and post or browse SNS contributions. However, for the purpose of such connections, we have to confirm the terms and conditions for using such services including the level of security before we contract with service providers for their cell-phone or wireless network services. Or, at least, we have to do click one or more soft buttons so that we are deemed to confirm the terms and conditions. Such procedure is cumbersome for us, while most of us do not really examine the terms and conditions including the security level and throughput.

Smartphones and tablets contain hardware and/or software that can record the conditions acceptable to respective users and transmit them to the terminals of telecommunication service providers. Therefore, it would be possible to have the smartphones and tablets automatically negotiate with the telecom service providers and connect themselves to the nodes of providers if their terms and conditions are acceptable to the users.

However, the acceptable terms and preferences may be very different depending on the individual user. Also, the preferences of specific consumers can be the result of the consideration of multiple factors such as the following:
- preference for Wi-Fi If the predetermined throughput is ensured, while preferring 4G if it is not ensured;
- preference for 4G if the Wi-fi connection is subject to governmental monitoring or filtering;
- preference for telecom network services that ensure the degree of security level predetermined by the user;
- demand to use 4G connection with authentication by means of SIM for the purpose of a financial transaction; or
- demand to use the cheapest means of telecommunication.

E. Smart contracts in finance

Smart contracts can be used to realize an ESG (environment, society and governance) oriented financing using cryptocurrency that enables the investors to monitor the company seeking fund to ensure that they are in compliance with the terms of the financing. For example, the liquidity of the cryptocurrency provided to the fund seeking company will become strictly limited upon non-compliance.

The terms of ESG oriented financing demand that fund seeking companies comply with specific conditions. For example, the terms of an environment oriented financing require the fund seeking company to prevent the pollution of the environment, emissions of carbon dioxide, etc. A fund seeking company that fails to comply with any of such terms will be subject to a variety of penalties including default, retrieval of funds, etc. However, because current ESG oriented financing is usually provided by means of stocks, bonds, mezzanines or loans, investors and lenders hardly have the means to effectively control the funds supplied to the fund seeking company. What they can do is almost entirely dependent on the penalties imposed on the fund seeking company that has breached the said terms.

However, financing by means of crypto tokens has the potential to nudge fund seeking companies to comply with the conditions of financing in a more effective way according to the following procedure:

- A token has an exchangeable value only for those who have entered into a specific contract under which such token can be exchanged with other assets, which are, typically, a popular crypto currency, such as ethereum or bitcoin.
- Accordingly, a holder of tokens has to exchange them with popular cryptocurrencies (, and further, with government-issued currencies) in order to procure goods or services or to hire employees.
- The degree of liquidity of each token to exchange it for a popular cryptocurrency, including, without limitation to, the exchange rate and the volume of tokens liquidatable within a specific period, can be manipulated and adjusted by a program that manages the wallet storing the token.
- Suppose that the financing is provided to the fund seeking company by means of crypto tokens, and that the degree of liquidity thereof is upgraded if the fund seeking company shows continuous compliance with the terms of the financing to preserve the environment, while it is degraded if the fund seeking company is not compliant.
- Also, it is possible to permit the fund seeking company to exchange the tokens for cryptocurrency for purposes only within the scope determined and permitted by the investors or lenders in advance.
- By implementing a smart contract mechanism in the said adjustment of the liquidity of the tokens, we will be able to execute ESG oriented financing more effectively and efficiently.

We can employ a very simple either-or smart contract process, if the liquidity of a token is 0 if a specific event occurs, and 1 otherwise. However, in the ordinary practice of finance, the occurrence of a specific event of default defined in the financing contract does not necessarily cause an instant default of the fund seeking company. The investors or their agent assess the magnitude of the relevant undesirable event, and decide whether to declare a default of the fund seeking company, or give it some time to cure the problem. Also, the length of such time, and the amount of monitoring by the financer during such time varies depending on the magnitude of the individual breach of term. So, here again, a smart contract has to employ very flexible procedures to reflect the actual intention of the fund seeking company.

II. Concerns about Smart Contract Platforms Using A.I.

A. A.I. may make flexible smart contracts realistic

These considerations suggest that a smart contract procedure is likely to be in demand to implement very complex and flexible choices of terms and conditions for the resulting contract. According to a conventionally designed algorithm, we have to set a series of a very large number of choices in order to achieve such complex and flexible choice automatically. However, it is not practical for us to predict almost an infinite number of choices in advance. However, artificial intelligence (A.I.) using deep learning is likely to achieve such complex and flexible choice, if A.I. can learn a very large number of human experiences of choice of terms and conditions, and the acceptability or unacceptability of the parties to such choices. Presumably, such smart contracting platform using A.I. (hereinafter, "smart contract platform(s)" or "platform(s)") will be provided by service companies (hereinafter, "smart contract platformer(s)" or "platformer(s)") to enable B to B, B to C, or C to C smart contracts. However, such services are hardly free from legal concerns.

B. Concerns of overly conservative decisions by a smart contract platform

The following undesirable results may be anticipated when a smart contract is employed to authorize physicians, etc. to access HR:

- The authorization of access to HR may be given beyond the scope preferred by the relevant citizen.
- In contrast, it is also possible that the decision of whether or not access to the HR is authorized is made in an overly conservative way. Therefore, the HR will not be able to be utilized effectively, and the relevant citizen will not be satisfied with the quality of medical care they are provided.
- If a smart contract system is designed to make conservative decisions, the second problem is likely to occur more frequently.
- In a worst-case scenario, the failure of physicians, etc. to access important records in HR may prevent a patient from receiving the most appropriate medical care. In such case, the patient may want to seek to hold the smart contract platformer liable, claiming that the malfunction of the platform caused such failure.

Similar concerns are likely to arise when a smart contract platform handling financing enforces the terms and conditions too strictly against the fund seeking companies.

C. Concerns of unfair or inconsistent choice of terms and conditions by a smart contract platform

The following unfair or inconsistent results may be expected when a smart contract is employed to realize the instant purchase of electricity.

As pointed out above, each consumer may have a pretty wide scope of acceptable terms and conditions, while the terms and conditions of the electricity suppliers may be quite varied. Also electricity suppliers offer various terms and conditions to provide electricity to consumers. Accordingly, the electricity suppliers that can meet the demands of a specific consumer on a specific occasion are not necessarily limited to one company. For example, a supplier providing low-cost electricity using nuclear power, a supplier providing middle-cost electricity using wind power, and a supplier providing high-cost electricity using solar power may meet the demand.

The choice of the supplier by a smart contract platform may not be necessarily consistent for every supplier. It is possible for a platform to manipulate the terms of the contract between an electricity supplier and a consumer, by utilizing the scope of acceptable terms prefixed by the consumers, thereby giving an advantage to the supplier. For example, a platform may be programmed to increase the probability that established and conventional electricity supply companies can contract with consumers within the scope of the terms prefixed by the consumers. It is also probable that a platform will apply different terms, such as giving priority to contracts with consumers to certain electricity suppliers, and give advantages to some of them, and cause disadvantages to others. The implementation of smart contracts is likely to require us, lawyers, to design a legal tool to prevent such unfair practices.

Also, it is likely that a platform will give an advantage to an electricity supplier paying more fees to the platformer. Moreover, some bias in the collection of data learned by the A.I. implemented in the platform may cause an inconsistent choice of suppliers, even if the platformer does not intentionally program the platform to cause inconsistent results. The disadvantaged suppliers and consumers who are dissatisfied with the results may blame the platform for causing inconsistent or unfair results.

D. Concerns of damage suffered by a party to a smart contract

The role of a smart contract platformer is to help possible parties to a contract to automatically close a contract by the terms and conditions acceptable to both of the parties. It does not fall within the duty of the platformer to guarantee the parties to a smart contract perform their respective obligations under the contract.

However, it is very likely that the people who use a smart contract platform, which enables parties to contract with each other without face-to-face negotiation, will intuitively assume that the capability of the other party to perform its obligations under the smart contract is guaranteed. Such expectation of the users of a platform can be strengthened if they experience repeatedly due performance of smart contracts.

Suppose that consumers want to have their smartphones or tablets automatically connected with a Wi-Fi service or a cell phone service via a smart contract platform. Some Wi-Fi services encrypt the communication between their Wi-Fi rooters and smartphones or tablets in a manner so that a third party cannot easily decode the signals used for the communication. Other Wi-Fi services employ vulnerable encrypting or even do not encrypt such communication. The consumers may prefix the condition that their smartphones or tablets may only be connected with the former type of Wi-Fi services, and that if any available Wi-Fi services do not provide such invulnerable encrypting, their smartphones and tablets must be connected with 4G or 5G cell phone services. It is likely that a platform will connect their smartphones or tablets with a Wi-Fi service that encrypts the communication in a manner that was deemed invulnerable for several years, but found very vulnerable due to a security hole discovered very recently. A malicious third party may hack the communication between such smartphones or tablets and a Wi-Fi rooter and cause consumers to suffer loss or damage. Such consumers may want to seek to make the platformer liable for such damage.

III. How to Design a Law Regulating Smart Contract Platforms and Platformers

A. The problems that may demand legal solutions

As discussed above, a smart contract platform that enables only an either-or choice does not meet the social demand for smart contracts. The scope of terms and conditions acceptable to respective possible parties to a contract is rather wide and includes the most preferable to the least preferable ones. A practical smart contract platform has to select a set of terms and conditions that falls within the scope of acceptable terms and conditions of the respective parties to the contract, and which are deemed by both parties as being reasonable, consistent and fair.

However, the set of terms and conditions chosen by a platform will not necessarily satisfy both parties to the contract. Either or both parties may complain that the chosen set of terms and conditions is:

- too conservative and, therefore, either or both parties to the contract will be disappointed with the insufficient benefit from the contracted transaction;
- too aggressive and, therefore, either or both parties to the contract will be exposed to an unacceptably high degree of risks; and/or
- unfairly advantageous or disadvantageous to either party to the contract.

A smart contract platform may be designed to choose one supplier from among multiple suppliers to contract with a consumer. Unchosen suppliers may complain that the platform is unfairly advantageous or disadvantageous to specific or a specific group of suppliers.

The execution of rights given by a smart contract by a platform may be overly strict although the creditor expects more flexible or generous execution. The creditor may complain that too hasty execution of rights without giving the obligor time to cure its problem deprived the creditor of the profit that would have been gained by waiting until the obligor makes delayed performance of its obligations.

It is also possible that a party to a smart contract will fail to perform its obligations thereunder and cause the other party to suffer damage or loss. The party suffering damage may complain that a defect in the platform caused such choice of such defaulting party.

Of course, the incremental learning of cases and complaints by the A.I. implemented in smart contract platforms may solve the problems to some degree. However, still remaining problems have to be solved through legal means.

B. Feasibility of liability law

Suppose that lawyers are requested to propose legal means to handle these problems. Lawyers are likely to propose that a party to a smart contract who has suffered damage to seek compensation for damages from the smart contract platformer.

Admittedly, we, lawyers know that assigning liability for harm or damage plays two major roles in our society, namely:

- To compensate the party who suffered the damage. The combination of seeking liability and liability insurance enables such compensation to be covered by the whole society; and

- To encourage the industries (smart contract platformers in the context of our discussion) to develop technologies and services to prevent the problems that cause damage or dissatisfaction to users of platforms and related parties.

However, we have to consider the burden of proof owed by the user of a platform as the plaintiff who seeks to hold the platformer, as the defendant, liable for its loss. Suppose that a customer of a good supplied or a service provided suffers damage due to a defect in the good or the service, and that the customer seeks to hold the supplier or the provider liable and to compensate for the damage. According to well-established legal principles, the customer has to prove the intention or negligence of the supplier or the provider to cause or not to prevent such damage.

Then, is it practical for the users of a platform to prove that the platformer intentionally or negligently designed the platform so that it causes inconsistent results?

If the algorithm implemented in the platform is fixed, such proof can be possible. However, it is likely to be extremely difficult, if A.I. implemented in the platform keeps such algorithm incrementally changed. Also, suppose that the bias in the dataset that A.I. has learned caused the biased results in the smart contracts. It would be extremely difficult to prove that the platformer intentionally or negligently had the A.I. learn a biased dataset. It is highly possible that any dataset available to platformers will be considerably biased. Presumably, the plaintiff may claim that the platformer should have prevented its platform from causing inconsistent results, and that the platformer negligently failed to do so. However, it is likely to be difficult to justify such duty of care, if the platformer hardly manipulates or adjusts the decisions of the A.I. implemented in the platform.

Assuming that the plaintiff is hardly able to prove the intention or negligence of the smart contract platformer, but that the plaintiff still wants to seek compensation for damages from the platformer, lawyers are likely to propose that a new law governing smart contract platformers should hold platformers strictly liable, or liable without negligence. However, such proposal is not free from several difficulties such as the following:

- Strict liability may discourage the smart contract platformers from providing smart contract platforms using A.I.
- Another problem is how to define a smart contract platform that is subject to strict liability. For example, such new law may define a regulated smart contract platform as a platform that makes a smart contract concluded without the intervention of a human being. Then, to circumvent this, platformers may have their users intervene in the contracting process by clicking the final acceptance button, although most users are not likely to read any terms and conditions chosen by the A.I. of the platform.
- It is impractical to establish a regulation that is unlikely to be accepted by the citizens and industries that will be affected by it. If lawmakers propose legislation that makes smart contract platformers subject to strict liability, lawmakers will also be expected to provide a defense that can be employed by platformers so that they can be exempted from liability when there is a good reason. For example, such defense may allow platformers to be exempted from liability by proving that they operated their platforms with a sufficient degree of care. However, it is questionable whether we can determine what is a sufficient degree of care by human beings, when the smart contracting process is totally handled by A.I. Moreover, it is likely that the platformers have not developed A.I. for themselves, and that they have just employed A.I. platforms provided by other A.I. platform providers. A.I. implemented in a smart contract platform can be a black box even to the platformer. If so, it will be almost impossible for the platformers to prove that they have paid a sufficient degree of care. To

provide a defence that would be extremely difficult to prove is almost the same as not providing a defence. Such legislation is not likely to be accepted by the affected industries.

- Also, it is likely that the courts will become very cautious in deciding that the results caused by smart contract platforms are inconsistent or unfair if the relevant defence cannot really be used by platformers. Such result runs counter to the protection of the users of smart contract platforms.

C. Feasibility of competition law

As discussed above, a smart contract platform may cause a result that is inconsistent to the suppliers using the platform. The disadvantaged suppliers due to such inconsistent results are likely to be given a legal tool that can correct such results upon their demand.

Lawyers are likely to consider that preparing such a tool is well within the field of competition law. Competition law does not necessarily require the intention or negligence of the commercial service provider in order to trigger a corrective order or other sanction. Therefore, seemingly, competition law is more suitable than liability law to regulate smart contract platforms, if the intention or negligence of the platformers is difficult to prove.

However, there still remains a major concern about whether competition law is a practical tool for regulating smart contract platformers. Suppose that a fair competition authority orders a smart contract platformer to correct inconsistent results among suppliers and provide every supplier with consistent chance of contracting with consumers. Suppose also that the platformer has not intentionally or carelessly programmed its platform to cause inconsistent results and cannot discover the reason why such inconsistent result was provided. It would not be practical for the platformer to comply with the order.

D. Feasibility of administrative regulation

As discussed above, a commercial supplier of goods or services that concludes a smart contract with a consumer by means of a smart contract platform may cause damage to the consumer by failing to perform its duties under the contract or otherwise failing to meet the reasonable expectations of the consumer. Consumers who may suffer such damage are likely to expect legislation that effectively prevents such possible problems to regulate the choice of suppliers by smart contract platforms.

Naturally, lawyers may consider that such preventive means are well within the field of administrative regulation However, the problems raised in the discussion concerning the feasibility of competition law also apply here.

IV. Designing a Smarter Law

According to the foregoing discussion, we, lawyers, have to anticipate that conventional legal tools such as liability law, competition law, and administrative regulation, have material problems in preventing or solving the problems that the use of smart contract platforms is likely to involve. Such prediction demands that lawyers design a smarter law that can effectively play its role in a smarter society.

However, we have to note that legal practice often emphasizes continuity from past practice. A new law that shows little continuity with the past legal practice is not likely to be accepted by practitioners, even if it seems very smart. Perhaps, we should consider the reason why we design laws. Seeking liability, issuing corrective orders, or imposing penalties are not the goals of a law. Rather, they are tools employed by the law to achieve a goal that is distinguished from tools or means.

The goal of the law regulating smart contract platformers is to nudge smart contract platformers to keep investing for the purpose of improving the quality of platforms so that they bring fair and consistent results to the users of the platforms. If a platformer maintains such investment, it will incur the cost of funding, labor, time, etc. for the purpose of such investment. If a platformer fails to maintain such investment, it will be exempted from incurring such cost. However, it is probable that the platformer will become obliged to pay other types of costs.

Suppose that the latter cost is significantly greater than the former cost. A platformer that makes a reasonable choice will keep investing for the purpose of improving the quality of its platform. A new law will be able to achieve its purpose, if such law can increase the latter cost significantly, and motivate platformers to keep improving the quality of their platforms.

Also, according to our everyday experience, the behaviors of investors, commercial banks, and customers have a great impact on the cost incurred by the production companies and service providers. For example, if institutional investors become reluctant to invest in the production or transportation companies that do not cut greenhouse gas emissions, the companies in such industries are likely to invest to employ more environmental technologies. If consumers become reluctant to wear clothes made by means of child labor, the clothing companies are likely to stop procuring products from factories using child labor. SRI (Social Responsibility Investment) or ESG (Environment, Society and Governance) investment and finance intend to utilize such impact.

Presumably, the majority of the actual or potential users of the smart contract platforms prefer that the platforms realize smart contracts having a fair and consistent choice of suppliers and terms and conditions. Also, the preference of actual or potential investors and commercial lenders to the platformers is likely to be greatly affected by such users' preference. If such preferences of the investors and commercial lenders or users trigger their actions oriented to guide smart contract platformers to invest in improving the quality of platforms, the cost to be incurred by the platformers if they would not have made such investment will increase significantly.

A law can nudge investors, commercial lenders and users to commence such actions by justifying and authorizing their preferences and actions by using various means such as:

- Guidelines that recommend smart contract platformers provide platforms that cause fair and consistent results;
- Rating of smart contract platforms by public rating agencies according to the said guidelines;
- Publication of material complaints from users to platforms; and/or
- Investigation of platforms by public agencies and publication of the results.

The employment of these means by a law does not undermine the value of the conventional means such as seeking liability, corrective orders or punishment. Rather, these means are likely to be deemed as being powerful by businesses and citizens, because if platformers keep neglecting the signs given by their investors, commercial lenders or users, they are very likely to be subject to liability,

corrective order or punishment. By empowering the actions of private parties, these means can impact the behaviors of the platformers before they cause damage to the users of the platforms.

After all, we, lawyers, cannot invent a simple and perfect solution to tackle the problems newly arising in the smart society. Practical solutions will empower the private parties and such empowerment will be backed by very conventional legal means. Smarter solutions will be realized by a combination of the power of the private sectors and public authorities, even if the combination appears to be more realistic than smart.