АКТУАЛЬНЫЕ ПРОБЛЕМЫ ГОСУДАРСТВЕННОГО УПРАВЛЕНИЯ

CURRENT PROBLEMS OF PUBLIC ADMINISTRATION

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The Use of Modern Technologies to Increase the Level of Trust in Society

Denis A. Gromyko

Peoples' Friendship University of Russia named after Patrice Lumumba,
6, Miklukho-Maklaya str., Moscow, Russian Federation, 117198

✉ da_gromyko@rudn.ru

Abstract. One of the pressing issues of the modern world is the problem of trust in government. The election process is a pivotal event in society's life, influencing a country's future. Decreased trust in authority, including elections, leads to vulnerability in the voting and result tallying process. Simultaneously, the rapid advancement of information technology, automation, and computerization affecting almost all spheres of life, among other things, has a widespread impact on the functioning of government institutions. One of the key tasks addressed by new technologies is increasing trust levels in society. Blockchain technology, or distributed ledgers, has revolutionized the world of information technology and found applications in various domains, including the organization of elections at different levels. The use of blockchain technology in the electoral process can help address the trust issue by ensuring transparency, reliability, and confidentiality in voting, while minimizing the possibility of result tampering. In a blockchain-based system, voting can occur anonymously without intermediaries and intermediate technologies. This article examines the problem of trust in government institutions, highlights issues in the electoral process, presents a description of the blockchain technology-based solution, and provides examples of existing systems used during the electoral process. It concludes that the implementation of blockchain technology in the electoral process will ensure a more transparent and secure voting process, significantly increasing trust in authority.

Keywords: trust, blockchain, distributed communication systems, block chains, distributed registries, elections, voting

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Introduction

Modern society is constantly searching for effective ways to increase the level of trust in various spheres of life. With the increasing flow of information and the complexity of interactions, the problem of trust in government, business and other institutions has become urgent and requires new solutions. This article explores the role of modern technologies such as blockchain and digital platforms in the context of increasing the level of trust in society.

We will look at what opportunities these technologies provide to ensure transparency, security and efficiency of electoral processes. Analyzing successful examples of the application of these innovations, we will try to identify the key factors and practices that contribute to increasing trust in modern society.

The article aims to explore how modern technologies can become tools for building trust and creating more stable and responsible public relations. We will discuss the possible challenges and limitations associated with the implementation of these innovations and provide recommendations for their successful use in the future. The purpose of the article is to show the prospects of how technologies can contribute to the creation of a more trusting and sustainable society.

The phenomenon of trust

Trust in the government and its political institutions is a basic element of civic political culture. Without trust, there is neither a civil society nor a strong political government.

The problem of trust, including the sources of maintaining trust, is considered in the socio-political sciences together with concepts such as freedom and equality, in the relationship between the state and civil society, between individual social institutions, social groups and citizens both within the country and in international relations.

In the past, social values, including trust, were supported by traditions, society, and the church.

However, along with the universal recognition of the importance of trust, there is still no clear definition of this concept itself.

In addition, the disagreements of the scientific community raise the following questions [1. P. 90]:

• Is trust based on calculation or on custom?
• What aspects of management are related to trust?
• What is the basis of trust — selfish or altruistic motives?

Historically, there have been at least four groups of scientists who consider trust from different angles.

F. Fukuyama, G. Zimmel, T. Parsons, E. Giddens and others consider trust as confidence in the actions of other people based on feeling and sensation, and not on rational calculation [2].

Thus, F. Fukuyama defines trust as "the expectation that members of a community have that other members will behave more or less predictably, honestly and with attention to the needs of others, in accordance with certain general norms. Some of these norms relate to the sphere of 'fundamental values' (understanding of justice), but they also include such completely secular things as professional standards and corporate codes of conduct" [3. P. 52].

F. Fukuyama also identified the basic characteristics of trust that are unchanged for any social group. At the same time, each social group has its own understanding of these "fundamental values" and a representation of the category of trust based on its own perception of reality [4. P. 185].

Another group of scientists (P. Shtompka, D. Gambetta, A. Seligman, J. Coleman and H. White) defines trust as a phenomenon inherent exclusively in modern types of society [5], which is based on rational calculation. This, in turn, helps a citizen navigate in a modern society of uncertainty and risk [6].

Thus, P. Shtompka defines trust as a bet "in relation to future unforeseen actions of others". At the same time, trust (distrust) acts as an important indicator of people's attitude to each other and to the society in which they live. In addition, trust is one of the characteristics of social expectations and behavioral strategies of citizens.

According to the scientist, objective conditions must be created, developed and maintained in order to increase trust in any area, including to have a positive impact on the personal interests of individuals.

But existing subjective desires, needs and creative aspirations, in turn, must be integrated into a trusting type of cultural interaction, often to the detriment of personal interests.

Another view on trust was formulated by a group of scientists led by N. Luhmann. From the definition of the German scientist, it follows that trust is "a risky advance with which we can still solve the problem of uncertainty". At the same time, two levels of trust are distinguished — a characteristic at the level of interpersonal relations (microlevel) and trust in society (macrolevel) [7].

The fourth group, led by the famous American sociologist A. Seligman, defined trust as "a function of the activity of social actors that is being implemented" [8].

In the most general and abstract form, A. Seligman argues that the need for durable, stable and universally recognized trust structures is rooted in the fundamental indeterminism of social interaction. This indeterminism of relations between social actors, between social actors and their goals, between social actors and resources leads to the fundamental unpredictability of social life, despite the universality of human interdependence.

It follows that any promising attempt to build a social order and integral systems of social interaction should be based on the development of stable relations of mutual trust between social actors.

Trust in civil society

Since the functioning of public structures directly depends on trust, the problem of trust plays an important role in civil society.

In modern society, citizens do not always trust not only each other, but also do not trust the organizations and institutions that make up civil society.

The most striking examples of the emergence of a trust problem could be seen during the 2008 financial crisis and the pandemic COVID-19 [9]. During such periods of large-scale cataclysms, citizens feel vulnerable and often turn to the government and other organizations for help and support. At the same time, the low level of trust in the authorities leads to the fact that citizens do not believe in the reliability of information and actions of their government.

One of the ways to solve the problem of trust is to establish transparency and openness in the activities of organizations and institutions, including the Government and elected institutions.

Openness, transparency, accessibility and clarity of communication between citizens and institutions will allow the population to better understand the actions of state organizations and the government, contribute to the increase in the efficiency of state institutions, improve their interaction with civil society, and increase the level of trust in the authorities.

Trust in the electoral system

Despite the uncertainty of the concept of such a thing as "trust", it plays an essential role in the relationship between government and society. It creates a moral environment in society that promotes development and effective problem solving.

The factor of trust acquires legal significance in the relationship between a citizen and the state, since on its basis the entire complex of relations for the formation and functioning of a representative system is built [10].

Since the principle of sovereignty of the people is the dominant legitimizing principle in the modern world, the Constitution contributes to the fact that the powers of authority are exercised by the relevant bodies in accordance with the will and trust of the people [11].

In other words, by electing deputies, the head of state, etc., the people confer confidence and delegate the right to exercise constitutional power, which can and should be exercised in the forms provided for by the Constitution and the limits established by it [12. P. 36].

It should be noted that elections are becoming the most important indicator of this trust. At the same time, when the choice is obvious, there is no need for it. When the choice is not obvious, its result is easily fabricated and manipulated, overgrown with a lot of speculation [13].

Problems of existing electoral systems

Distrust of elections as a way of forming the ruling social stratum has been known since the era of the ancient Greek philosopher Plato.

The voting procedure does not ensure or guarantee the selection of the worthiest people. Decent people may or may not get there, there are no guarantees. A voter can be bribed, deceived, or intimidated.

The age-old experience of election campaigns with and without electors has shown that, all other things being equal, a decent candidate cannot win elections, since he will never allow himself to fight techniques to which a dishonest opponent descends. And the higher the level of elections, the higher the level of moral degradation of its participants.

A normal man in the street treats electoral instruments with very, very great suspicion, and negativity, distrust and internal rejection of electoral decisions.

Solutions

In order to increase confidence in the electoral procedure, and as a result in the government structures, it is necessary that the mechanism become as transparent and reliable as possible, as well as really anonymous.

At the same time, citizens should be aware that there is no possibility of falsifying voting documents, as well as the possibility of destroying the results.

In addition, it is necessary to implement a procedure that will allow any citizen, as well as law enforcement and supervisory authorities, to view and verify the entire chain of collection and counting of votes.

Thus, a citizen must understand the security, transparency, anonymity and reliability of the entire voting mechanism.

With the introduction of pandemic restrictions that have affected many areas of human activity, there has been a trend towards the introduction of remote electronic voting, on the electoral mechanism itself.

The implementation of this mechanism implies increased requirements for the security of the electoral process itself, its openness and transparency, and an effective and transparent regulatory framework.

Distributed systems

At the present stage of information technology development, one of the promising areas in the field of data storage and processing is distribution [14].

So, in 1964, the American scientist Paul Behren, along with centralized and decentralized communication systems, proposed the idea of a distributed system (peer-to-peer) [15].

The idea is that there is no single decision-making center, which allows individual nodes to communicate with each other directly.

Examples of the use of distributed systems were the Napster peer-to-peer music exchange network (1999) and the BitTorrent data exchange protocol (2001).

A well-known project for the use of distributed registries at the state level is e-Estonia,

Starting in 1994, within the framework of this project, the Estonian authorities began work on providing access to electronic services linking the public and private sectors. After the formulation of the Principles of Estonia's Information Policy, a nationwide initiative for the development of the Tiger Leap IT infrastructure was developed in 1996.

Among other things, online banking solutions have been created and implemented (e-Banking). Further, a database and scheduler for streaming management decision-making processes (e-Cabinet), an online tax declaration (e-Tax), parking payments from the phone (M-Parking), a distributed data exchange layer for registers and information systems (X-Road), a digital identification system were developed and implemented (e-ID), as well as an electronic medical card (EHR) and, of course, an online voting system (i-Voting). Electronic prescription and e-government systems using artificial intelligence elements successfully operate on the e-Estonia platform and help to optimally organize the work of public institutions.

Blockchain technology

It should be noted that distributed registries gained the greatest popularity after the implementation of blockchain technology.

For the first time, a description of the operation of this technology was contained in the article "Bitcoin: A Peer-to-Peer Electronic cash system" [16]. The essence is the secure distributed storage of information on electronic media without the possibility of deleting and changing it.

The blockchain is a "distributed database that contains information about all transactions conducted by all participants in the system. Information is stored in the form of 'block chains', each of which contains a certain number of communications".

The information stored in the blockchain is evenly distributed between working computers [17].

The first practical implementation of blockchain technology is the creation of the bitcoin cryptocurrency [18].

Blockchain technology has advantages such as transparency and anonymity, all transactions on the network are carried out openly, anyone can get acquainted with the history of transactions, but will not be able to get information about the actual sender and recipient.

All participants in the blockchain system get access to information using special unique keys, which are an individual set of cryptographic records that cannot be obtained by an outsider.

Summarizing the above, it is safe to say that blockchain technology allows you to solve the problem of trust through the following principles:

1. Decentralization: there is no central supervisory authority in the blockchain, data is stored on distributed nodes, each node has a copy of the data and verifies it for authenticity.
2. Transparency: any network participant can verify all transactions recorded in the blockchain.
3. Security: Blockchain uses cryptographic algorithms to protect data from hackers and intruders. Each data block has a unique digital signature that allows you to verify its authenticity.
4. Data immutability: data in the blockchain cannot be changed or deleted without the consent of the majority of nodes. This ensures the reliability and stability of the system.

The use of smart contract technology allows us to automatically perform pre-programmed actions, including transactions, when certain conditions occur. Such a tool eliminates the interference of third parties, eliminates the human factor, ensures the security of transactions, as well as transaction complexes.

The use of blockchain technology in the election system

All the above principles and mechanisms make it possible to create a decentralized, safe, reliable and transparent environment that solves the problem of trust between participants in any process, including the election process.

In particular, the blockchain can be used to record election results, to verify the legitimacy of voting and electoral processes. The actions of the participants in the electoral process become transparent and open to all. The data recorded in the blockchain is protected by a cryptographic signature, it cannot be forged or changed without the consent of all participants.

The introduction of blockchain technology in the field of elections makes it possible to improve the voting process, eliminate the possibility of fraud, and increase citizens' confidence in the results of voting and the activities of government agencies.

An example of the implementation of blockchain technology in the field of elections is the Agora project, which was tested as part of the elections in Sierra Leone in 2018 [19].

About 70 % of voters took part in secret (anonymous) voting [20], which is not least due to the use of blockchain technology.

Records of each electoral vote were stored on the blockchain. After the votes were counted and the voting results were published, these recordings became available for download and study by everyone.

Thus, the use of blockchain technology will make the electoral process more open and fully verifiable. The use of this technology also significantly reduces the cost of conducting elections, since at least there is no need to issue voting ballots.

Another example is the blockchain project of the Department of Information Technology of the Government of Moscow (DIT). So, in 2019, the department tested blockchain technology in three electoral districts of Moscow (Chertanovo, Bibirevo and Zelenograd) when conducting electronic voting in the elections to the Moscow City Duma of municipal elections [21].

You could choose your candidate from the comfort of your home. In addition, the use of blockchain technology has made it possible to ensure anonymity and transparency of the electoral process.

The customer of the blockchain project was the CEC of the Russian Federation. The goal was to conduct a public and completely transparent, experimental voting.

During the international competition for hacking the system, more than 40 independent experts in information security and cryptography were able to verify the protection of the portal infrastructure mos.ru and protect servers from possible DDoS attacks, test encryption algorithms.

The French cryptographer Pierrick Gaudry has advanced the furthest. He discovered that the 256×3 private key did not provide sufficient encryption strength, and posted a mathematical code that decrypts the data.

For his recommendations, P. Gaudry received a prize of 1 million rubles. The other participants of the experiment shared the second half of the prize fund: they made important comments on the operation of the form and identified potential

vulnerabilities of the system. The stability of the system created on the blockchain was also shown by the crash test.

At the same time, it should be noted that the implemented system is not a classic blockchain case, since it is controlled by the executive authorities.

Problems with the implementation of technology in the electoral process

To put blockchain technology into practice (even in municipal and regional elections in Russia), it will be necessary to carry out grandiose educational work to inform citizens, register them, as well as to develop, implement and configure this system.

In addition to the above organizational measures, it will also be necessary to make appropriate changes to the norms of the current electoral legislation.

Conclusion

Thus, the use of blockchain technology can be used to improve elections at any level, from municipal to federal (both parliamentary and presidential).

The use of blockchain technology during elections makes it possible to organize the procedure in such a way as to ensure maximum transparency and security.

This approach is one of the effective steps to increase confidence in the government and government institutions, especially if there is no atmosphere of justice in society [22]. And if the voter understands exactly that it is not possible to rig the elections and make a choice for him, and that a really elected candidate will be elected, then this may become one of the parameters that will give stability to government structures and ultimately raise confidence in the people's deputies and their activities.

REFERENCES

1. Kautonen T. Trust as a Governance Mechanism in Inter-firm Relations: Conceptual Considerations. *Evolutionary and Institutional Economics Review.* 2006; 1 (3): 89–108.
2. Nikitina Yu.N. *Doverie kak jelement struktury rynka strahovanija zhizni* [Trust as an Element of the Life Insurance Market Structure]. URL: http://www.ecsoc.msses.ru/ pdf/ecsoc_t8_ n1.pdf/ (accessed: 20.08.2023) (In Russ.).
3. Fukuyama F. *Doverie: Social'nye dobrodeteli i put' k procvetaniju* [Trust: Social Virtues and the Creation of Prosperity]. Moscow: AST: Ermak; 2004 (In Russ.).
4. Milner B.Z. *Teorija organizacii: Uchebnik dlja studentov vuzov, obuchajushhihsja po special'nosti «Gosudarstvennoe i municipal'noe upravlenie»* [Organization Theory: A Textbook for Students Majoring in "State and Municipal Management". 4th ed.]. Moscow: INFA-M; 2004 (In Russ.).
5. Schtompka P. *Sociologija. Analiz obshhestva* [Sociology. Society Analysis]. Moscow; 2005.

6. Freik N.V. *Koncepcija doverija v issledovanijah P. Shtompki* [The Concept of Trust in the Research of P. Schtompka]. URL: http://www.ecsocman.edu.ru/images/pubs/2007/08/14/0000310977/002_Freik.pdf/ (accessed: 20.08.2023) (In Russ.).

7. Luhmann N. *Trust and Power.* Chichester: John Wiley and Sons Inc.; 1979.

8. Seligman A. *Problema doverija* [The Problem of Trust]. Moscow: Idea-Press; 2002 (In Russ.).

9. Baranov N.A. Vybory kak institut doverija: osobennosti funkcionirovanija v uslovijah pandemii COVID-19 [Elections as an Institution of Trust: Features of Functioning in the Conditions of the COVID-19 Pandemic]. *Management Consulting.* 2021; 10 (In Russ.).

10. Kokotov A.N. *Doverie. Nedoverie. Pravo* [Trust. Distrust. Law]. Moscow: Jurist; 2004 (In Russ.).

11. Kravets I.A. *Konstitucionnaja teologija i osnovy konstitucionnogo stroja* [Constitutional Theology and Foundations of Constitutional System]. Moscow: Publisher's Decisions; 2016 (In Russ.).

12. Ebzeev B.S. Narod, narodnyj suverenitet i predstavitel'stvo: doktrinal'nye osnovy i konstitucionnaja praktika [People, Popular Sovereignty, and Representation: Doctrinal Foundations and Constitutional Practice]. *State and Law.* 2016; 4 (In Russ.).

13. Fatenkov A.N. Kak vernut' sebe doverie k vyboram? [How to Regain Trust in Elections?] *Bulletin of the Nizhny Novgorod Academy of the Ministry of Internal Affairs of Russia.* 2019; 1 (45) (In Russ.).

14. Kuteynikov D.L. Osobennosti primenenija tehnologij raspredelennyh reestrov i cepochek blokov (blokchejn) v narodnyh golosovanijah [Features of Applying Distributed Ledger Technologies and Blockchain in Public Voting]. *Current Issues in Russian Law.* 2019; № 9 (106) (In Russ.).

15. Baran P. On Distributed Communications. *Rand Corporation.* URL: https://www.rand.org/content/dam/rand/pubs/research_memoranda/2006/RM3420.pdf (accessed: 20.08.2023).

16. Nakomoto S. *Bitcoin: A Peer-to-Peer Electronic Cash System.* URL: https://bitcoin.org/bitcoin.pdf/ (accessed: 20.08.2023).

17. *Chto takoe tehnologija blokchejn prostymi slovami?* [What is Blockchain Technology in Simple Terms?]. URL: https://www.bitbetnews.com/kriptovaljuty/chto-takoe-tehnologija-blokchejn-prostymi-slovami/.html/ (accessed: 20.08.2023) (In Russ.).

18. *Ne bitkoinom edinym. Blokchejn — tehnologija budushhego* [Not Just Bitcoin. Blockchain — the Technology of the Future]. URL: http://racurs.ua/1690-ne-bitkoinom-edinym-blokcheyn-tehnologiya-buduschego/ (accessed: 20.08.2023) (In Russ.).

19. Alexeev R.A. Blokchejn kak izbiratel'naja tehnologija novogo pokolenija — perspektivy primenenija na vyborah v sovremennoj Rossii [Blockchain as a Next-Generation Voting Technology — Prospects for Use in Modern Russia's Elections]. *Bulletin of the Moscow State Regional University.* 2018; 2 (In Russ.).

20. Sychev V. *V S'erra-Leone proshli blokchejn-vybory prezidenta* [Blockchain Elections for President Held in Sierra Leone]. URL: https://nplus1.ru/news/2018/03/15/votes/ (accessed: 20.08.2023) (In Russ.).

21. Kibervybory v1.0: kak sozdavalas' sistema blokchejn-golosovanija v Moskve [Cyberelections v1.0: How the Blockchain Voting System Was Created in Moscow]. *DIT Company.* URL: https://habr.com/ru/specials/480152/ (accessed: 20.08.2023) (In Russ.).

22. Ivanov V.G. Krizis koncepcii tehnokratii v kontekste izuchenija post-industrial'nogo obshhestva [The Crisis of the Concept of Technocracy in the Context of the Study of Post-industrial Society]. *Voprosy gumanitarnyh nauk.* 2007;1:428–433 (In Russ.).

Information about the author:
Denis A. Gromyko — Researcher of the Department of Public Administration, Peoples' Friendship University of Russia named after Patrice Lumumba (RUDN University) (Russian Federation) (e-mail: da_gromyko@rudn.ru).

Использование
современных технологий блокчейн
для повышения уровня доверия в обществе

Д.А. Громыко

Российский университет дружбы народов имени Патриса Лумумбы,
117198, Россия, Москва, Миклухо-Маклая ул., д. 6

✉ da_gromyko@rudn.ru

Аннотация. Одной из актуальных проблем современного мира является проблема доверия к власти. Процедура выборов является важнейшим событием в жизни общества, влияет на будущее страны. Снижение доверия к власти, в том числе к выборам, приводит к уязвимости процесса голосования и подсчёта результатов. В свою очередь, стремительное развитие информационных технологий, автоматизация и компьютеризация процессов, затрагивающие практически все сферы жизнедеятельности, кроме всего прочего, оказывает повсеместное влияние на функционирование государственных институтов. Одной из основных задач, решаемых новыми технологиями, является повышение уровня доверия в обществе. Настоящей революцией в мире информационных технологий стали блокчейн, или распределенные реестры, которые нашли применение во многих сферах, в том числе при организации процедуры выборов на разных уровнях. Использование технологии блокчейн в выборном процессе может помочь в решении проблемы доверия, так как обеспечивается прозрачность, надежность и конфиденциальность голосования, а также минимизируется возможность подделки результатов. В частности, в системе, разработанной на основе блокчейн, голосование может проходить анонимно, без участия посредников и промежуточных технологий. В статье рассмотрена проблема доверия к государственным институтам, выделены проблемы выборного процесса, представлено описание решения с использованием технологии блокчейн, приведены примеры существующих систем, используемых во время выборной процедуры. Сделан вывод о том, что внедрение блокчейн технологии в выборный процесс позволит обеспечить более прозрачный и безопасный процесс голосования и существенно повысить уровень доверия к власти.

Ключевые слова: доверие, блокчейн, распределенные системы коммуникаций, цепочки блоков, распределенные реестры, выборы, голосование