Possibilities of Blockchain Technology Implementation in Accounting in the Slovak Republic

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Abstract: *Blockchain is a current trending topic. Since its first public implementation when Bitcoin was adopted and publicly available in 2009, many studies were published. Blockchain technology could provide secure solutions where public knowledge of previously recorded transactions is necessary and integrity of data is a must. The scope of this article is to identify potential areas of accounting for blockchain implementation in the Slovak republic with potential of fraud where users could benefit from the reassurance provided by blockchain technology.*

Keywords: *accounting, blockchain, fraud-prevention*

JEL codes: M40, M41, M48

1 Introduction

Most people heard about virtual currency especially Bitcoin but not everyone knows the technology behind Bitcoin called blockchain. This technology was proposed by an author Satoshi Nakamoto in 2008 – Bitcoin as a digital currency not backed by any central bank, without central clearing place, but with electronic lager called blockchain which is stored in a globally distributed electronic ledger that keeps track of all Bitcoin transaction. This proposal of new technology lead to development of numerous real or potential applications of blockchain. In general, many authors (Liu et al., 2019; Zhang R. et al., 2019; Kňažková & Ondrušová, 2019; Kubaščíková et al., 2019; Šlosárová & Blahušiaková, 2018) state that the first documented design of the blockchain was in 2008 and the first implementation of the blockchain in the form of open-source occurred in 2009 as an integral part of bitcoin

According to Zhang R. et al. (2019) blockchain offers an innovative approach to storing information, executing transactions, performing functions, and establishing trust in an open environment. Many consider blockchain as a technology breakthrough for cryptography and cybersecurity, with use cases ranging from globally deployed cryptocurrency systems like Bitcoin, to smart contracts, smart grids over the Internet of Things, and so forth. According to Dutta et al. (2020), Chang et al. (2019) and Blockchain is an innovative, decentralized, and distributive technology, which maintains confidentiality, integrity, and availability of all the transactions and data. It is a shared, open and distributed ledger that can help store/record data and transactions backed by a cryptographic value across a peer-to-peer network. Blockchain is a digital shared ledger which is distributed over the network. Once the records are added they cannot be edited without changing the previous records (with the consent of all/majority of involved parties), which makes it very safe to business operations. According to Srivastav et al. (2020) security of blockchain technology is provided by hash - every block has consisted three main parts that is data, hash block, and the previous hash block. Hash is controls the uniqueness of each block and it is unique for each block. Each block also contains the hash of the previous block; thus, the blocks are connected to each other. However, many authors (Ferrag et al., 2018; Saad et al., 2020; Tosh et al., 2017; Zhang H. et al., 2019) are concerned about security and vulnerabilities of blockchain technology, for example 51 % attack, Double-spending attack, Sybil attack or other. According to published research by Kubaščíková et al. (2019) and by Tupmach et al. (2020) and by Pakšiová & Oriskóová (2020) financial statements presented by many Slovak companies contain errors, some of which could be eliminated by blockchain adoption.

2 Methodology and Data

The scope of this article is to identify potential use of blockchain technology in accounting in the Slovak republic. Blockchain offers a new way to record, process and store information about financial transactions and has the potential to change common accounting practices to increase confidence in the presented outputs thanks to a chain-like data structure where all records are secured against additional change and publicly available / verifiable. Each individual transaction represents one block which are ordered into the chain by transaction time, later blocks are added to the end of the chain while maintaining the hash of the previous block, which guaranties the integrity of the whole blockchain. This blockchain as a whole is publicly available so users can verify presented information. To achieve successful implementation of blockchain into accounting policies several criteria has to be met. The first to determine is if the blockchain network would be public, private consortium or hybrid – each type has its own advantages and disadvantages. The next step is to determine how agreement are reached in a blockchain network, called blockchain consensus algorithm (Tosh et al., 2017). The position of the central authority must also be taken into account when designing the blockchain network – according to research of Liu et al. (2019) there are two types: a permissionless blockchain, where any entity can join the network (e.g. Bictocin). A permissioned blockchain represent a type of network with some kind of central authority with restrictions in the membership and control procedures. To identify potential use of blockchain in accounting based on the use of methods of analysis and synthesis several criteria has to be met: (a) numerous (public) transactions, (b) risk of fraud, (c) the need to build trust/public interest.

3 Results and Discussion

Based on the criteria mentioned above, we were able to identify following possible areas for blockchain implementation: (1) Invoicing, (2) cash receipts. Each agenda as one of day-to-day operations impose great risks of potential fraud – according to the research of Cressey (1973) there is a "Fraud triangle theory". In order to commit a fraud, there must be a combination of the following three factors: motive; opportunity; justification, or risk assessment vs. profit. Both areas are great example of fraudulent conduct, mainly due to VAT tax refunds (Babčák et al., 2018). Today, electronic cash registers called eKasa which utilize an online communication interface for the registration of issued receipts are implemented to prevent post-issue receipt deletion/manipulation. However, system is designed to work semi-online – receipts could be issued in off-line mode and have to be processed online later, when internet connection is available. All issued receipts contain a QR code for verification.

Invoicing is another agenda of day-to-day accounting operations with high risk of fraud. Although electronic invoicing is a live project as a part of implementation of Directive 2014/55/EU. Electronic invoicing could be described as the exchange of an electronic invoice document between a supplier and a buyer. An electronic invoice is an invoice that has been issued, transmitted and received in a structured data format which allows for its automatic and electronic processing. A structured electronic invoice contains data from the supplier in a machine-readable format, that can be automatically imported into the buyer's Account Payable system without requiring manual entering. According to the research of Marci (2020) the design of this new system looks like to be centralized, like eKasa system, which has potential risks, for example long response times or down times of system, which are common in all previous government implemented e-solutions.

Both systems, registration of cash receipts and electronic invoicing could benefit from blockchain technology and distributed network structure. Both types of blockchain designs, permissionless and permissioned could be used. However, due to governments oversight on whole process we recommend a permissioned design. Currently all cash registers are an electronic machines with internet access and most of invoices are computer issued, so all current users would be easily accepted into blockchain network, which will provide additional reassurance that presented documents were not altered in any way due to the basic function of blockchain technology - ensuring data integrity by hash implementation.

With permissioned type of network there will be a global authority to provide oversight on the whole network, which could possibly eliminate some of the vulnerabilities, e. g. 51 % attack wouldn't be possible, because of different permissions of users and user authentication, so fake user accounts could not join the network or take control over the network with intention to modify previous records since this option would unavailable.

Conclusions

The current state of use of blockchain technology in accounting in Slovakia is still at an early stage compared to other industries. Users could benefit by introduction of blockchain into electronic invoicing, which will provide addition reassurance that received documents were not changed/deleted or falsified after issuance. Blockchain technology will secure that all issued invoices would be recorded in a virtual blocks that are sequentially connected with previously issued documents in the chain using hash. Public verification of received invoices would eliminate doubts and improve trust that received document is not a part of fraud scheme

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