The uses of the Blockchain Smart Contracts to reduce the levels of corruption: Some preliminary thoughts

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ABSTRACT

The increasing demands for more transparency in public administration worldwide ask for open data, and the establishing of other mechanisms as well as keep using the contributions of new technologies to increment the management capacity, focusing on better controls and governance mechanisms. One of the new technologies that presents potential to be used to protect organizations from corruption is Blockchain. An important point when dealing with corruption perpetrated by frauds is the use of technology to avoid wrongdoing or to reduce its impact. Contracts are a very complex subject provided they are the main way governments transfer money to other organizations, including private ones. This document presents a study proposal about the use of Smart Contracts technology in Blockchain environments as a way to face corruption in governmental instances. Smart Contracts can be used to all government payments as a way to increase transactions transparency, as well as to avoid overbilling, provided that contracts and bids are typical ways to exert frauds and money misappropriation. As future researches it is important to verify barriers to Blockchain adoption as well as its main vulnerabilities.

CCS CONCEPTS

• **Corruption Combat → Blockchain Smart Contracts Technology**; *governance mechanisms* • **Corruption Levels →** *increase transactions transparency*

KEYWORDS

Blockchain, Smart Contracts, Corruption Levels, Governance.

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1 INTRODUCTION

The increasing demands for more transparency in public administration worldwide ask for open data, and the establishing of other mechanisms as well. When effective dealing against corruption, it is necessary to go further and keep using the contributions of new technologies. Most efforts related to the reduction of the corruption levels in organizations day-by-day are focused on legal measures. From a legal point of view, to a certain extent the current levels of corruption are a consequence of the lack of laws, so, the more laws, the less corruption, Vicente [4] agree with this statement, to a certain extent, in agreement, regarding to the effective results of the application of anticorruption laws in state-owned enterprises. Consequently, legal measures are more focused on the punishment of those implicated in wrongdoing. However, a complex subject as corruption needs an equally complex discussion, considering several dimensions such as legal, cultural, economic, political and also administrative and governance ones. This work takes into consideration the administrative and governance dimension, which involves the increment on the management capacity, focusing on performance and better controls and governance mechanisms [2]. Studies on administrative dimension are not imitated to bureaucracy reduction, provided it involves public policies, fraud preventive measures, public transparency, participation and social control [3]. One of the new technologies that presents potential to be used to protect organizations from corruption is Blockchain. It is related to Bitcoin cryptocurrency, a new financial transaction technology that has been considered as a very innovative way to exchange money, assets, shares or any valuable [6]. Bitcoin and Blockchain work together provided that Blockchain is a safe environment to the financial transactions using Bitcoin. Blockchain technology was developed to be virtually fraudproof, presenting unique cryptography and security characteristics. Created in 2008, just recently Blockchain called the attention from both organizations and academic world. Nakamoto [5] wrote about Blockchain as a coin that was totally digital and controlled by an application layer

protocol that validates transactions through a point-to-point network (P2P), having its operation and governance totally distributed and without the regulation of any central private or state organization. Based on the first positive results of this technology, new applications started to arise, such as patients

follow-up in health, online voting in Sierra Leone, participatory systems surveys and referendums as well as Smart Contracts, which are the focus of this work. Smart Contracts can be understood as autonomous control platforms such as robot software that can be used to validate transactions without the necessity of human interference [6]. The aim of this work is to discuss potential uses of Smart Contracts as a way to reduce the levels of corruption in the administrative and governance dimension.

2 BLOCKCHAIN AND SMART CONTRACTS APPLICATIONS TO REDUCE THE LEVELS OF CORRUPTION

An important point when dealing with corruption perpetrated by frauds is the use of technology to avoid wrongdoing or to reduce its impact. Contracts are a very complex subject provided they are the main way governments transfer money to other organizations, including private ones.

According to Economics, a contractual arrangement presents an agency problem, which can have two consequences. The first one is a moral risk caused by asymmetric information, which is the lack of ability of the principal to observe and verify the actions of the agent. The agency problem occurs when one person or entity (the agent) is able to make decisions on behalf of another person or entity (the principal).

The second consequence is an incomplete contract, which is a consequence of the difficulty of the parties in considering all the situations that might happen during the contract term. It can also happen due to asymmetric information among the parties since one of them might not have access to all information related to the contract. Consequently, information for all the parties is necessary to reduce the risks associated to contracts and its lack can hinder the trust among the parties. Lack of information can also increase the breaches to corruption.

Smart contracts can reduce asymmetric information because they are more open and self-executed, which means that once established and in operation, their information is available to all parties [6]. If one of them is a public organization, the information about the contracts is supposed to be available to the entire society. Moreover, contracts cannot be deceitfully changed, which contributes to the contracts guarantees and statements and to reduce asymmetric information as well.

Among the Blockchain applications in public organizations, the following ones can be named: the transfer of funds from one government level to others or from government to private companies, management and storage of bid contracts through Smart Contracts, and citizens participation in elections or referendums. Smart Contracts can be used to all government payments as a way to increase transactions transparency, as well as to avoid overbilling, provided that contracts and bids are typical ways to exert frauds and money misappropriation. Besides the increment in information access and transparency, the self-execution characteristic of contracts can reduce the expenses of manual payments, and also errors and delays, as well as the vulnerability to frauds and misconduct.

They also consume time and efforts to be managed and might directly or indirectly foster corruption caused by asymmetric information or by breaches to misconduct or misappropriation.

Smart Contracts are autonomous and execute all the activities without any help or interference of any third party, showing unparalleled transparency, increasing efficiency and reducing vulnerabilities.

The technology is potentially great, but as future researches, it is important to verify barriers to Blockchain adoption as well as its main vulnerabilities, such as risks, challenges and issues to pay attention to. One of these issues is the governance, which is decentralized in Blockchain, which constitutes an important variable when contracts evolve government and public funds. According to Atzori [1] challenges can vary from traditional mechanisms of State authority, citizenship and democracy. Particularly, the paper verifies to which extent Blockchain and decentralized platforms can be considered as hyper-political tools, capable to manage social interactions on large scale and dismiss traditional central authorities.

Much has been said on Blockchain applications in private organizations, but it is necessary to more deeply study the possibilities of using them in public organizations in order to maintain the focus on public value creation. According to this concept, the most important role of public organization is to create value to citizens, regardless of the technology used.

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