The State of the Art of Top 20 Cryptocurrencies

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Abstract
This article focused on the investigation of the big picture of top 20 cryptocurrencies for preparing readiness of Thais and inventing the first cryptocurrency for Thais. Documentary research and descriptive statistics like mean and standard deviation were used in this study. The findings stated that cryptocurrecies were mostly developed their products in the stage of fully working product with their own blockchain (native blockchain). C++ was mostly used as key languages. Decentralized Application (DAPPS), online payment without third party, and Smart Contract were key usages with proof-in-a-consensus, mostly done by Proof-of-Work (PoW), Proof-of-Stake (PoS) and the hybrid of PoW and PoS, Proof-of Activity (PoA). Finally, the average of block time was 3.25 minutes whereas 70,608.8 transactions per second was in average.
Keywords: Cryptocurrency, State of the Art, Blockchain

Introduction
According to my last paper on February 2018 about the state of the art and trend of cashless society in Thailand, Thai government does not have long-term strategies for cryptocurrencies in the draft of Thailand-20-year-national-strategy (2017-2036) whereas Bank of Thailand has only short-term strategy since 2013 by strictly freezing all banks and financial institutions of Thailand from investing in cryptocurrencies (Gohwong, 2017b). However, Bank of Thailand has now a good start for long-term solution by inventing TokenBaht-the first cryptocurrency by Thai government for using among BOT and5 banks (Bitcoin Addict Thailand, 2018a). In addition, Electronic Transactions Development Agency (ETDA), as a public organization under Ministry of Digital Economy and Society, collaborate with Omise, an Ethereum Blockchain Startup, and Thai Government for developing the Know Your Customer (KYC) solution (Bitcoin Addict Thailand, 2018b). The reason is very simple that the application of cryptocurrencies with blockchain 3.0 is inevitable due to the emerging of advanced technologies like The STACK, IoT, blockchain 3.0, mobile digital platform, grid computing, cloud computing, autonomic computing, the developing 5G. It stands for that we all totally are in the invisible jail with lots of traceable mechanism of our transactions. (Gohwong, 2017a, 2017b) This paper, therefore, will investigate the similarity of top 20 cryptocurrencies as a basic data for preparing readiness of Thais and inventing the coming first cryptocurrency for Thais.

Scope and Limitation of the Study
Due to time limitation, this paper will investigate only top 20 cryptocurrencies on March 2018.

Methodology
Documentary research and descriptive statistics like frequency, percentage, mean and standard deviation were employed in this study for discussing the big picture of the top 20 digital money as follows-Bitcoin (BTC, XBT, □), Ethereum (ETH), Ripple (XRP), Bitcoin Cash (BCH), Litecoin (LTC, Ł), EOS / EOS.IO (EOS), Cardano (ADA, ₳) Stellar (XLM),

NEO (NEO), IOTA (IOT, MIOTA), Dash / Darkcoin / Xcoin (DASH), Monero (XMR, ɱ), TRON (TRX), NEM (XEM), Tether / Realcoin (USDT), Ethereum Classic (ETC), VeChain / VeChain Thor-in future) (VEN / VET-in future), Qtum (QTUM), ICON / Loopchain (ICX) and Binance Coin (BNB) (CoinMarketCap, 2018).

Cryptocurrency and Blockchain

Cryptocurrency is a kind of digital money according to my classification on February 2018. Its basic intention is to invent borderless money of people, by people, and for people by employing blockchain as one and only heart for inventing good governance of financial sector. The financial data of all users will be disseminated to everyone in the circle among themselves. Transparency and accountability are inevitably two outstanding consequences of this kind of decentralized system like blockchain because the trust of services is based on consensus mechanism or proofs as follows-proof-in-a-service (such as supply chains, asset registration), proof-as-a-service (such as proof of asset, proof of indentity, proof of ownership), and proof-in-a-consensus (such as Proof-of-work (PoW), Proof-of-Stack (PoS). In addition, forking or ramification will be employed by a group of users for serious bad governance and insecurity of the blockchain. One reason of blockchain usage has come from distrust of people towards fiat currency, an invented money by government, and financial management of both public and private institutions, especially the Hamburger Crisis in 2008. (Franco, 2015; Tapscott, 2015; Tapscott & Tapscott, 2016; Parker, Van Alstyne, & Choudary, 2016; Vigna, & Casey, 2016; Gohwong, 2017b). Now there are 1,589 cryptocurrencies in the world for serving demand and supply of people according to the data of CoinMarketCap on 27 March 2018 (CoinMarketCap, 2018).

The Findings of Top 20 Cryptocurrencies

The findings can be shown from Table 1-5 (Vigna & Casey, 2016; BitScreener, 2018; CoinCheckup, 2018; CoinGecko, 2018; CoinMarketCap, 2018; CryptoCompare, 2018; CryptoSlate, 2018; GitHub, 2018; WorldCoinIndex, 2018).

Table 1 Name, Symbol and Development Status

No	Name	Symbol	Development Status
1	Bitcoin	BTC, XBT, □	Fully working product
2	Ethereum	ETH	Fully working product
3	Ripple	XRP	Fully working product
4	Bitcoin Cash	BCH	Fully working product
5	Litecoin	LTC, Ł	Fully working product
6	EOS (EOS.IO)	EOS	Alpha version
7	Cardano	ADA, ₳	Fully working product
8	Stellar	XLM	Fully working product
9	NEO	NEO	Fully working product
10	IOTA	IOT, MIOTA	Fully working product
11	Monero	XMR, ɱ	Fully working product
12	Dash (Darkcoin/ Xcoin)	DASH	Fully working product
13	TRON	TRX	Beta version; Currently on testnet
14	Tether (Realcoin)	USDT	Fully working product
15	NEM	XEM	Fully working product
16	Ethereum Classic	ETC	Fully working product

Table 1 (Con.)

No	Name	Symbol	Development Status
17	VeChain (VeChain Thor, In the future)	VEN (VET, in the future)	Fully working product
18	Qtum	QTUM	Fully working product
19	Binance Coin	BNB	Beta version
20	ICON (Loopchain)	ICX	Fully working product

Table 2 Type of Coin, Title and Type of Blockchain

No	Name	Type of Coin	Title of Blockchain	Type of Blockchain	Block time (min)
1	Bitcoin	Bitcoin / Coin	Blockchain	Original blockchain	10
2	Ethereum	Altcoins	Hard-fork-based Ethereum 2016; initial year 2015	Native blockchain	.25
3	Ripple	Altcoins	Ripple Transaction Protocol (RTXP)	Native blockchain	.06
4	Bitcoin Cash	Altcoins	Blockchain; hard fork from Bitcoin on August 1, 2017	Bitcoin-derived blockchain	10
5	Litecoin	Altcoins	Blockchain; hard fork from Bitcoin on November 7, 2011	Bitcoin-derived blockchain	2.5
6	EOS (EOS.IO)	Altcoins	Ethereum	Native blockchain	.05
7	Cardano	Altcoins	ADA Blockchain / Cardano Blockchain	Native blockchain	.33
8	Stellar	Altcoins	Stellar's Blockchain	Native blockchain	.08
9	NEO	Altcoins	NEO Blockchain	Native blockchain	.25
10	IOTA	Altcoins	Iota’s blockchain	Native blockchain	3
11	Monero	Altcoins	CryptoNight proof-of-work hash algorithm, from the CryptoNote protocol	Native blockchain	2
12	Dash (Darkcoin/ Xcoin)	Altcoins	Blockchain; hard fork from Bitcoin on January 18, 2014	Bitcoin-derived blockchain	2.5
13	TRON	Altcoins	TRON blockchain	Native blockchain	1.5
14	Tether (Realcoin)	Altcoins	Bitcoin blockchain through the Omni Layer Protocol	Bitcoin-derived blockchain	2
15	NEM	Altcoins	Mijin (commercial blockchain of NEM)	Native blockchain	1
16	Ethereum Classic	Altcoins	Ethereum	Native blockchain	.25
17	VeChain (VeChain Thor, in future)	Altcoins	VET, based on Ethereum	Native blockchain	N/A

Table 2 (Con.)

No	Name	Type of Coin	Title of Blockchain	Type of Blockchain	Block time (min)
18	Qtum	Altcoins	Qtum's hybrid blockchain-the combination of the transaction model of Bitcoin with the developed consensus system of Ethereum	Hybrid blockchain	2.13
19	Binance Coin	Altcoins	Hybrid Blockchain built on Bitcoin, Ethereum, Litecoin	Hybrid blockchain	N/A
20	ICON (Loopchain)	Altcoins	Hybrid Blockchains of Ethereum and EOS	Hybrid blockchain	N/A

Table 3 Programming and Products

No	Name	Programming	Products
1	Bitcoin	C++, Python, Java	Peer-to-peer version online payments + wallets without any financial institution + few Smart Contract + DAPPS
2	Ethereum	C++, Go, Python, Java, Rust; Solidity	Smart Contract + DAPPS
3	Ripple	C++, C, Java, JavaScript, GO, Shell, HTML	online payments + exchange networks for large financial institutions + DAPPS
4	Bitcoin Cash	C++	Peer-to-peer version online payments+ wallets without any financial institution + DAPPS
5	Litecoin	C++, Python, Java, JavaScript, HTML	Peer-to-peer version online payments+ wallets without any financial institution + DAPPS
6	EOS (EOS.IO)	C++, C, Rust, WebAssembly,	Smart Contract + DAPPS
7	Cardano	Haskell, Nix, PureScript, HTML, TeX, Shell	Smart Contracts, decentralized applications, side chains, multi-party computation, and metadata + DAPPS
8	Stellar	C++, Go, JavaScript, Java, Python, Ruby, Shell	online payments + exchange networks for large financial institutions and non-profit organization + DAPPS
9	NEO	C++, JavaScript	Digital Assets + Digital Identity + Smart Contract + DAPPS
10	IOTA	C++, C, C#, Python, Java, JavaScript, Rust, GO, Shell	Internet of things (IoT) -- IOTA enables secure sale and sharing of data streams.; M2M (Machine-to-Machine Payment) + DAPPS
11	Monero	C++	Peer-to-peer version online payments + wallets, done by a third party like Monerujo with privacy. Untracable transfer by using ring signatures and stealth addresses. Some use it for money laundering.

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12	Dash (Darkcoin/ Xcoin)	C++	Decentralized autonomous organization (DAO) / decentralized autonomous corporation (DAC) with smart contracts for instant transactions (InstantSend) and private transactions (PrivateSend)
13	TRON	C++, Python, Scala, Java, GO	Peer-to-peer version online payments for TPS and entertainment such as gaming, betting + supports of various kinds of blockchain networks and smart contract systems- including Bitcoin, Ethereum, EOS, Qtum +dapp
14	Tether (Realcoin)	Ruby (now employed), PHP (planned)*, Python (planned)*	Peer-to-peer version online payments + wallets via the Bitcoin blockchain backed by actual fiat currency assets, including USD, Euros and, soon, Japanese Yen; Some use it for money laundering + DAPPS
15	NEM	C++, Java, HTML	Peer-to-peer version online payments + wallets without any financial institution + DAPPS

Table 3 (Con.)

No	Name	Programming	Products
16	Ethereum Classic	C++, Go, Rust, Scala	Smart Contract + DAPPS
17	VeChain (VeChain Thor, in future)	Ethereum Solidity / Solidity	Blockchain solutions with smart contract across various industries-Liquor, Luxury Goods, Auto, Retail, Agriculture, Cold-chain logistic, Logistics
18	Qtum	Solidity, C++, C, C#, Python, GO, PHP, and Java	Online payments with P2P Value Trabsfer Protocol (VTP) of Bitcoin and endless possibilities by smart contracts of Ethereum for mobile devices, IoT, supply chain management, telecommunications, social networking + DAPPS
19	Binance Coin	C++, JavaScript	Cryptocurrency exchange / digital currency exchanges (DCE) by supporting trading pairs in the following coins: BTC, ETH, LTC, NEO (ANS), and BNB (Binance Coin) + DAPPS
20	ICON (Loopchain)	SCORE (Smart Contract on Reliable Environment), Python, Java, Go	Online payment and Smart Contract of South Korean's blockchains in various communities such as banks, securities markets, universities and healthcare + DAPPS

Table 4 Consensus / Proof

No	Name	Consensus / Proof
1	Bitcoin	Proof-of-Activity (PoA) / PoW + PoS
2	Ethereum	Proof-of-Activity (PoA); full Proof-of-Stake in the future
3	Ripple	The Ripple Protocol consensus algorithm (RPCA) / Proof-of-Stake (PoS)
4	Bitcoin Cash	Proof-of-Work (PoW)
5	Litecoin	Proof-of-Work (PoW)
6	EOS (EOS.IO)	Delegated Proof-of-Stake (DPOS)
7	Cardano	Proof-of-Stake (PoS)
8	Stellar	Stellar Consensus Protocol (SCP)
9	NEO	Byzantine Fault Tolerance (dBFT); Proof-of-Stake (PoS)
10	IOTA	The Coordinator / milestone + MCMC; Proof-of-Work (PoW)
11	Monero	Proof-of-Work (PoW)
12	Dash (Darkcoin/ Xcoin)	Proof-of-Activity (PoA)
13	TRON	Delegated Proof-of-Stake (DPOS)
14	Tether (Realcoin)	Proof of Solvency / Proof of Reserves / POS
15	NEM	Proof-of-Importance (POI) algorithm-first to use the POI using EigenTrust++ reputation system
16	Ethereum Classic	Proof-of-Work / PoW
17	VeChain (VeChain Thor, in future)	Proof-of-Concept / Proof of Authority
18	Qtum	Proof-of-Stake (PoS) (Incentive Proof-of-Stake / IPoS-in the future)

Table 4 (Con.)

No	Name	Consensus / Proof
19	Binance Coin	Proof-of-Activity (PoA)
20	ICON (Loopchain)	Loop Fault Tolerance (LFT)-an improved algorithm from PBFT of BFT series; Delegated Proof-of-Stake (DPOS)

Table 5 Founder, Released Year, Responsible Organization, Country, Source Model

No	Name	Founder	Released Year	Responsible Organization	Country	Source Model
1	Bitcoin	Satoshi Nakamoto (pseudonymous)	2009	Bitcoin Foundation	Washington, DC; US	Open source
2	Ethereum	Vitalik Buterin	2016	Ethereum Foundation	Switzerland	Open source
3	Ripple	Arthur Britto, David Schwartz, Ryan Fugger	2012	Ripple	San Francisco, California, US	Open source
4	Bitcoin Cash	Calin Culianu	2017	ViaBTC (under Bitmain)	China	Open source
5	Litecoin	Charlie Lee	2011	Litecoin Core Development Team	Singapore	Open source
6	EOS (EOS.IO)	Dan Larimer	2017	block.one	Cayman Islands	Open source
7	Cardano	Charles Hoskinson & Jeremy Wood	2017	Input Output Hong Kong (IOHK)	HK, China	Open source
8	Stellar	Jed McCaleb and Joyce Kim	2014	Stellar Development Foundation	San Francisco, CA, US	Open source
9	NEO	Da Hongfei and Erik Zhang	2014	Onchain	Shang Hai, China	Open source
10	IOTA	David Sønstebø, Sergey Ivancheglo, Dominik Schiener and Dr. Serguei Popov	2015	IOTA foundation (on process)	Germany	Open source
11	Monero	Nicolas van Saberhagen, a pseudonym like Satoshi Nakamoto	2014	Monero Core Team	N/A	Open source
12	Dash (Darkcoin / Xcoin)	Evan Duffield and Kyle Hagan	2014	Dash Core Team	Scottsdale, Arizona, US	Open source
13	TRON	Justin Sun	2017	TRON Foundation	Singapore	Commercial

[8]

Table 5 (Con.)

No	Name	Founder	Released Year	Responsible Organization	Country	Source Model
14	Tether (Realcoin)	Jan Ludovicus van der Velde	2017	Tether	HK, China	Open source
15	NEM	Pseudonymous	2015	The NEM.io Foundation	Singapore	commercial blockchain, Mijin
16	Ethereum Classic	Arvicco (pseudonymous)	2015	Arvicco	Russia	Open source
17	VeChain (VeChain Thor, in future)	Lu Yang (Sunny Lu)	2015	The VeChain foundation	Singapore	Open source
18	Qtum	Patrick Dai (developer of the Chinese origin),Neil Mahi, and Jordan Earls	2017	Qtum Foundation Company	Singapore	Open source
19	Binance Coin	Changpeng Zhao, Roger Wang, James Hofbauer, Allan Yan, Sunny Li	2017	Binance	Malta	Commercial
20	ICON (Loopchain)	N/A	2017	ICON Foundation	South Korea	Open source

According to the above findings, almost of cryptocurrecies developed their products in the stage of fully working product (17 currencies, 85%). More than half of them created their own blockchain (native blockchain) with 12 currencies (60%), followed by bitcoin-derived blockchain (4 currencies, 20%) and hybrid blockchain (3 currencies, 15%). For programming, C++ was highest with 16 currencies (19.3%), followed by Java (10 currencies, 12%), Go (8 currencies, 9.6%), and Python (8 currencies, 9.6%). The highest application of their products were the application of blockchain 3.0 to everything of human life (Decentralized Application, DAPPS) with 19 currencies (40.4%), followed by online payment without third party with 11 currencies (23.4%), and Smart Contract with 9 currencies (19.1%). For proof mechanism for consensus of users, most of them were proof-in-a-consensus. The Proof-of-Work (PoW) with 5 currencies (25%) was the highest, followed by Proof-of-Stake (PoS) and Proof-of-Activity (PoA-the hybrid between Proof-of-Work and Proof-of-Stake)-both with 4 currencies (20%), and Delegated Proof-of-Stake (DPOS) with 3 currencies (15%). The rest were one currencies (5%) per one consensus method as follows: Proof of Solvency / Proof of Reserves / POS, Proof-of-Importance (POI), Stellar Consensus Protocol (SCP), and Proof-of-Concept / Proof of Authority. In addition, the average of block time was 3.25 minutes (S.D. = 3.77) whereas transactions per second was 70,608.8 transactions in average (S.D = 312914.14). Finally, half of these currencies were developed in Asia.

Discussion

This part would firstly be dedicated for lessons from top 20 cryptocurrencies. After that the coming people-oriented cryptocurrency of Thailand is then discussed. First, blockchain is a must for every curriculum in all levels of all institutions in Thailand because blockchain is not only currency anymore, but it is also autonomic services with smart contract for all sectors of our country. In fact, blockchain and cryptocurrencies are borderless. In the era of hyper-competition among nations like digital economy and Thailand 4.0, illiteracy is not only common language like Thai, Chinese, Russian, Italian, Korean, and English but also coding. Anyone who cannot write at least a program is an illiterate person. With illiteracy, we cannot compete with others, especially in Asia because half of the top ones were invented in Asia. Hence, C++, Java, GO, and Python must be taught by teachers and lectures. In addition, coding books should be done with simplified explanation for every age since primary school as I have seen from South Korea last month.

Figure 1 Coding book for kids at South Korea

Last, the development of the Thais-oriented cryptocurrency should invent on our own blockchain (native blockchain) due to the Bitcoin's limitation such as block time. There are lots of C++ books in Thai. However, almost of them are written in user-unfriendly style, not suitable for kids and general people. In addition, the consensus method shoud be Proof-of-Stake (PoS) because the trend of Proof method is Proof-of-Stake (PoS) and its extension like Delegated Proof-of-Stake (DPOS). They both was seven currencies (35%) while Proof-of-Work (PoW) with five currencies (25%) has been continuously decreased due to its high cost from massive power consumption and expensive hardware for mining. Furthermore, the block time should be 3.25 minutes in average and 70,608.8 transactions should be done per second.

Conclusion

Market and competition are not our parents. They, therefore, cannot wait for the readiness of Thais and Thailand for the blockchain revolution. Coding is the best solution for preparing all Thais and reinventing Thailand to achieve Thailand 4.0 under digital economy.

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