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The Development of Accounting Verification Process Affecting Digital Currency Transactions Using Blockchain Technology For Small and Medium Business in Thailand

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Abstract: *This research aims to develop the model of accounting verification process affecting digital currency transactions for small and medium business in Thailand, using blockchain technology as a case. The decentralized ledger underlying blockchain has created its potential for building trust and transparency in financial transactions, as well as, Thai SMEs' cooperative structures and ecosystems. Our model is based on the concept of consensus protocol and cryptocurrencies is the keys that affect digital currency transactions. We implement MyEtherWallet, which is a distributed ledger platform, leveraging private asymmetric key by SHA256 and various functions allowing data flow between multiple parties can be tracked and managed in real time. The findings revealed that the consensus protocol with Proof of work in the model can provide effectiveresults. It canrecord, verify, and traceall ofthe transactions correctly, as well as establish trust relationships to support sustainable cooperation for Thai SMEsastheaccounting best practices.*

Keywords: *Accounting, Blockchain, Thailand, Transactions, Verification.*

INTRODUCTION

Small and medium enterprises (SMEs) play important roles in Thai economic growth and sustainable development. Recently,Thai government has improved operational efficiency in SMEs development as sources of innovation and business evolutionsector that can solve high unemployment problems facing in the country. Nowadays, there are approximately 40,000 entities in Thailand, and there are approximately about170 SMEs in the financial sectors dominated all service in the economy including banking (The Bank of Thailand, 2019).

Related to operational efficiency in SMEs development, the accounting systems provide and support a source of information to owners and managers of SMEs operating in any industry for use in the measurement of financial performance. It is importance to any business regardless entity, big or small that the accounting practices of SMEs need to improve the accounting and relevant financial information by the concepts and principles adopted digital financial technology to ensure reliability in business and financial performance as measured. All the relevant accounting information are related by profitability, appropriate for a successful management of any business entity, whether large or small entrepreneurs (Fei and Minqian, 2019).

In cutting edge technology, blockchain has provided the state-of-the-art solutions in a democratic virtual economic system that can verify payments, reach consensus, and store encrypted data in virtual eco-

nomic systems which meets the requirements of speculators, profit-driven entrepreneurs, market-fundamentalist libertarians and technology fetishists (Yelowitz and Wilson 2015). Blockchain is defined as a distributed ledger technology that can implement financial models (Fei and Minqian, 2019). The cryptocurrency is based on collaborative open source principles and peer-to-peer networks that suggest a commitment to social solidarity and mutual aid.

The blockchain is a composite technology for trusted data flows in an untrusted environment. In blockchain network tier, verification nodes legalize transactions on the longest hash chain. Each block contains multiple legal transactions. Taking transactions and clearing business in the financial industry as an example, the central database cannot solve the multi-party trust problem. Every participant has to maintain a database for carrying their own business data that potentially increases the cost of labor. The blockchain is a good solution for data transmission management in distributed networks. However, all transaction verification nodes need to ensure the comprehensive backup of transaction history. Therefore, this matter is in concerned and inspected by untrusted parties (Fei and Minqian, 2019).

This researchaimstodevelop the accounting verification process affecting digital currency transactions recorded being kept and maintained by Thai SMEs' entrepreneurs, their reliable and the confident of accounting information and privacy control to protect and process accounting information that can be measured by using blockchain technology for small and medium business in Thailand. In this paper, we organized as follows: Section 1, introduction. Section 2, literature review. Section 3, the proposed model. Section 4, the findings and give recommendations for future development in the conclusion.

Literature Reviews

A blockchain is a shared, distributed ledger, that is, a log of transactions that provide for persistence and verifiability of transactions (Hari and Lakshman, 2016). A transaction is a cryptographically signed instruction constructed by a user of the blockchain (Muzammal et al., 2019). For example, the transfer of cryptocurrency from one account to another. Transactions are grouped into blocks, linked and secured using cryptographic hashes. A consensus protocol enables the nodes of the blockchain network to create trust in the state of the log and makes blockchains inherently resistant to tampering (Daniel and Guida, 2019; Florian and Luca, 2019). Therefore, blockchain technology is able toeliminate the need for a middleman from the management of transactions, such as a bank in the transfer of money (Florian and Luca, 2019).

A blockchain is as a distributed database that built up by a network of participating parties who run the same subjects, the constraints and rules set by the underlying blocks of data gradually being "chained" together. Unlike a centralized database held by a single entity, it creates an indelible record, resistant to tampering by any individual party. Furthermore, if any code of the underlying chains are tweaked by participants, the nature of the resultant blockchain changes, opening the possibility of creating blockchain databases storing all manner of diverse data, including, property titles, contracts, shares, voting decisions, or even reputation scores (Hasanova et al., 2019). Blockchain systems are most useful in recording simpler data. Besides the type of cryptocurrency adopted as incentive mechanism, these platforms distinguish themselves by few key properties. The access policy tells who can participate in the blockchain network. Public blockchains allow anyone to join and to access the information stored in the blockchain via the Internet; private blockchains are restricted to private networks and selected nodes only (Waltl, 2019; Florian and Luca, 2019).

In theory, neither party can completely control the process of the parent chain. Miners can only update status or verify the legality of the data on chains in strict accordance with rules. Unlike the concurrency control in trusted distributed database block-chain1.0 consider the existence of Byzantine nodes in the network may perform malicious behavior. Replicable state machine model between node A and B in block-chain1.0 is generated with a full backup. Transaction verification nodes called miners always pursuit the Unspent Transaction Output (UTXO) via massive calculation. The miners are willing to spend electricity cost to pay for the record right of the next block. Competition for rights ensures blockchain1.0 are naturally able to resist double spend attack via the vulnerable (Fei and Minqian, 2019).

In 2013, Ethereum application platform was developed to the built-in ether coin which implements cryptocurrency (Fei and Minqian, 2019). This system also provides a Turing complete engine which is used on behalf of blockchain 2.0 (Lin, F. and Qiang, M., 2019). Later in 2015, the Linux Foundation launched an open source blockchain project Hyperledger to develop the cross-industry commercial blockchain platform (Ma, C. et al., 2019). Despite this, the question of whether Ethereum can be harnessed to empower marginalized communities and build new means of solidarity-based finance remains unanswered.

Particularly, the regulation that must be rigorously considered in blockchain ledger applications in banks is that of the provisioning accounting standard currently referred to as IFRS 9 Financial Instruments document, published in July 2014 by the International Accounting Standards Board (IASB) based ledger for banking that it is recording and processing of losses in the ledger are compliant with the IFRS 9 standard classifications. These classifications determine how financial assets and financial liabilities are accounted for in financial statements and significantly how they are measured on an in-progress basis. Such building-block contracts could be woven together to form the basis for more complex multi-stage or multi-function entities, referred to by some as decentralized autonomous organizations (DAOs) (Pangburn 2015). DAOs are primarily advanced multi-stage algorithms held in the validation policy that informs who among the nodes can participate in consensus creation and deploy smart contracts.

The consensus protocol specifies how trust is created among participants: Proof of work (PoW) requires nodes, so-called miners, to invest significant hashing power to create trust. Proof of stake (PoS) requires nodes to prove ownership of sufficient cryptocurrency to establish trust (Florian and Luca, 2019).Other notable consensus protocols are proof of elapsed time (PoE), proof of importance (PoI), proof of state (Universa Blockchain Protocol), Raft-based consensus (Quorum), and stream processing ordering services that all use replication to establish trust in the state of the network, even if faced with failing network nodes. (Daniel and Guida, 2019; Florian and Luca, 2019).

However, some blockchain architectures in which unchangeability would not enable the reversal of misclassifications (Lin, F. and Qiang, M., 2019). Under the IFRS 9 framework, there is a logical classification structure for all financial assets which is driven by cash flow characteristics and therefore the business model in which an asset is a settlement. Under IFRS 9, it standardizes the management and reporting of such items in banking ledgers in a simplified fashion compared to those of the previous rule-based requirements that are complex and difficult to apply, and more importantly, complicated to automate into smart contract transformations on a blockchain banking ledger (Rosati, P. and Čuk, T., 2019).

In this paper, we study some key issues that affect digital currency transactions in SMEs by developing verifies accounting processes using blockchain technology as a tool to build new processes of property rights in Thailand—based on explicitly cooperative and social trust principles. Cryptocurrencies are subject to the concept of a decentralized public ledger, collectively maintained by a network of participants. The use of a blockchain ledger to record log transactions (Allen, L. et al., 2019; Rosati and Čuk, 2019) In fact, it can expand the vision of trust-enabling decentralized co-operatives, or distributed collaborative organizations among Thai nation.

THE PROPOSED MODEL

We design and build our model using cryptocurrency with blockchain 2.0 technology providing customized features such as deposit, withdrawal, financial contracts, and gas limits via .NET programming language that can be created for any transaction type or application. The research population comprises of 100 SMEs involve with digital currency exchanges and various services in Thailand. Our model consists of followings (as shown in figure 1).

Data model

The integrity, sequence, and validity of block are checked by block header which includes the version number, previous hash, timestamp, target difficulty, random nonce. All nodes run the blockchain application can generate a pseudo random private key by SHA256 (Fei and Minqian, 2019) to encrypt payments.

Network Tier

The consortium blockchain improves the speed of the verification and authentication by adjusting the decentralization or vertical scalability. The architecture pays more attention to risk management for upgrading traditional enterprise application. In the public blockchain scenario (Fei and Minqian, 2019), the network environment is fair although the types of nodes are different. It is unsecured for nodes that exposed network brings a multitude of security issues, including attack, statistics, and analysis.

The Consensus Algorithm

The blockchain operation into two parts: leader election and transaction serialization. The algorithm PoW (Fei and Minqian, 2019) is reused, but PoW is only used to select the leaders. The leaders can write a block containing the public key and multiple micro-blocks that they can prevent forking. These blocks are generated and broadcasted after an intensely short interval. The public key of the miner is merely included in the key block. All subsequent micro blocks are signed with the corresponding private key to prevent faking a micro block. The incentive mechanism is a hard-coded split incentive, which may have an allocation vulnerability.

The Contract Engine (Fei and Minqian, 2018)

We employ MyEtherWallet (Mara-nhão et al., 2019) that has customized the underlying Ethereum virtual machine. We implement customized contract engines that extend the functions of blockchain 2.0 or enrich user interfaces.

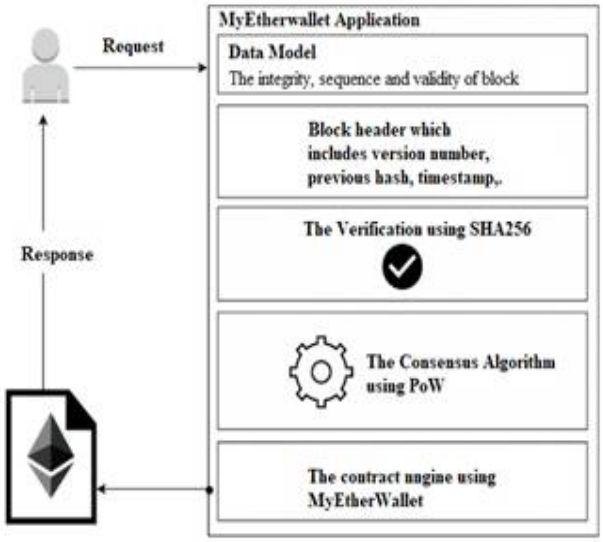

Fig 1: The proposed model using with blockchain 2.0 technology

THE FINDINGS

In the experiment, our model is based on the concept of consensus protocol and cryptocurrencies isthe keysthat affect digital currency transactions.We implement MyEtherWallet, which is a distributed ledger platform, leveraging private asymmetric key by SHA256 and various functions allowing data flow between multiple parties can be tracked and managed in real time. It is one of distributed ledger platform which provide the state of financial transactions' scenarios.

In the scenario, it is a transaction (as shown in Figure 2) requested to transfer money $X from A to B, and the state transition function reduces the value in A's account by $X and increases the value in B's account by $X. If A's account has less than $X in the first place, the state transition function returns an error. Hence, one can formally define:

Examples : APPLY({ Somsri: $50, Somchai: $50 },"send $20 from Somsri to Somchai") = { Somsri: $30, Somchai: $70 }

But:

APPLY({ Somsri: $50, Somchai: $50 },"send $70 from Somsri to Somchai") = ERROR

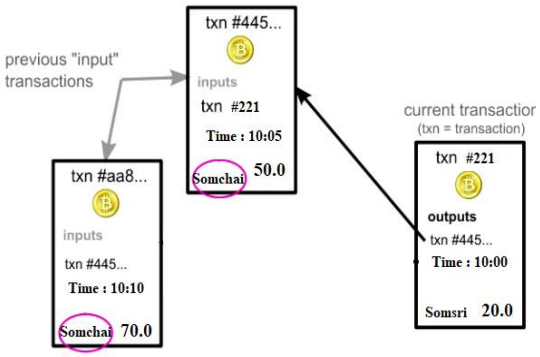

Fig 2: The verification procedures based on the cryptographic blockchain 2.0

In Findings, we found that the consensus protocol in blockchain 2.0 affects accounting transaction. The methods of consensus algorithm using Proof of work can provide formal verification based on asymmetric mathematical verification logic calculus, cryptography, security encryption. The advantages of PoW can make the verification procedures based on the cryptographic blockchain 2.0are not only to stop abusive people who control central institutions, but also to resolve the problem of how to establish trust relationships amongSMEs' financial transactions. Therefore, the security and reliability of the decentralize database can solve the multi-party trust problem in accounting verification process.

CONCLUSION

This research objective is to develop the accounting verification process affecting digital currency transactions, included, SMEs' cooperative financial structures and ecosystems in Thailand as a case. The findings revealed that the consensus protocol using Proof of work in the model can provide effective results. It is not only to record, monitor, and trace all of the transactions correctly, but also to establish trust relationships to support sustainable cooperation and best practices for Thai SMEs. However, the decentralized ledger technology is still new in Thailand.It is the Fintech outlook of disruptive technology, especially among Thai SMEs and start-up entities that consider how blockchain technology could be benefits. Therefore, it is recommended that the national regulators must develop specific accounting guidelines to support sustainable cooperation and best practices for Thai SMEs. Finally, this research is ongoing development based ecosystems such as crypto-equity systems. In the future,we will create online financial applications to establish across SMEs and other financial entities via a crypto integration platform.

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