



CSE 4000 : Thesis

A Decentralized Approach To Collect Government Service Tax Using Blockchain

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Chapter 1

Introduction

Revenue administration is often ranked as one of the poorest performing public sectors in terms of corruption. Tax administration is an attractive sector for corruption to take place as the opportunities and incentives to engage in illicit activity are numerous. Tax administration in particular is often perceived as one of the sectors most vulnerable to corruption due to complexity of tax laws, the high discretionary powers of tax officials and the low cost of punishment. Corruption can happen in many ways in collecting taxes, where tax officials strike deals with taxpayers to allow the latter to underpay taxes in exchange for a share of the money “saved”, or abusive, where tax officials use their discretionary powers to extort bribes from honest taxpayers and can take various forms.

Taxpayers can abuse the complexity of tax laws to evade taxes by, for example, under-reporting turnover or over-reporting expenditure, with or without the involvement of tax officials. Rich and well connected groups and individuals can also use political corruption to exercise undue influence on the tax regulations, lower and circumvent tax rates as they have both incentives and resources to buy influence, both legally and illegally.

Tax officials can abuse their position to issue tax exemptions, apply lower tax rates, un-register individuals from the tax registers in exchange for lower “private” tax, among others.

Tax officials can extort bribes from taxpayers by threatening them to pay above rates. They can also simply steal the tax revenues collected, sometimes with the complicity of bank officials or auditors. Internal auditing may also be inefficient or corrupt, reducing the likelihood of detection and punishment

Chapter 2

Related Work

Implementation of blockchain in tax collection to use its features such as security, transparency and trust is an effective solution. Blockchain technology – a distributed ledger that allows anything of value to be traded securely, transparently and without the risk of tampering – could be just what the world of tax is waiting for. It has the ability to deliver real-time, reliable information to a wide group of people, and create a system where both taxpayers and tax authorities have equal confidence in the veracity of the data collected. It could make it easier for people to pay tax and to help the government to prevent these tax frauds.

[5] This paper describes the development of a road tax payment application using the Ethereum platform. The web solution was developed using the ReactJS platform. The smart contract was developed using Remix. They proposed a web application based on blockchain framework for collecting road taxes which is quite effective. The researchers in [5] added blockchain transaction process for existing solution to introduce more transparency, cost effective solution.

[3] investigates the state of the art within the field of Blockchain application on taxation, in order to drive new researches that could close current gaps and to support the development of new applications.

Chapter 3

Proposed Model

Our proposed model is-

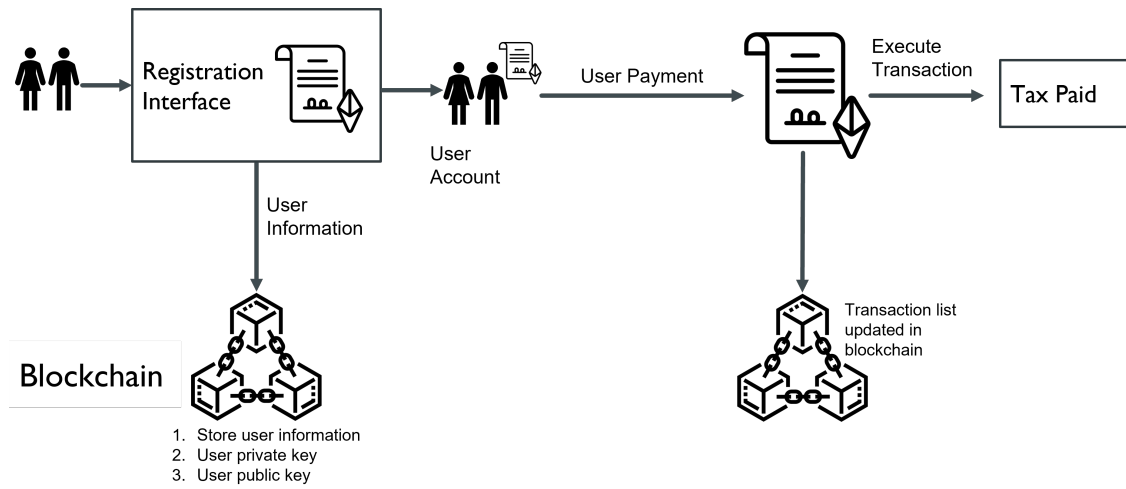


Figure 3.1: Proposed Model

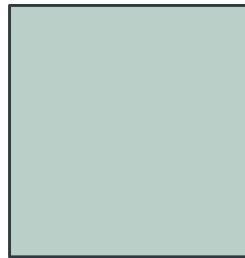
We are here proposing a model for preventing corruption happening at tax collection by using Blockchain as a storage and transaction medium.

User first have to register in the system to open a blockchain(ethereum) account using his/her information which will be safely stored into the blockchain. Then the user will pay taxes through the interface of the account which will be managed in the blockchain. We are using Ethereum network for the whole process and the application will be in the blockchain.

3.1 Blockchain

A blockchain is a distributed database or ledger that is shared among the nodes of a computer network. As a database, a blockchain stores information electronically in digital format.

Blockchain has appeared in a 2008 paper [2] as a proposed technology for the first cryptocurrency known as Bitcoin, which was released in 2009. Blockchain is a storage system similar to a database that uses cryptography to bind data into blocks and tie them together as a chain. Due to its linear structure, the data cannot be tampered with, without altering the entire chain of information and that's where the main advantages of the system comes from. All information is saved with the help of the network nodes known as “miners” which gather information, bind it together in a block and publish the block on the chain.



1. Data: “Hello World!”
2. Prev. Hash: 1894A19C85
3. Own Hash: 43FC004C891

Figure 3.2: Block Representation

The other nodes check the block of information for validity and if every piece of it is correct, meaning the blockchain history matches the new piece of information, the new block will be saved in the chain and the miner will receive a payment in virtual currency. This is called the consensus model and it is the way the system is governed, meaning there is no central authority that needs to make decisions, but the entire community as a whole.

The security comes from the fact that an attacker has to control more than 50% of the network in order to manipulate the decision process, which in theory could never happen.

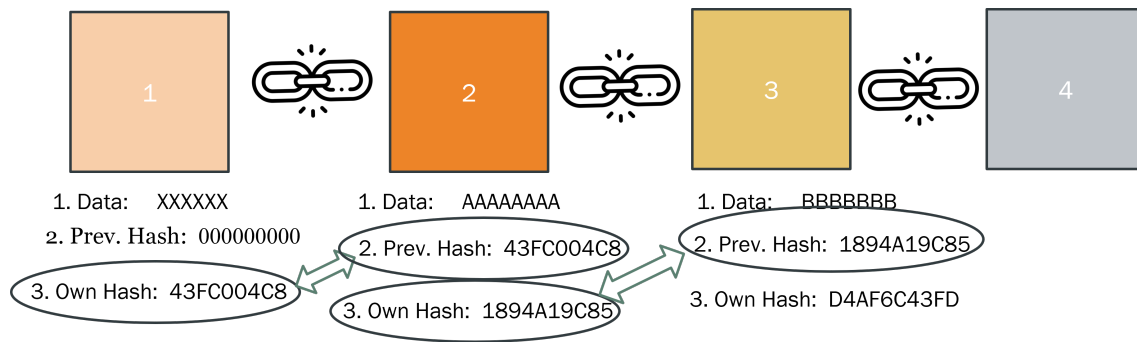


Figure 3.3: Blockchain

3.2 Ethereum

Ethereum [1] is an open-source blockchain platform that offers the possibility of building online decentralized applications which work on its own blockchain system. At a basic level, Ethereum is a programmable blockchain that works using Eth as the base cryptocurrency for using the system (every piece of information that is saved or processed on the blockchain has a cost, paid by the user in Eth).

Apart from Bitcoin which is specialized in monetary transactions, Ethereum does not offer its users a standard set of actions but an entire ecosystem which allows them to create their own functionalities through decentralized applications known as DApps or at a technical level, smart contracts [4]. In this way, Ethereum stands for a platform that will serve as the base for many blockchain applications, including but not limited to cryptocurrencies. The way one can write Dapps is by using the Ethereum's own programming language known as Solidity.

This is a highlevel programming language, Turing complete. Similar to JavaScript, it supports inheritance and polymorphism, external libraries and many variable types (including user defined ones) but apart from it is a statically typed programming language, meaning the variables' types have to be known at compile time.

3.3 Smart Contracts

Smart contracts are simply programs stored on a blockchain that run when predetermined conditions are met. They typically are used to automate the execution of an agreement so that all participants can be immediately certain of the outcome, without any intermediary's involvement or time loss. They can also automate a workflow, triggering the next action when conditions are met.

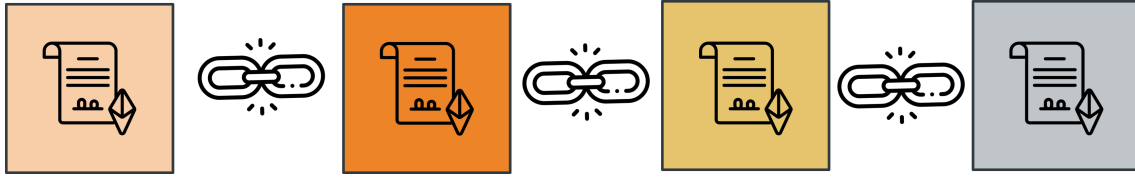


Figure 3.4: Smart Contracts

Smart contracts work by following simple “if/when... then...” statements that are written into code on a blockchain. A network of computers executes the actions when predetermined conditions have been met and verified. These actions could include releasing funds to the appropriate parties, registering a vehicle, sending notifications, or issuing a ticket. The blockchain is then updated when the transaction is completed. That means the transaction cannot be changed, and only parties who have been granted permission can see the results.

Once a condition is met, the contract is executed immediately. Because smart contracts are digital and automated, there’s no paperwork to process and no time spent reconciling errors that often result from manually filling in documents.

Because there’s no third party involved, and because encrypted records of transactions are shared across participants, there’s no need to question whether information has been altered for personal benefit.

Blockchain transaction records are encrypted, which makes them very hard to hack. Moreover, because each record is connected to the previous and subsequent records on a distributed ledger, hackers would have to alter the entire chain to change a single record.

Smart contracts remove the need for intermediaries to handle transactions and, by extension, their associated time delays and fees.

Chapter 4

Why This Approach?

All the systematic and present solution can be enough but cannot provide like blockchain. Also, the present methods are giving easy access for being fraud or corrupted. Blockchain can prevent this.

Blockchain for business uses a shared and immutable ledger that can only be accessed by members with permission. Network members control what information each organization or member may see, and what actions each can take. Blockchain is sometimes called a “trustless” network — not because business partners don’t trust each other, but because they don’t have to. For this, taxpayers do not need to worry about paying extra money, being harrassed for paying tax, they can be sure that their hard earned money for which they are giving tax for is reaching it’s destination always.

Data is sensitive and crucial, and blockchain can significantly change how taxpayers critical information is viewed. By creating a record that can’t be altered and is encrypted end-to-end, blockchain helps prevent fraud and unauthorized activity. Privacy issues can also be addressed on blockchain by anonymizing personal data and using permissions to prevent access. Information is stored across a network of computers rather than a single server, making it difficult for hackers to view data. Data tempering is not at all effective in blockchain because of avalanche effect in it’s blocks (changing one single piece of data changes the entire reason for this block to be existed).

Because blockchain uses a distributed ledger, transactions and data are recorded identically in multiple locations. All network participants with permissioned access see the same information at the same time, providing full transparency. All transactions are immutability recorded, and are time- and date-stamped. This enables members to view the entire history of a transaction and virtually eliminates any opportunity for fraud.

Traditional paper-heavy processes are time-consuming, prone to hu-

man error and corruption, and often requires third-party mediation. By streamlining these processes with blockchain, transactions can be completed faster and more efficiently. Documentation can be stored on the blockchain along with transaction details, eliminating the need to exchange paper.

Chapter 5

Timeline

We have divided our thesis work in a few segments. Figure 5.1 portrays a preliminary timeline of the thesis work.

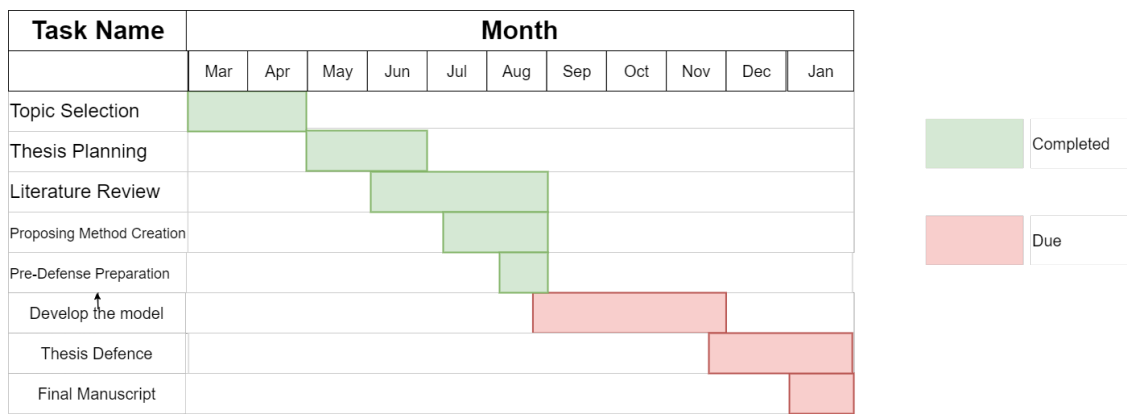


Figure 5.1: Timeline

Chapter 6

Conclusion

Blockchain is certainly interesting and has the potentiality of removing tax frauds that is happening constantly benefiting the evil of tax administrator. The idea of sharing economy gives rise to unique ideas and develops innovative businesses. Blockchain is said to be the next big thing in today's world. It is more than a cryptocurrency now a days. Blockchain protocol like Ethereum is now offering block chain as a platform to attract more developers to build decentralized app on their blockchain. So we are proposing a model where government can take their service fees and tax by using blockchain technology. This types of innovation will encourage people to build more decentralized app on blockchain and it will also be able to prevent corruption. This technology will also be able to reduce the transaction fees than the user bears and it will also be able to reduce processing time.

References

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