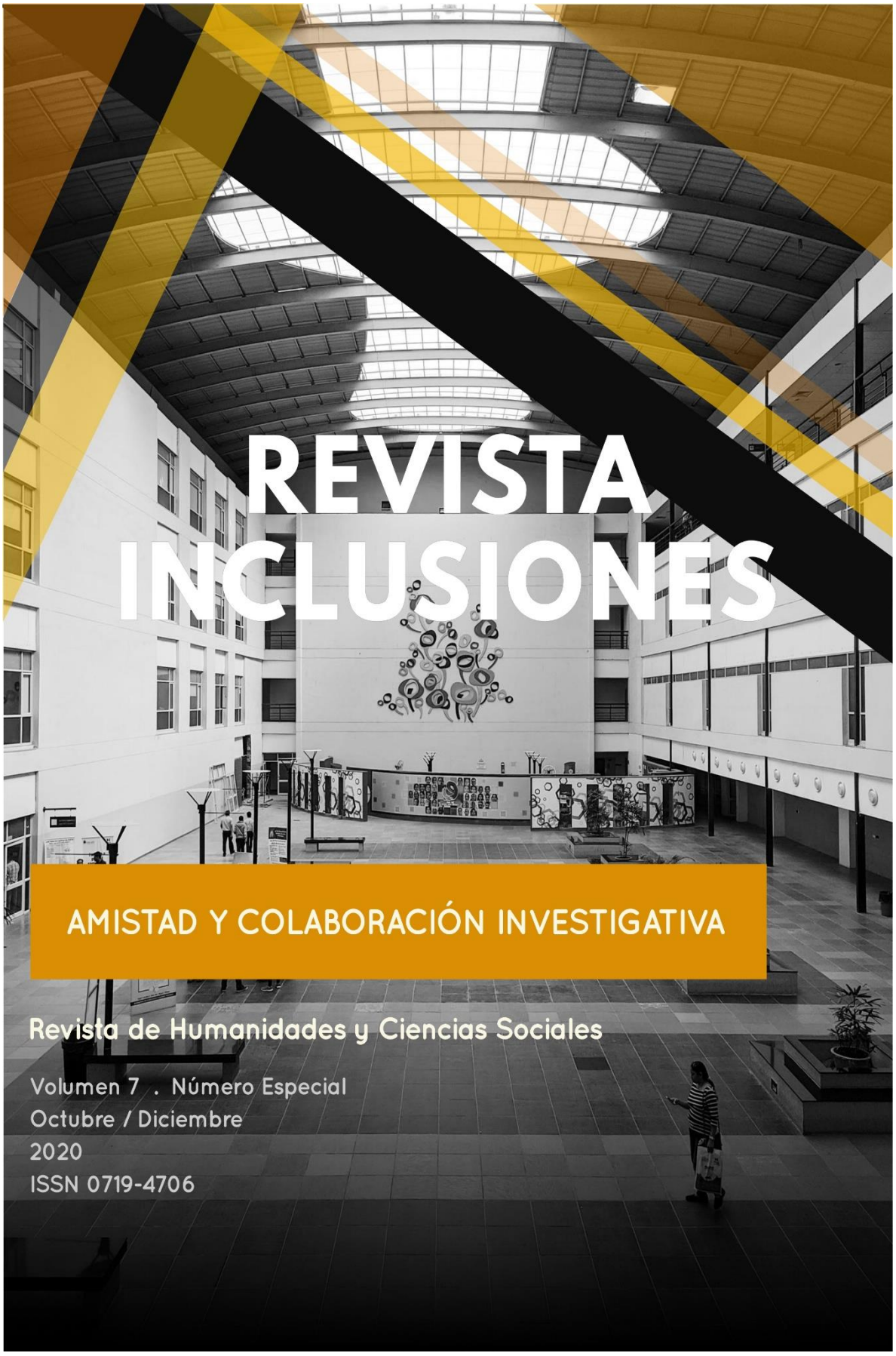

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ALGORITHMIZATION OF LAW AND LAW-MAKING: POTENTIAL AND KEY CHALLENGES

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Abstract

This article is devoted to the study of law and computer algorithms as means regulating social and technical processes. The objective of the work is to study the possibilities of using computer code to regulate social relations, as well as the impact of this process on traditionally used legislative procedures. This article uses a comparative analysis, which allows the authors to draw an analogy between law and computer algorithm and between social relations and technical operations. The authors propose the thesis that the computer code regulating technical processes can be used to a certain extent in the legal sphere. One such example is smart contracts, which are used in certain areas. The authors have studied different approaches to the definition of the term "smart contract" and formulated their own definition of this concept.

Keywords

Smart contract – Blockchain – Law-making – Computational law – Algorithms – Internet of things

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Introduction

In the modern world, there is a steady trend of development and mass introduction of computer algorithms into social life, which to some extent regulate various processes. In this regard, legal science and practice are faced with the tasks related to the understanding of new technological solutions for their subsequent implementation in the legal sphere. One of the ways to apply new technologies in law is to use computer code to regulate social relations. This topic is quite controversial, on the one hand, there is a known experience of successful use of smart contracts in narrow spheres. On the other hand, at this moment, it is difficult to predetermine the prospects of using code on a larger scale. At the same time, the use of code to regulate social relations directly affects the issues of law-making and can make some amendments to traditionally used legislative procedures.

Methods

This article uses a comparative analysis, which has allowed drawing an analogy between law and computer algorithm and between social relations and technical operations. As a thesis, the idea of similarity of law with the algorithm was put forward, which allowed studying, in particular, smart contracts as an example of legal regulation through the algorithm of social relations. With the help of scientific methods of analysis and synthesis, the approaches to the concept of smart contract, available in science, were studied and the author's definition of this term was formulated.

To study algorithms in the context of law-making, an interdisciplinary approach was used, in which the technical features of computer code functioning were studied. This approach allowed developing several legal recommendations (requirements) regarding legislative procedures in cases of translation of certain regulatory provisions into computer code.

Results

1) To a certain extent, the law is an algorithm, which allows one to conclude that the same methods that are used in the technical sphere to fix the sequence of various operations can be used to regulate social relations.

2) There are two main approaches to defining a smart contract in the scientific literature: legal and technical. The first approach uses the term "smart contract" to refer to a legal contract, or elements thereof, presented and executed through software. According to the second (technical) approach, a smart contract is understood as a computer code designed to perform certain operations when predetermined events occur.

3) When a legal smart contract is used in the legal sphere, the term should be understood as a legally binding contract in the form of computer code and supported by appropriate legal remedies.

4) To use computer code in the law-making, it is necessary to define the spheres of legal regulation, develop an appropriate programming language, and take a set of measures for the internal and external audit of the code that will ensure transparency, the legality of the code, and, consequently, public trust in the adopted regulations.

Discussion

Law and algorithms

Law is one of the key regulators of relations in modern society. In its most general form, law is a set of norms that regulates certain processes by prescribing a list of necessary actions. Such understanding closely correlates with the term "computer algorithm", since a system of consecutive operations (according to certain rules) to solve a task can be called an algorithm. Thus, it can be argued that the law functions according to the laws of the algorithm with the only difference that, due to the complexity of social relations, the degree of accuracy and unambiguity of legal requirements is much lower than the technical requirements inherent in the algorithm.

At the same time, both the law and the computer algorithm are systems containing a set of semantic signs regulating public and technical processes respectively. The law has its input data, e.g. information on social relations that need to be regulated, results of the analysis of the application of normative prescriptions, or the will of the people. "Processing" of the given information leads to acceptance of the legislative and judicial decisions aimed at the adjustment of public processes and, as a consequence, satisfaction of interests of both an individual and society as a whole.

The unprecedented development of technology in recent times has opened up several new opportunities for civilization, including the legal sphere. If we accept the thesis that law is an algorithm, then to a certain extent, the same methods used in the technical sphere for fixing the sequence of different operations can be used for regulating social relations.

Approaches to the algorithmization of law have long been developed in the framework of computational law, which is part of legal informatics.

Smart contracts

Today, the algorithmization of law is most evident in the development of smart contracts. To study the possibilities of smart contracts in the field of law-making, it is necessary to form an unambiguous definition of this term. The concept of smart contract was introduced into scientific circulation by lawyer and cryptographer Nick Szabo in 1994. He believed that a distributed registry could be used for contracts, in other words, self-executing, blockchain, or digital contracts. In this format, contracts could be translated into computer code, stored, and reproduced in a system controlled by a network of computers on a blockchain. He defined smart contracts as computer protocols that fulfill the terms of the contract and argued that the main purpose of a smart contract is to develop satisfactory contract terms (payment, deposit, confidentiality, enforcement, etc.), including those aimed at preventing intentional and unintentional violations and allowing the need for trusted intermediaries[1].

[1] N. Szabo, Smart Contracts: Building Blocks for Digital Markets. Retrieved from: http://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo.best.vwh.net/smart_contracts_2.html

In modern literature, there are quite a few scientific works devoted to smart contracts, which reveal their concept. Let us consider some of them that demonstrate the breadth of approaches. Smart contracts are defined as:

– "self-executing electronic instructions installed in computer code"[2];

– "a digital agreement, which is written in computer code, is executed on a blockchain or similar distributed registry technology and is automatically executed without any human intervention"[3];

– "a piece of computer code that is capable of monitoring, executing and enforcing an agreement"[4];

– "a software, which computer code binds two, or a multitude, of parties in view of the execution of predefined effects and that is stored on a distributed ledger"[5];

– "contracts that are represented in code and executed by computers"[6];

– "the new generation of the digital contract"[7];

– "programs that perform part of the contractual obligations and may contain and execute contractual conditions, as well as invoke physical remedies"[8];

– "an agreement implemented in software"[9].

A comparative analysis of the definitions described above leads to the conclusion that there are two main approaches to the definition of a smart contract: legal and technical. The first (legal) approach uses the term "smart contract" to refer to a legal contract, or elements thereof, presented and executed through software. According to the second (technical) approach, a smart contract is understood as a computer code designed to perform certain operations when predetermined events occur. Such operations are most often recorded in a distributed registry.

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[2] R. O'Shields, "Smart Contracts: Legal Agreements for the Blockchain", North Carolina Banking Institute Vol: 21 num 1 (2017): 179

[3] R. Caria, Definitions of Smart Contracts: Between Law and Code, in: The Cambridge Handbook of Smart Contracts, Blockchain Technology and Digital Platforms (Cambridge: Cambridge University Press, 2019), 19-36.

[4] Freshfields Bruckhaus Deringer. Blockchain and contracts – a smart new world. Retrieved from: https://www.freshfields.com/en-gb/our-thinking/campaigns/digital/fintech/blockchain-and-smart-contracts/?fbclid=IwAR0yzaQLxgmhZUH1PZHdPZvA-9EM8--TI3o0JZQ2I1w3P9tJ0cyiDxDC1G8

[5] G. Jaccard, Smart Contracts and the Role of Law. Jusletter IT 23, 2018. Retrieved from: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3099885

[6] E. Mik, Smart Contracts: Terminology, Technical Limitations and Real World Complexity. Melbourne Law School; Singapore Management University. 2017. Retrieved from: https://ssrn.com/abstract=3038406

[7] P. De Filippi y A. Wright, Blockchain and the Law: The Rule of Code (Cambridge: Harvard University Press, 2018).

[8] E. Tjong Tjin Tai, Force Majeure and Excuses in Smart Contracts. Tilburg Private Law Working Paper Series No. 10, 2018. Retrieved from https://ssrn.com/abstract=3183637

[9] M. Sokolov, Smart Legal Contract as a Future of Contracts Enforcement. 2018. Retrieved from: https://ssrn.com/abstract=3208292

For example, there is a known example of the use of a smart contract that describes a software agent that creates a cryptographic currency, provides an electronic vote, or offers an electronic blind auction.

In our opinion, the difference in these approaches is due to the fact that both lawyers and programmers focus on separate aspects of smart contracts. It is more reasonable to have an integrative understanding of a smart contract that combines both of these approaches. This means that the actual legal content of a smart contract is to some extent reflected in computer code, which contains a programmed algorithm of actions in response to the events specified in the contract. Thus, a smart contract can be understood as a legally binding contract, written in the form of computer code and supported by appropriate legal means of protection. Smart contracts have the potential to increase efficiency in sectors such as financial services, healthcare, and the energy industry, especially in combination with other new technologies such as automated algorithms (artificial intelligence), Internet of things, and robotic process automation.

Algorithmization and law-making

The use of the program code in legal regulations creates the need for additional requirements for the procedure of their adoption. Although legislative procedures in different countries have quite a lot of differences, several general recommendations can be distinguished.

Firstly, it is necessary to define the spheres of legal regulation in which it is reasonable to use program code in legal acts. At present, as it has been already mentioned, the corresponding prerequisites arise in the field of private law and e-commerce.

For example, startup Symbium[10] is engaged in "computational law" through which it translates laws and other regulations into computer code. On this digital platform, the company has created an application that divides a number of cities in the state of California, USA into separate zones so that the user can find out what legal possibilities one has, for example, to build or reconstruct a house on a single plot, including to determine the permissible number of floors of the house and other legal requirements without having to contact the government. This application works because all the legal requirements of a particular area are translated into computer code, which is quickly and unambiguously read by the user's smart device.

The algorithmization of legal rules will become particularly important when it becomes necessary to interpret them by technical means (devices of the "Internet of things", especially with autonomous algorithms).

In this regard, there are several solutions to this problem: the development of technologies for natural language processing to the level of full understanding by such technical means of legal norms; the creation of legal norms that can be easily translated into software code. The most effective integration of autonomous technical means into the public space will require both options.

[10] Symbium Build. Retrieved from: https://symbium.com/

Secondly, there is currently no single standardized programming language. For example, regarding smart contracts, there are now a lot of its variants (Solidity, Serpent, Clarity, Viper, Lisk, Chain, etc.). However, it is obvious that the development of digital platforms, even at the first stage, will require intrastate or regional standardization.

For example, the Government of Singapore has allocated $10.8 million to conduct a legal technology research program[11] (Legaltech), which aims to digitize various laws, regulations, and agreements in the country. The grant was awarded to the School of Law of the Singapore Management University (SMU) and will be sent to establish a Centre for Computer Law (CCL). The five-year research program provides for the establishment of smart contracts and smart laws. This initiative will begin with the development of subject-specific high-level computer programming language that will be used to encode laws, regulations, and agreements.

It will also require the introduction of requirements for versions of software products for law-makers and enforcement agents, as well as for society and business entities.

Thirdly, a necessary measure is to audit the code during its development, implementation, and use in the legislative process. Algorithms have such known disadvantages as opacity and closed nature due to their complicated technical content. At the same time, norms adopted in the form of computer code will have legal force and cover a wide range of subjects of social relations. Under such circumstances, the process of such law-making should be sufficiently transparent and open.

These drawbacks of computer algorithms are actively studied in the scientific and applied studies, within the framework of which various measures aimed at ensuring sufficient transparency and openness of the algorithms are proposed[12].

Conclusion

In our opinion, in case of the introduction of separate digital solutions into the legislative process, it will be necessary to develop a system of internal and external code audit. In particular, concerning the reliability and security of the code against unauthorized interference, its compliance with the current legal regulation of the relevant sphere, and the absence of discriminatory bookmarks of other illegal restrictions of rights and freedoms of citizens. Adoption of these measures will allow creating in the society an atmosphere of trust in normative legal acts written in the form of a computer code, which can significantly increase their efficiency and reduce transaction costs.

[11] O. Faridi, Legaltech: Singapore Government Pledges $10.8 Million towards Program Supporting Legal Technology Research, which Will “Digitize” Local Laws. Crowdfund Insider. Retrieved from: https://www.crowdfundinsider.com/2020/03/158943-legaltech-singapore-government-pledges-10-8-million-towards-program-supporting-legal-technology-research-which-will-digitize-local-laws/

[12] J. A. Kroll; J. Huey; S. Barocas; E. W. Felten; J. R. Reidenberg; D. G. Robinson y H. Yu, Accountable Algorithms. A governance framework for algorithmic accountability and transparency. 2017. Retrieved from http://www.europarl.europa.eu/RegData/etudes/STUD/2019/624262/EPRS_STU(2019)624262_EN.pdf

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References

Caria, R. Definitions of Smart Contracts: Between Law and Code, in: The Cambridge Handbook of Smart Contracts, Blockchain Technology and Digital Platforms. Cambridge: Cambridge University Press. 2019.

Faridi, O. Legaltech: Singapore Government Pledges $10.8 Million towards Program Supporting Legal Technology Research, which Will "Digitize" Local Laws. Crowdfund Insider. Retrieved from: https://www.crowdfundinsider.com/2020/03/158943-legaltech-singapore-government-pledges-10-8-million-towards-program-supporting-legal-technology-research-which-will-digitize-local-laws/

Filippi, P. De y Wright, A. Blockchain and the Law: The Rule of Code. Cambridge: Harvard University Press. 2018.

Freshfields Bruckhaus Deringer. Blockchain and contracts – a smart new world. Retrieved from: https://www.freshfields.com/en-gb/our-thinking/campaigns/digital/fintech/blockchain-and-smart-contracts/?fbclid=IwAR0yzaQLxgmhZUH1PZHdPZvA-9EM8--TI3o0JZQ2I1w3P9tJ0cyiDxDC1G8

Jaccard, G. Smart Contracts and the Role of Law. Jusletter IT 23, 2018. Retrieved from: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3099885

Kroll, J. A.; Huey, J.; Barocas, S.; Felten, E. W.; Reidenberg, J. R.; Robinson, D. G. y Yu, H. Accountable Algorithms. A governance framework for algorithmic accountability and transparency. 2017. Retrieved from http://www.europarl.europa.eu/RegData/etudes/STUD/2019/624262/EPRS_STU(2019)624262_EN.pdf

Mik, E. Smart Contracts: Terminology, Technical Limitations and Real World Complexity. Melbourne Law School; Singapore Management University. 2017. Retrieved from: https://ssrn.com/abstract=3038406

O'Shields, R. Smart Contracts: Legal Agreements for the Blockchain. North Carolina Banking Institute Vol: 21 num 1 (2017): 179.

Sokolov, M. Smart Legal Contract as a Future of Contracts Enforcement. 2018. Retrieved from: https://ssrn.com/abstract=3208292

Symbium Build. Retrieved from: https://symbium.com/

Szabo, N. Smart Contracts: Building Blocks for Digital Markets. Retrieved from: http://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo.best.vwh.net/smart_contracts_2.html

Tjong Tjin Tai, E. Force Majeure and Excuses in Smart Contracts. Tilburg Private Law Working Paper Series No. 10, 2018. Retrieved from https://ssrn.com/abstract=3183637

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