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Smart contracts – a threat or an opportunity for the global economies?

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Introduction

When the lawyer, technologist and visionary Nick Shabo introduced the idea of smart contracts for the first time in 1994 the concept was quite surreal and was not taken seriously for several years. It is only now, in 2017, that we are fully able to comprehend how to make use of smart contracts and have the necessary infrastructure to do it. The issue of the impact of smart contracts on the private sector has been already the subject of discussion in several analyses and reports. Therefore, in this paper, I will focus on the potential impact of smart contracts on the public sector and state administration.

I will first explore the issue of why legislating smart contracts may be beneficial to governments and the public sector, and then I will discuss how governments should design laws so that the society and government administration can fully benefit from solutions offered by the smart-contract concept.

It may well be that smart-contract implementation legislation will have a breakthrough effect. Indeed, the introduction of blockchain-based contracts could revolutionize public administration, facilitate access to public registers, provide better protection for critical infrastructure and improve collection of taxes – all in all, it has the potential of making legal relations between citizens and public authorities far more transparent and secure than they are today.

The concept of smart contract

A smart contract is an agreement, but different from the traditional agreement written on a piece of paper. A smart contract is coded as a computer script - there are no traditional signatures. The code is tamper-proof. The contents of the contract can be modified either by online input of external data or manually. Smart-contract execution and date of enforcement can be made conditional. Smart contracts are automatically enforceable and self-executing. It will be much safer for the parties to a smart contract to accomplish their plan – basically, once a smart contract is concluded, it is extremely difficult to default thereon. The reason for this is that smart-contract performance does not depend on the party's conduct but rather on a computer code, so there is no room for improper performance by individuals. Smart contracts run exactly as programmed. There is no need for intermediaries, the parties can conclude the contract independently without incurring additional transaction costs. Smart contracts were developed to minimize fraud loss as well as enforcement and other transaction costs, and to increase the security and safety of business relations.

Smart contracts are stored on a blockchain which offers cryptographic security and immutability. A blockchain is a secure, decentralised and distributed ledger which contains time-stamped blocks that form groups of transactions and are linked through a secure encryption. The best-known platform for concluding smart contracts is Ethereum. It is a public, open-source and blockchain-based platform, through which it is possible to script smart contracts.

It has become clear that in the near future smart contracts will reshape the private sector and contractual relations in finance, insurance and business. My goal in this paper is to consider how smart contracts could innovate and transform the public sector.

Legislating smart contracts can benefit governments and the public sector

There are many ways of applying smart contracts in the public sector. I will concentrate on the beneficial influence of the application of smart contracts in state elections and referendums[1], more efficient collection of taxes and operation of land registries.

Voting

As it stands today, the process of organising elections is slow, expensive and easy to manipulate and falsify. Counting votes is also a slow process. This is so because vote counting and other activities involved in elections are left to humans. The whole voting procedure could be made much faster, more transparent, corruption-resistant, easier and cheaper if it was blockchain-based and used smart contracts.

So far we had to rely on government actions and election organization methods. In the blockchain protocol, however, records would be automatically distributed to users and the system would be decentralised and would enable users to store a copy of their voting record. What is more, any changes made to that vote would be noticeable to other users – so vote fraud would be virtually impossible. Also, the problem of illegitimate and void votes would no longer exist as users would be able to supervise whether voting ballots had been distributed in compliance with the rules.

With this innovative blockchain-based voting process, it is possible that the voter turnout would be higher and that the voting system would be better protected. There would be no room for falsification, so citizens would be more trusting of their governments and less inclined to question election results. Election costs would be reduced and so would be the security risk. The high cost involved in running elections and referendums is an important point: because of it, due to the high cost of referendums and polls[2], citizens do not often have the chance to present their opinion in this direct way. Thanks to the blockchain and smart-contract solution, people would be able to share their views more often and actively participate in politics.

Of course, there is a threat that e-voting will not be sufficiently secure. Consequently, the most important issue that this innovative solution has to face is proper vote anonymization.

[1] The Estonian government is planning to introduce voting through blockchain.

[2] The estimated cost of conducting the EU referendum by the UK government has been put at £142.4 million: https://www.gov.uk/government/speeches/eu-referendum-counting-officers-regulations.

In the context of smart contracts, if e-voting were organised using this formula, election results could activate an automatic implementation of politicians' promises, financial declarations or other decisions that can be implemented through a blockchain platform.

Thus, legislating smart contracts in the context of elections and referendums may be beneficial because it will enable citizens to fully participate in civic processes, will require less state spending on the organisation voting events and will accelerate the whole process and make it more transparent and resistent to fraud.

land transactions

Land registration is a domain where I do not have to be predicting the future and musing on potential smart-contract applications. The future is already happenning in Sweden and in Georgia. Sweden is conducting trials of the application of blockchain smart-contract technology in land registry[3]. Gerogia decided to use the blockchain technology to validate property-related government transactions.

In Sweden, the idea is to investigate how blockchains could reduce the risk of manual errors while creating more secure document-circulation processes. The identity of users registered in the new smart-contract system is based on Telia's technology. As written in a report of the Swedish Mapping, Cadastral and Land Registration Authority:

> "*It usually takes a long time from when the purchasing contract is signed until the bill of sale is signed and the actual transfer of the property takes place. Only long after the first contract is signed the sale is registered at Lantmäteriet, and is until then not visible in the land registry. The sale of tenant-owner rights is also not registered with Lantmäteriet at all, since tenant-owner rights and owners are only registered at the level of the cooperative housing society that owns the property to be sold*."

Thus, the introduction of smart contracts and blockchains in this sphere of life would be highly appreciated by citizens. With access to blockchain ledgers, traders would be able to track properties, identify them and be sure that the properties are indeed free of burdens. Currently, there are often mistakes made by notaries, encapsulated in paper-based land registries. Blockchains are perfectly suited for keeping land ownership records and would faciliate administrative work, improve citizens' access to databases and increase their trust in government. Today, real estate registries are vulnerable to fraud

[3] In partnership with the Swedish blockchain startup ChromaWay, consulting firm Kairos Future and telephone service provider Telia.

and, in some jurisdictions, access to such registries can be complicated. Making these registries citizen-friendly would be a major achievement.

If there were land registries on blockchains, smart contracts would make real estate transactions easy and quick. Instead of having to fide the administrative merry-go-round and visit several offices, one would just need to meet the preliminary conditions and be able to become an owner of the property, if the platform was synchronised with the apropriate cryptocurrency platform.

Fiscal system, better control of public spending

Even though it is still a rather distant perspective, nonetheless, in the future, if appropriate legal amendments will be enacted, companies will be able to pay taxes through blockchains with the use of smart contracts. If the tax authorities and tax payers used the same blockchain, tax administrators would be able to follow all transactions live and charge tax payers at the exact moment of the transfer. Special programs designed for the tax authorities would count the tax owed and collect the tax immediately and automatically from the tax payer's account. Tax fraud would be eliminated, tax payers would not be able to hide their revenue and the tax authorities would be able to scrutinise all transactions.

There are several advantages open to those governments which decide to rely on smart contracts to collect taxes. Firstly, state authorities will be able to permanently monitor transactions thus making tax evasion extremely difficult. Secondly, the state will be able to shed a lot of unnecessary bureaucracy and tax administration – tax collection will be performed by the system instead of people. Thirdly, less mistakes will be made in calculating taxes and tax payers will be requested accurate tax payments. Lastly, there will be no need for manual preparation of tax returns – they will be calculated in real time, without uncertainty and corrections[4]. In the context of VAT, implementation of blockchains and smart contracts would essentially simplify corporate transactions and lower their costs[5]. Compliance departments would not have to monitor all provisions and transactions – that monitoring would be performed instead by computers in real time. Of all presented advantages of introducing smart contracts in tax law, the greatest advantage will be probably the system's significant potential to counteract tax evasion.

Because of the reasons mentioned above, legislating smart contracts and making use of blockchain-based solutions would be beneficial to state governments. Main reasons for this are: lower costs of operating administration, raising citizens' trust in government, accelerating procedures and making them more secure. Since, in my opinion, legislating smart contracts would have a positive impact on state administration, how then should states design laws to govern smart contracts and blockchains?

[4] Some states which have problems with tax fraud like Brazil, Mexico and Russia have already started to ask companies for access to their financial information.

[5] According to the UK government report *Distributed Ledger Technology: beyond block chain*, the EU should introduce a blockchain-based VAT system that would increase transparency to "make the black market economy more difficult to conceal" and "include smart contracts designed to outsmart the tax quasi-compliant economy".

How should states design laws governing smart contracts?

Since it is difficult to predict how smart contracts will reshape government/citizens relations, lawmakers should be cautious about creating new regulations. On the one hand, there is a strong need to regulate the most burning issues like, for example, taxes – in order to avoid uncertainty among tax payers and tax evasion, but, on the other hand – governments must bear in mind that every change may harm the expansion and development of smart contracts and blockchains.

Therefore, a good solution would be to protect the new technology sector (in particular blockchains and cryptocurrency startups and projects) by way of introduction of regulatory sandboxes. As a result, protection would be spread over both – creators of startups and blockchain platforms as well as their users.

In some domains, however, governments should issue guidelines to enable users to act in compliance with the law. That would be the case of tax law. Governments should issue general tax interpretations[6] on cryptocurrencies and blockchains. By the way, because of the lack of proper regulations, several companies have decided to leave those states where laws concerning smart contracts and blockchains are not clear.

What is more, governments should implement programs addressed to administrators, civil servants, judges and lawyers – they should be aware of the potential offered by smart contracts and blockchain infrastructure.

Of course, it depends on the legal system of the particular country, but it is important not to overregulate the blockchain and smart-contract field. Legislators should leave this new concept to evolve on its own and fully develop before they start placing restrictions on its use.

To sum up, in my view, crucial issues regarding legislation are: the problem of overregulation, the need for creation of regulatory sandboxes for the blockchain based companies, the lack of the capacity to sue anonymous users of the network and be sued thereby, and the absence of proper jurisdiction of the courts and legal forum for solving arising disputes. Last but not least, governments should develop legislation related to tax law and criminal law – today's blockchain users are immune to punishment. It is also unclear whether blockchain transactions are taxable and what are the criminal consequences of misconduct in blockchain technology.

[6] Similar to the English model Policy paper nr 9 (2014) published by the British taxation agency HMRC : https://www.gov.uk/ government/publications/revenue-and-customs-brief-9-2014-bitcoin-and-other-cryptocurrencies.

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