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DESIGNING A NEW CRYPTOCURRENCY WITH HARD FORK AND STABLECOIN APPROACH AS A DISRUPTIVE INNOVATION IN PAYMENT SYSTEM OF INTERNATIONAL TRADE

MARDI TANDRA[1], JAROT S. SUROSO[2]

[1,2]Bina Nusantara University, Information System Management Department, BINUS Graduate Program, Master of Information Systems Management, Jakarta, Indonesia

E-mail: [1]mardi.tandra@binus.ac.id, [2]jsembodo@binus.edu

ABSTRACT

For many years, banks and central authorities had always monitored the activities of international trade by enforcing a series of strict regulations. Payment is made secure but difficult and slow at the same time. Faster option is only available for high fees. This research is intended to discuss blockchain and cryptocurrency as a possible alternative to replace the intermediated system of banks within international trade. Two methods would be used, namely hard fork and stablecoin to create a cryptocurrency as the foundation of payment system design for international trade that can complement or replace banks as financial intermediaries in international trade. Hard fork splits an existing blockchain to create a cryptocurrency with one half of the blockchain whereas stablecoin is the state where a cryptocurrency is tied with a reserve asset in an attempt to stabilize its value. The results of this study produced a design for international trade payment system capable of operating without supervision of banks. The designed stablecoin serve as an exchange medium in a payment system revolving around blockchain network. Most processes of the international trade apart from compliance and payment remain the same after application of design.

Keywords: *Disruptive Technology, Blockchain, Decentralized Finance, Cryptocurrency, International Trade*

1. INTRODUCTION

The world is facing constant changes and rapid evolution. The trend of automation and data exchanges with smart system are very influential nowadays [1]. The fourth industrial revolution or more commonly referred to as Industrial Revolution 4.0 facilitates this change. The development for smart industries where utilization of equipment is supported by advanced technology has advanced the way business operates and all aspects of business are affected as a result. The phase of Industrial Revolution 4.0, as the name indicates, marks the fourth change to the global industry. The first revolution occurred with the deployment of steam engine, followed by the second revolution which occurred by emphasizing mass production to generate large quantities of high-quality products. Starting from the third revolution, mankind was introduced to digital technologies. Further advancement of the third revolution is what drove the fourth industrial revolution into existence [2].

Industrial Revolution 4.0 urged innovators to reduce the complexities in business operations even further. Thus, the term disruptive technology is popularized to realize this initiative. Disruptive technology serves as the force of change to boost the performance of firms and improve their capabilities to gain competitive advantages. Disruptive technology creates a room for disruptive innovation and in most cases, both terms are used synonymously. An example of disruptive technology is blockchain, commonly associated with the cryptocurrency Bitcoin back when the term was esoteric to many people. Blockchain, through cryptocurrency is potentially capable of disrupting the global banking industry and replace their business models into a disintermediated one. Payment settlement procedures rely on the currently implemented banking system, and international trade is among many businesses that are greatly depending on its existence. The discussion for the nature of disruption that blockchain and cryptocurrency have towards international trade

will be covered further on this chapter, but first, it is necessary to reach better understanding about how international trade works.

According to the statistics provided by Organization for Economic Co-operation and Development (OECD), the G20 or Group of Twenty, an annual intergovernmental forum with 19 participating countries and European Union (EU), the second quarter (Q2) of 2021 for G20 in international trade experienced slowdown as exports increased by only 4.1% while imports increased by only 6.4%, which is a major contrast to the rates posted in the first quarter (Q1) of 2021 (8.6% and 8.5% for exports and imports, respectively). The cause is the pressure put on the price of traded goods [3].

However, exports of primary commodities grew in Q2 2021, particularly due to scarcity of global supply like copper and strong demand from certain countries, such as China, Japan, and Korea. Exports in Australia also increased by 10% with the contributing factor being the rise of sales of goods like cereals, metals, and coal. The popularity of iron ores and soybeans from Brazil also contributed to the increase of exports by 29.4%, while Russia, having advantage of abundant amount of energy supply, surpassed both Australia and Brazil with increase rate of 30.7%. North America breaks the record with Canada reaching 4.7% of exports of their energy and forestry products, whereas purchase of metals and pharmaceutical products brought increase of imports by 3.6%. South America, represented by Mexico exports and imports increased by 3.3% and 5.1% respectively. Strong demand from Canada and Mexico for aircraft, pharmaceuticals and semiconductors of the United States supported the growth in exports for the democratic state by 6.8% while imports peaked at 4.2% from imports of mobile phones and several other vehicles.

Every nation that is part of European Union also grew. France recorded 1.3% and 2.9% for exports and imports respectively, followed by Germany at 1.3% and 6.3%, and Italy at 4.0% and 6.4%. The overall percentage for exports and imports of European Union are at 2.8% and 5.7%. United Kingdom, the former member of European Union bested the union with increase of exports by 12.3% and imports at 11.3%, a dramatic improvement compared to Q1. The major contributors for the European nations' growth are China and the United States, mainly to their interest of aircraft, agriculture products and pharmaceuticals from Europe.

Imports in East Asian counterparts of G20 are dominating, with lesser exports. Japan exports increased by 2.7% while Korea exports increased by 2.2%. Their imports, however, exceeded their exports rate, with Japan scored 7.4% and Korea recorded 11.8%. The only nation to showed decline in exports in Q2 is China, with their exports lowered by 2.5% while imports expanded to 10.9%.

International trade is ideal to compensate for what a country lacks that another country has, and vice versa. For example, according to The Observatory of Economic Complexity [4], Indonesia's top export is coal briquettes at the value of $20.3B and top destination for exports is China with total value of $28.6B while top imported commodity is refined petroleum at $12.3B and most overall imports came from China with the sum of $45B.

Banks are strongly attached to the payment processing in international trade with varying methods of payment to choose from. But, of course, different options of payment method yield fees for the commercial parties. Different charges may occur, like charges related to the creation of underlying documents, such as stamp duties and consular fees. Not to mention that charges will also occur not only to the seller's country, but also to the buyer's country, and they may vary, depending on the country. Fees may not seem like much of a trouble, but the reason this research brought this up is to compare it with a better method of payment for international trade that this research is going to propose in further chapter of this paper.

Verifications for the international trade payment methods require some time to complete and so, in 1973, to enforce faster payment processes, a new complimentary payment method was introduced in the form of SWIFT (Society for Worldwide Interbank Financial Telecommunication) under the leadership of then inaugural CEO of SWIFT, Carl Reuterskiöld and was supported by 239 banks in 15 countries as of 2013 [5]. Sending money abroad using SWIFT services requires the following information to be fulfilled:

1. Name of the receiver of the money
2. Address of the recipient
3. Receiving bank's name and address
4. SWIFT code or BIC (Bank Identifier Code)

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5. IBAN (International Bank Account Number)

The original payment methods for international trade came with many options, yet with its own complexities, tons of underlying documents, and fees generated. Blockchain technology with cryptocurrency as the payment medium, as a disruptive technological force is capable of reducing the complications within international trade current payment methods. Blockchains are a special version of distributed ledgers which got initially invented to materialize Bitcoin (BTC) back in 2008.

Despite the benefits that blockchain has to offer, experts have mutual agreement when it comes to the risk of cryptocurrency, the exchange medium commonly associated with blockchain's existence. The digital currencies are famous for being highly volatile in price compared to conventional currencies and investment instruments that are created before them [6]. Therefore, in terms of risk, the cryptocurrency is not beneficial to use as a complementary or replacement payment instrument in international trade. On top of that, blockchain's flexibility comes with a price. The development process requires effort and patience as the foundational mechanisms develop gradually in order to achieve the desired degree of control and decentralization across wide span of options and high-skilled individuals are required to program the smart contract [7], [8].

To tackle cryptocurrency creation related problems and make it usable for payment in international trade, two methods will be used in this research. One for designing the framework of cryptocurrency development with hard fork method [9] and the other one is stablecoin method, a collateralization method for keeping the price of cryptocurrency from escalating and reducing rapidly [10], [11]. Hard fork is best used for crypto developers that want to avoid the hassle of creating blockchain codes from scratch while stablecoin method can improve the usability of a cryptocurrency as international trade payment method by reducing their volatility. Stablecoin involves collateralization of a crypto asset with an outside asset. There are four known methods to create stablecoins, such as fiat tokens, on-chain, off-chain, and algorithmic stablecoins. The continuity of this research will explore which stablecoin type is the most suitable for collateralization.

The usability of blockchain is also necessary to be tested before putting it to use. There are two common methods to gauge the usability of blockchain along with cryptocurrency. The methods are Proof-of-Work (PoW) and Proof-of-Concept (PoC). PoW is an algorithm embedded in blockchain that protects many cryptocurrencies and is common within major cryptocurrencies like Bitcoin and Ethereum, Bitcoin Cash, and Litecoin which is useful to prevent double spending the cryptocurrencies in users' possession [12]. PoW In conventional payment system, intermediating entities like banks can solve this problem, but since banks do not have authorities in blockchain ecosystem, the role is ultimately replaced by PoW algorithm. Unlike PoW, PoC is a consensus algorithm for blockchain that acts as a process to proof how a blockchain can be applicable in an actual circumstance or how the concept of a blockchain can be realized [13]. The main reason to use PoC method includes:

1. Testing a blockchain project before commencing large scale production.
2. Identify possible flaws that can hinder the blockchain project from being useful.
3. Reduce costs and time needed to complete the blockchain project.

Based on hard fork and stablecoin principles, along with proper testing of Proof-of-Work and Proof-of-Concept, the research will design the framework for cryptocurrency and its collateralization to create a new payment instrument to use in international trade.

The research questions, based on the narration can be formulated as follows:

1. How blockchain hard fork can be used to create new blockchain as the initial step of designing a new cryptocurrency?
2. What type of stablecoin is the most suitable to stabilize the price of the cryptocurrency that will be designed, to make it appropriate for use as payment medium in international trade?
3. What differs the newly designed cryptocurrency from another existing cryptocurrency that makes it a possible alternative of transaction system for international trade?
4. How cryptocurrency as an exchange medium and blockchain as the technology that backs cryptocurrency can solve the issue of intermediation in international trade?

2. LITERATURE REVIEW

For the purpose of disambiguation and properly defining terms within context of the research, this chapter will provide related theories consisting of inclusive theories and exclusive theories and cover reviews of previous researches with relevant topics to provide bigger picture for readers.

2.1 Inclusive Theories

Inclusive theories are theories related to information system management academic discipline.

2.1.1 Disruptive technology

Disruptive technology is a modern technology that radically changes the way a system works, for the favor of organizations and firms to extend their capabilities in winning against competitors [14]. Key technologies in disruptive technologies are artificial intelligence (AI), Industrial Revolution 4.0, Internet of Things (IoT), Internet of Medical Things (IoMT), big data, virtual reality (VR), drone and autonomous robots, 5G, and blockchain [15]. This research will solely focus on discussing about blockchain and so, other key technologies are excluded from further discussion.

2.1.2 Industrial revolution 4.0

The fourth industrial revolution is the current phase of changes in global industry. The concept emphasizes on the usage of smart technologies where most works done by human in the past are replaced with machines for autonomous tasks. The goal of Industrial Revolution 4.0 is to replace every aspects of business with more effective approach to carry on with operations [16].

2.1.3 Blockchain

Reference [17] from Blockchain Research Lab stated, "The blockchain is a basic technology that allows values to be securely transferred directly between parties on the Internet. This can result in various advantages, such as higher efficiency by eliminating intermediaries, a higher level of transparency or the automation of processes by means of so-called smart contracts. The special combination of encryption, data verification and reconciliation mechanisms make it virtually impossible for transactions to be subsequently manipulated or deleted". Blockchain technology comes with several types, namely [18]:

1. Permissionless blockchain, where programmers are given freedom to be users or run a node, meaning anyone can participate in the consensus process to decide the validity of the state. Permissionless blockchain is commonly referred to as public blockchain. Concrete examples of permissionless blockchain are Bitcoin and Ethereum blockchains. This type of blockchain is strongly tied with cryptocurrency and its consensus protocols, like proof-of-work or proof-of-stake. Therefore, it is more suitable to use in the development of new cryptocurrency.
2. Permissioned blockchain, which has a system that is capable in distinguishing nodes that can control and update shared information. Permissioned blockchain is operated by known entities. Involved parties work together in arranging authorization for each respective individuals or groups to reach consensus. There are many platforms that can be used to create the permissioned blockchain, e.g.: Tendermint, Iroha–Sumeragi, MultiChain, and HydraChain.
3. Private blockchain, which in contrast to the previous two, only has one trust domain, meaning only one entity has authorization over the network. The most common example of private blockchain is Hyperledger Fabric by Hyperledger, specializing in both permissioned and private blockchains.

It is important to note that not every blockchain platform is designed to support the creation of cryptocurrency. Hyperledger Fabric, Quorum, R3 Corda and MultiChain are among these blockchain platforms [19].

2.1.4 Cryptocurrency

The motivation behind the birth of cryptocurrency or digital asset as known by many, takes its root from the conception proposed by Satoshi Nakamoto in the infamous 2008 white paper entitled "Bitcoin: A Peer-to-Peer Electronic Cash System". The white paper may seemed to be outdated but since this is the only conception available that led to the actual creation of the first cryptocurrency, it is still worth referring to. They proposed a system for electronic transactions which completely omits trust from its equation.

The very first cryptocurrency that came into existence is Bitcoin with ticker symbol of BTC [20]. Ticker symbol is similar in manner to stock symbol which is used as abbreviation for stocks in stock market. All cryptocurrencies (coins and tokens) have this ticker symbol.

If Bitcoin is the first coin, then Ether or ETH is the first token. Ether, the second-largest cryptocurrency by market capitalization, after BTC, which is the native crypto of Ethereum platform, a famous blockchain technology proposed in 2013 and founded in 2015 by Vitalik Buterin and his partners [21].

Another major cryptocurrency besides Bitcoin and Ether is XRP, the native token of Ripple platform which is a cutting-edge cryptocurrency with the ability to act as a cryptocurrency, yet at the same time is also a peer-to-peer decentralized digital payment system [22]. Ripple is an open-source platform capable of connecting bank ledgers to execute real-time payments everywhere in the world. This allows Ripple to execute more than 1,500 transactions every second. Ripple, being a blockchain based network is not dependent in a central party, resulting in lower transaction costs without neglecting the importance of security and privacy. Security and privacy are enforced by giving Ripple users a couple of signing/verification keys to do payments. Low cost, fast, and secure transactions with maintained privacy are the reason why many large banks and other enterprises use Ripple services as a whole or XRP token at the very least [23].

Bitcoin, Ether, and XRP have uniqueness that makes it easy to distinguish them from each other. The distinctive features of these cryptocurrencies are tied to the blockchain platform they originated from—Bitcoin from Bitcoin blockchain, Ether from Ethereum blockchain, and XRP from Ripple network respectively. The key differences of these cryptocurrencies lie on BTC and XRP having limited amount of supply at 21 billion BTC and 100 billion XRP respectively while ETH has unlimited supply with the condition that the supply is capped at 18 million ETH annually. XRP also excels from BTC and ETH in terms of average transaction time of 4 seconds, followed by ETH which can take 14 seconds to complete, and BTC being the slowest at 10 minutes. Judging by this small comparison, BTC can be considered as the most unsuitable cryptocurrency to use for replacement of fiat currency in modern day financial ecosystem, while XRP is the best candidate because of its success in executing the fastest transaction with least fees compared to BTC and ETH. Although ETH has unlimited supply, an advantage which XRP doesn't have, it was not invented to compete with BTC and other cryptocurrencies, but rather for its smart contract offerings to the public.

2.1.5 Smart contracts

Smart contracts are computer programs written in the Solidity programming language, which is a mix of C++ and JavaScript that are run through blockchain transactions that can maintain status, interact with cryptocurrency in a decentralized way, and take user input [24]. Simply put, smart contracts refer to computer protocols that enables processes of digital verification, control, and/or execution of an agreement through blockchain platform. Treat smart contracts as a mediator to execute transactions based on contracts. Smart contracts can be used for various purposes like government voting system, healthcare, supply chain, and financial services but most commonly associated with securing transactions involving cryptocurrency.

2.1.6 Hard fork

Hard fork is the state when the existing protocols within Bitcoin creates new rules that changes invalid blocks or transactions into valid blocks [25]. Upgrading to a new protocol will result in a permanent state of fork. Based on these characteristics, nowadays hard fork is often associated with radical changes in blockchain, and since the state of change is irreversible, the fork is intentionally used as a method to create a new blockchain for the development of cryptocurrency, which the framework design in this research will be based on [9]. The previous work of reference [9] is aimed to solve the dependency of the nation of Cameroon towards the fiat currency, Central African CFA franc by replacing it with cryptocurrency, but no actual implementation or suggestion is proposed for the monetary system of the nation. The limitation in this past research is what this paper will overcome by proposing a crypto-based framework of payment system that will be suited for the international trade.

2.1.7 Proof-of-Work (PoW)

Bitcoin (BTC) is known for its use of a certain protocol for transactions verification before grouping them into blocks within the Bitcoin blockchain and deciding on the next blocks to verify and group. The protocol is created by Satoshi Nakamoto along with the creation of Bitcoin and its blockchain and is widely known as Proof-of-Work (PoW) [26]. Hash function plays prominent role in deciding which blocks to verify and group first, since many parties can create blocks simultaneously. PoW requires mining equipment to function and provide good security. However, the protocol requires high energy consumption and tends to operate in centralize environment, meaning it is only applicable for select cryptocurrencies and can determine the path that a blockchain project wish to pursue.

2.1.8 Proof-of-Concept (PoC)

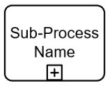
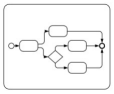
Proof-of-Concept (PoC) in recent uses depict the earlier phase of a research, particularly in the development of new applications or technologies, and serves as a tool for scientific

research to measure its extendibility and/or scalability [27]. A specific context is also predetermined to provide a solid conclusion in the ending phase of proving conception. Simply said, PoC measures the feasibility of a business idea or a design concept. In the case of this study, PoC plays important role to prove the validity of the blockchain and cryptocurrency ideas design for use in international trade.

2.1.9 Business process model and notation 2.0

Business Process Model and Notation (BPMN) is a standard created by The Object Management Group® (OMG®) intended for easy navigation of business processes by connecting the dots between both design and implementation of the business processes [28]. The graphical notation gives an organization the ability to communicate business procedures in a standardized manner. BPMN has vast amount of modelling elements, but only relevant ones are going to be mentioned in this research, as illustrated in Table 1.

Table 1: BPMN 2.0 Modelling Elements [28]

Element	Type	Description	Notation
Event: An occurrence during a process that have cause and effect towards the direction of the entire processes. 	Start	The point where a particular process will begin.	
	End	Marks the conclusion of a process.	
Activity: The basic element type that depicts task performed by an organization. 	Collapsed Sub-process	Activity that contains detailed level of processes. Collapsed means that the detailed processes are not shown. The plus sign indicates that the element can be expanded to view more detailed processes.	
	Expanded Sub-process	The expanded version of sub-process element which shows the smaller fraction of processes within the element. The processes within this element must not pass the outer line (boundaries).	
	Transaction	A special type of sub-processes where all activities included must be completed. Failure to meet the condition will result in cancellation of the entire process.	
Gateway: Sequence flows are directed into and from the gateway. 	Exclusive	Exclusive decision makings are depicted with this element type. Exclusive means that only one path can be chosen at a time and each path has its own consequences.	
	Complex	Complex synchronization behaviour can be illustrated with this element type.	
Data Object	Data Object	Activities that must be executed may require some specific information to be performed. The significance of data object is for provision of such information.	
Sequence Flow: The order of the activities performed within BPMN is shown with this element.	Normal Flow	This sequence flow doesn't start from intermediation nor attached to the boundary of an activity.	
	Uncontrolled Flow	This sequence flow is not affected by the presence of gateway nor	

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		any conditions. It is mostly used to connect two different activities directly.	
	Message Flow	Two parties that send and receive messages to each other are connected through this sequence flow.	
	Association	Association supports the linking of information that are correlated with each other.	

2.2 Exclusive Theories

Theories from different branches of knowledge to the information system management are categorized in this section of the paper.

2.2.1 International trade

International trade is better defined as the concept of exchange of goods or services between people with mutual interests involving two or more different countries [29]. The main principle for international trade is it must be beneficial for involved parties. International trade ecosystem is tremendously fragmented across several different entities and processes. [30] classified the entire ecosystem into 5 major groups along with parties associated with each group, such as:

1. *Corporates*. First and foremost, importers and exporters or in some cases often referred to as buyers and sellers, are the main parties that initiate the whole processes of international trade. Importer purchases goods and/or services from another country (exporter's country) and exporter sells goods and/or services to another country (importer's country).
2. *Banks*. International trade requires the banks from countries of both sides to provide risk mitigation and financing. Risk mitigation means that banks ensure the security of its customers' transactions and financing means the banks moves the funds or receives and keeps them at behest of banks' customers. Aside from the importer's bank and the exporter's bank, the corresponding bank also required to support communication between said banks.
3. *Governing bodies*. The regulatory entities that created and enforce the rules and standards for participants of international trade to abide by. Customs in both importing country and exporting country are part of the governing bodies.
4. *Facilitators* provide services to support international trade ecosystem by carrying out majority of the operations. Invoicing platform, SWIFT as interbank messaging system, freight forwarder, insurer, pre-shipment inspector, import/export terminals, shipper, and document courier are these facilitators. Most of the facilitators apart from SWIFT handles the physical aspects of international trade.
5. *Disruptors*. The presence of disruptors is only acknowledged recently after the emergence of companies specializing in financial technology or fintech, artificial intelligence (AI), and machine learning (ML). International trade finance ecosystem originally consists of 4 groups except the disruptors. It is the latest addition to be added to the ecosystem, merely because it presents opportunities to hasten the pace of international trade in the future.

As simple as it sounds, international trade coexists with numerous amounts of theory, policy, and business strategy that are accompanying its practice. As such, affairs across countries are not without its problems, as mentioned in previous chapter. For example, since 2019, US and China are engaging in trade conflict that continues to deepen caused by 30% tariff for foreign solar panels that US placed back in 2018, an act that China condemned as the globe leading solar panel manufacturer [31].

2.2.2 Centralized payment scheme

Payments are surrounded by two important aspects, namely methods of payment and terms of payment. Methods of payment decides how payment is going to be executed upon reaching consensus between buyer and seller through fulfilment of their respective obligations in relation to monetary settlement. Terms of payment describes the obligations of buyer and seller in detail, such as what is the form of payment, and when and where the payment is going to be done by the buyer, or from seller standpoint, is determined by the success in delivery of goods or service according to contract [32].

In traditional or centralized payment scheme, banks may have direct or indirect role in the payment settlement, depending on the methods of payment. Whatever their role is, banks will have charges to their services in relation to the payment

completion. Reference [32] divided bank charges into the following components:

1. Standard fees for specified services–commonly charged at a flat rate;
2. Payment charges–mostly charged at a flat rate but for some cases can be a percentage of the amount paid;
3. Handling charges–usually charged as a percentage on the underlying value of the transaction, e.g.: charges for documents checking;
4. Risk commissions–commonly charged as a percentage of the amount at a rate that may differ depending on the risk estimation and time period, e.g.: the issuing of guarantees and L/C (letters of credit) confirmation.

2.2.3 SWIFT system

These days, most bank transfers are processed through an internal networking system developed for use of international payments and sending messages between banks. This internal network is called SWIFT, which stands for Society for Worldwide Interbank Financial Telecommunication. According to [32], more than 10,000 financial institutions in more than 200 countries are members of SWIFT network.

SWIFT is established to hasten the international transaction process, yet as convenient as it sounds, both parties are required to fulfill their obligations to proceed with payment. Buyer must give correct instructions in designated time to buyer's bank and seller decides on the standard they use in their own systems and routines. Thus, fast processing in SWIFT system only works when the payment instruction has been communicated to the network. Most receiving banks have automated validation in processing payments, but whenever a missing piece or mistake present in given information, the correction must be done manually, and in this case, the service charges higher fee.

2.2.4 DeFi (decentralized finance)

Creation of blockchain and cryptocurrency technology led to the emergence of the concept of Decentralized Finance or DeFi for short [33], whose main aim is to eliminate intermediaries between financial transactions and replacing it with peer-to-peer transactions instead. DeFi uses smart contracts on blockchains and doesn't rely on central financial intermediaries (brokerages, exchanges, or banks). Simply put, DeFi is the concept, crypto is the tool to utilize the concept, and blockchain is the technology to materialize the concept.

2.2.5 ICO (initial coin offering)

Initial Coin Offering or ICO, as stated before in the introduction, is a condition where the developers of an exchangeable cryptocurrency are gathering funds for their project before launching it to the market. It is almost similar in manner of IPO (Initial Price Offering), a crowdfunding initiative during the initial phase of introducing a new stock into the stock market. Aside from the basic principles of ICOs, defining them can be very hard, especially since the technology for ICOs are still in continuous development and past researchers have yet to reach a mutual decision for a similar definition of ICO [34].

2.2.6 Market, exchange, and wallet

Cryptocurrency has a unique mechanism. It circulates around markets that are decentralized, meaning they are not established nor backed by official authorities like government [35], [36]. The market run across a network of computers and crypto can be bought and sold through exchanges and stored in wallets. Coin Market Cap and CoinGecko are among the most famous cryptocurrency market [37], [38].

Crypto-trading platforms or simply exchanges are exchange platforms which permit the interchange of a cryptocurrency for another cryptocurrency or fiat currency [36], [39]. The example of exchanges are Binance, Coinbase, and Bittrex, among many others [40].

Exchanging cryptocurrencies are pointless unless one can possess it by storing it in a secure place. This is where a wallet plays a pivotal role. Of course, this not a physical wallet by literal means. The wallet to store one's cryptocurrencies is a digital storage system to keep their digital assets [36], [41]. A wallet keeps personal information of its owner through a combination of recovery phrase, also referred to as private key or seed, which validates transactions so the crypto can be used to make purchases or exchanged for another digital assets or certain fiat currency. These recovery phrases prevent unauthorized person from using one's cryptocurrency or altering the transactions. The phrases are a security functions that is unique to a wallet address and should not be shared by any means. Every individual possessing the phrases can access the wallet address, so to prevent risk of trespassing, the holder of the wallet should keep the recovery phrases a secret only he/she knows. Losing or forgetting the phrases could also mean permanent loss of the access to the wallet. Example of wallets are TrustWallet, Exodus, Electrum and Ledger Nano X [42].

2.2.7 Stablecoin

Stablecoins are digital currencies that do not represent any specific currency, but instead, depends on a set of stabilization tools to have the capacity of minimizing volatility of its price [10].

One particular method to stabilize crypto price is called Fiat tokens, which is the most basic form of stablecoins that are backed by real currencies, from actual cash, electronic money to reserve deposits. Crypto are issued by depositing equal amount of the aforesaid currencies. The stablecoins backed in this manner can be converted back to fiat currencies anytime [11].

3. RESEARCH METHODOLOGY

3.1 Data Collection

Qualititative research will be conducted by collecting information from reliable data sources. The data sources consist of two groups. Primary data sources include a survey of cryptocurrency usage impact with 25 cryptocurrency users as respondents conducted by [43] and a two-phase survey of existing blockchain and cryptocurrency system, particularly from its smart contract development by [44] with 20 developers for first phase and 232 practitioners for second phase as respondents.

Secondary data is derived from worldwide responses to the emergence of cryptocurrency with various regulatory measures that differ in every jurisdictions based on the research in reference [45].

3.2 Methods for Developing Solutions

3.2.1 Determining specific criteria for cryptocurrency design based on survey of experienced respondents and cryptocurrency jurisdictions

Designing a new currency for use in international trade is a serious task that requires sets of specific criteria to suit with the complex and greatly fragmented layer of international trade ecosystem. Determining every criterion for designing the new blockchain and the new cryptocurrency for this study will borrow the results from two surveys previously conducted on separate studies by another researchers. The first being survey to find out the possible influences that perceived ease of use and perceived benefit may have toward cryptocurrency usage impact by [43]. The second survey conducted by [44] is about smart contract development, which is the key aspect of blockchain development, and ultimately the cryptocurrency itself. In contrast to the first survey, the second survey dwelled deeper into technicality of blockchain's smart contract. A checklist for the criteria of how the system is going to be designed with hard fork and stablecoin methods, will be made based on both survey results combined.

More importantly, cryptocurrency may be independent from regulatory entities, but that doesn't mean it is no subject to the rules enforced by countries around the world. The legal status of cryptocurrencies differs depending on jurisdiction and is sometimes undefined properly and a subject to constant change [45]. No matter how independent it is, cryptocurrency utilization is limited if local law rejects it, therefore, it is necessary to put this as a main concern in designing or developing cryptocurrency.

3.2.2 Hard fork mechanism for blockchain development

The method for developing cryptocurrency varies, each with its own difficulties. In this research, the writer uses hard fork method for developing cryptocurrency. Fork is resulted when a blockchain breaks into two branches, and can occurs in two ways, either through soft fork or hard fork [9]. Both method produce similar results, with the only difference lies in their capability in recognizing nodes that are operating under new rules. Soft fork is capable of doing this, but hard fork on the other, isn't. Hard fork triggers radical changes in the blockchain that makes all previous blocks or transactions before it was split invalid. This characteristic of hard fork is what makes it suitable to use as development method for new cryptocurrency.

As stated before, transactions of the new blockchain that is created from hard fork is deemed invalid by the preceeding blockchain, meaning every transactions on the new blockchain to be counted as its own. This characteristic of hard fork is the basis for crypto development using hard fork method. The hard fork method has seven steps to follow in order to develop cryptocurrency as illustrated in Figure 1.

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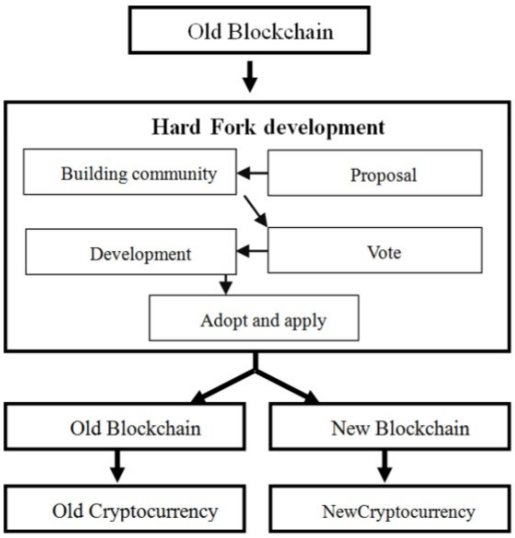

Figure 1: Hard Fork Approach of Cryptocurrency Development [9]

Along with hard fork method, reference [9] also identified another methods of cryptocurrency development, namely token approach, source code fork approach, and software fork approach (not to be confused with soft fork), and. Comparison of hard fork approach with these 3 approaches will be discussed further in this paper.

3.2.3 Stablecoin for cryptocurrency collateralization

Volatility of a cryptocurrency can be reduced by tying it with outside assets. This act is called collateralization and cryptocurrency that is collateralized with outside assets is often referred to as stablecoin [10]. Stablecoin can be created with four methods according to [11], but only one method will be proposed by the researcher to collateralize the cryptocurrency that is going to be used in international trade payment system. This method is called fiat tokens (tokenised funds), where real currencies back the cryptocurrency to control its price flow. The strong point of this method is that the cryptocurrency can be converted back to fiat currencies anytime, making liquidity of the digital asset to be less of an issue. Fiat tokens method is going to be compared to the remaining three collateralization methods, namely on-chain collateralized stablecoins, off-chain collateralized stablecoins, and algorithmic collateralized stablecoins methods further in this paper.

3.3 Realizing Design from Proposed Solutions

Designed new cryptocurrency is going to be compared to existing cryptocurrencies like TrueUSD (TUSD), Tether (USDT), USD Coin (USDC), Rupiah Token (IDRT), Bitcoin, Ether, and XRP to learn its strengths and to find out any possible weaknesses. Lastly, a simulation for the international trade payment system with the new crypto will serve as the illustration to how the design is going to be realized.

4. RESULTS AND DISCUSSION

4.1 Practitioners' Survey Review

Reference [43] did a survey in 2020 to discover the correlations of factors that may affect usage impact of cryptocurrency. The questionnaire for the survey is designed to address issues represented by 3 variables, namely perceived benefit, perceived ease of use, and users' behaviour.

The research sought to prove these hypotheses:

H1: The perceived ease of use and users' behaviour have a significant relationship.

H2: The perceived ease of use and perceived benefits have a significant relationship.

H3: The perceived benefit and users' behaviour have a significant relationship.

Analysis results of the survey responses indicated that perceived ease of use and perceived benefit do not have significant relationship with each other, and perceived benefit doesn't affect usage behaviour as well. Significant relationship is only shown by perceived ease of use towards cryptocurrency usage behaviour. The complete survey data consisting of respondents' demographic, questionnaire, descriptive statistics of responses and correlation analysis can be accessed in reference [43] research paper.

Based on the correlation discovery, the progression of this research in designing a new cryptocurrency system will emphasize on convenience for users instead of benefits that the cryptocurrency can offer.

Another survey carried out by [44] in a 2021 research focused on defining strengths and weaknesses of smart contract, a component that gives blockchain the ability to function properly. The research is divided into two phases. The preliminary phase was directed toward developers working on smart contract development on several companies where in the end 20 people were interviewed. These 20 people have varying backgrounds, making the participants to be heterogenous with an average experience of general software development and smart contract development at 11.35 years and 1.27 years respectively.

By analyzing the responses of the interviewees, the researchers identified six main

concerns about developing smart contract (i.e., security; debugging; programming language; EVM (Ethereum Virtual Machine); gas; and online resources and community support). The second phase of the smart contract research involved 232 respondents where mostly are developers with varying demographic backgrounds. The interview of 20 respondents and survey of 232 experts collectively yielded these analysis results:

1. Smart contract needs code security above anything else. Unfortunately, currently there is no effective way to guarantee code security. Code auditing and formal verification procedures are immensely favored. Developers must use testing and code reviews for the time being to maintain code correctness.
2. Debugging tools are lacking that it makes the practice to be painstakingly primitive and inefficient. There is dire demand for more powerful interactive debugging tools with informative error messages to display.
3. Effective and efficient programming of smart contract requires extreme effort, since Solidity programming language is very hard to use in passing data to external functions, not to mention that the number of variables are limited. The constantly changing compiler including its unseen flaws is another challenge to face if it is not backward compatible, and non-informative error messages, limited stack size, and ineffective execution of EVM makes it even worse.
4. A great need for code with better readability must be supported with tools for gas-estimation and optimization.
5. Overall, the best practice is still lacking (scarce code examples, insufficient community support, information libraries for smart contract and properly defined standard for smart contract development)

4.2 Understanding Legality of Cryptocurrency by Country or Territory

Cryptocurrency has always been a source of controversy. Many doubted its capability of shaping the future of technology and finance as responses vary from one country between the others. Some approve of its use in general transaction and acknowledge crypto's functional aspect, while some responded by ultimately banning or restricting its usage with no exception. An occasional paper written by [45] discussed the differences of cryptocurrency regulations of various countries in the world. The researcher also pointed out that the regulations are a subject to change due to the fluid nature of cryptocurrency acceptance. While the word Bitcoin is constantly uttered towards majority of the explanation, it is obligatory to assume that the regulatory measures also apply to other cryptocurrencies due to their same nature. The countries responses are (unspecified countries are following guidelines issued by the FATF (Financial Action Task Force) which will be classified in a different section below):

1. North America
   In United States, Bitcoin is classified as a convertible and decentralized virtual currency by the state's treasury in 2013 and as a commodity by the Commodity Futures Trading Commission in 2015. Companies in Canada are obliged to register with the Financial Transactions and Reports Analysis Centre of Canada (Fintrac) to use cryptocurrency. A legal framework called La Ley Fintech is established in Mexico to supervise the ownership, transaction, and purchase of the digital asset.

2. South and Central America
   Bolivia and Ecuador banned the use of Bitcoin in 2014 and 2015 respectively. Brazil, Chile, Colombia, Nicaragua, and Costa Rica assume neutral stance, meaning they do not prohibit nor legalized the use of Bitcoin. Argentina has ambiguous regulatory maneuver towards the use of crypto. While Bitcoin is not necessarily legal in Argentina, it is treated as a money or a thing in Argentina Civil Code. Venezuela is one step ahead and even created their own crypto called Petro, which is backed by oil assets of the state. Caribbean countries like Jamaica and Trinidad & Tobago legalize the use of Bitcoin.
3. Middle East, Central and South Asia
   While it is not banned, Jordan, Saudi Arabia, and Lebanon do not recommend the use of Bitcoin as transaction medium. In Israel, it is considered as a taxable asset rather than a financial instrument. Bangladesh and Nepal banned Bitcoin. Kyrgyzstan enforces a very specific set of rules regarding cryptocurrency. While it is legal to use it as a commodity, the country forbids it usage for domestic settlements. Uzbekistan legalized crypto in 2018 as a tax-free commodity to mine and trade.
4. East Asia
   China completely banned cryptocurrency since 2021. Japan regulates cryptocurrency exchange businesses operating in Japan since 2017 with the Payment Services Act. South Korea

enforces a KYC process to record all transactions of cryptocurrency and there is a minimum age requirement to legally possess and commit transactions with cryptocurrencies. Taiwan warned its people that Bitcoin is void of legal protection but doesn't forbid the use of Bitcoin. As for ASEAN countries, the legal status of cryptocurrency varies. Singapore encourages their citizens to use them as a digital payment token. Malaysia discourages the use of Bitcoin but still allows it. Philippines' central bank do not recognize crypto as a currency. Banks in Cambodia ban crypto but holding crypto is legal. In Thailand, digital currencies can only be exchanged with Thai Baht via Bitcoin exchanges that are properly licensed as e-commerce business by Thailand's authority. Indonesia and Vietnam legalize the possession and trading of cryptocurrency but forbid its usage as a payment tool.

5. Europe
   EU countries treat cryptocurrency as legal. Greece, Ukraine, Portugal, Spain, Italy, and some other EU countries do not have a specific regulatory framework for cryptocurrency. French categorized loan involving Bitcoin as consumer loan in 2020. Norway considered Bitcoin as an asset instead of money in 2013.
6. Africa
   Nigeria used to treat cryptocurrency as illegal only to be revised later in 2017, albeit the legality status is left ambiguous instead of expressively legalizing it. In 2014, South Africa stated that they decided to leave the legal status of cryptocurrency remain unregulated.
7. Oceania
   Australia treats cryptocurrencies like a regular currency whereas New Zealand doesn't prohibit the use of crypto as a commodity.
8. Countries following FATF (Financial Action Task Force)
   The FATF issued the "Guidance for a Risk-based Approach to Virtual Currencies" or the "2015 VC Guidance" for short in 2015 as a response to the evergrowing use of cryptocurrency and to mitigate or prevent AML/CFT (Anti Money Laundering/Combat the Financing of Terrorism) related risks associated with the use of cryptocurrency. UAE, Pakistan, India, Zimbabwe are the example of countries that decide to follow these guidelines.

Seeing the various responses from aforementioned countries, the general picture from the variation of regulations is rooted from the suspicion towards cryptocurrency's fraudulent potential. Instead of being pessimistic, the countries that restrict or forbid cryptocurrency saw it as harmful. Since international trade involves many countries, designing a cryptocurrency system that is suitable for use must heed the interest of each country with high regard. Therefore, the FATF gave recommendations in "Guidance for a Risk-based Approach to Virtual Currencies" or the "2015 VC Guidance" [46] to address ML/TF (Money Laundering/Terrorism Financing) issues related with cryptocurrency, particularly cryptocurrency that can be exchanged into a fiat currency or in the term used by FATF is referred to as convertible VC (virtual currency). To suit the context of this study, the term convertible VC will be referred to as cryptocurrency for the remainder of this paper. Among the recommendations made by FATF, only few are applicable to regulate cryptocurrency. These recommendations include:

1. Specify the distinction between centralized cryptocurrency and decentralized cryptocurrency.
2. Apply enhanced due diligence measures.
3. Create mechanisms to facilitate the joint effort of tackling cryptocurrency ML/TF issues among policymakers, regulators, supervisors, the financial intelligence unit (FIU), and law enforcers.
4. Develop compliance measures for MVTS (Money or Value Transfer Services) providing companies to abide to, e.g.: operating license.
5. Countries should conduct proper filtering of new products or new businesses that are going to be launched in their jurisdictions.
6. Set threshold for cross-border wire transfers and domestic wire transfers.
7. Amends legal framework to properly regulate cryptocurrency exchange service providers to fit with the regulated fiat currency financial system.
8. Give sanctions to cryptocurrency users and/or cryptocurrency service providers that violate the ML/TF related restrictions.
9. International cooperation between countries is necessary to help in combating ML/TF related with cryptocurrency.

4.3 Existing Systems Issues

Existing issues in the currently implemented systems that this research want to solve are discussed in this sub section before

proposing possible solutions to tackle these issues. These issues are:

4.3.1 Payment systems in international trade

This subsub section uncovers conventional payment systems currently used in international trade, based on past researches by reference [32]. The illustrations for each payment method will refer to exporter as seller and importer as buyer.

1. Bank remittance (bank transfer).
   Bank transfer or bank remittance is perhaps the simplest method to use in international trade. However, the seller is at risk of receiving late payments with this method, usually between 30 to 180 days, or even worse, the payments will never reach the seller.
2. Cheque payments (corporate cheque).
   Cheque payments are less popular in international trade nowadays, as more advanced methods that cost less and works faster are introduced. Corporate cheque clearing processes can be time-consuming, as it may take weeks to complete. Additional charges may apply to the seller if this is the case. Seller is also at risk as cheque payments are also disadvantageous in liquidity, but the gravest risk that this payment method process is the postal risk. If somehow the cheque is lost or delayed while in delivery, the buyer can claim that payment has been done as the cheque was sent, even if the seller has not actually received the payment. Bank transfer method can mitigate this risk entirely.
3. Documentary collection (bank collection).
   From buyer's perspective, documentary collection is very beneficial because buyer knows if shipment of goods has commenced and underlying documents can be examined before payment or acceptance. The goods, however, won't be in buyer's possession until payment is complete. Documentary collection also give another option of concluding transaction–if so desired by the seller. Bill of exchange can be addressed to the buyer as a document from seller that contains the written form of demand for payment upon request or at the time appointed in the bill. From buyer's standpoint, this could be considered a documented proof of debt.
4. Letter of credit (L/C).
   Letter of credit (L/C) is a documented property that acts as a payment mechanism to provide an economic guarantee from a creditworthy bank, being the issuing bank to the seller, as the exporter of goods. Among any conventional international trade payment schemes, L/C has the best security since small documentation mistakes like wrong shipping details or late presentation (documents presented more than the number of dates specified within the L/C since shipment) are hard to correct in later stages of the payment and shipment processes. Lengthy processes do not make L/C an absolute secure method of payment in international trade. Cases of fraud have been reported in the past where forged documents containing information of inferior or even worse, fictitious goods were presented to banks under L/C [32], [47]. The vulnerability lies in the fact that L/C method emphasizes on review of underlying documents, not underlying goods. Seller that uses this method should heed with extreme caution before sending goods to a buyer whose identity has not been verified to the bank. Buyer, on the other hand, should avoid sending advance payments before verifying the identity of the seller.

4.3.2 Blockchain development requires expertise

Consensus protocols is one of the components that shapes blockchain. Creating the protocols are similar in creating cryptographic systems. Programming flaws can endanger the entire blockchain system as financial value that is applied to the new protocols may be improperly enforced as it is intended to. Therefore, it is absolutely necessary for the blockchain developers to have experience in cryptography, security, and the theory of distributed systems to establish systems with capable trust protocols [18].

4.3.3 Instability in cryptocurrency price

Bitcoin (BTC), the predecessor of cryptocurrency, was originally constructed to be a breakthrough of payment without central banks' interference. But instead, the digital asset acts more like a speculative vehicle in current practice [48]. The price of Bitcoin roller coasters vastly. For example, the price rose from $4,000 to $20,000 in less than three months late 2017 before suffering from dramatic descent to just $3,200 per BTC shortly after. It would take two years later for the BTC to rise to $12,000 in August 2019. The Bitcoin experienced extreme rise and decline of its price towards USD dollar before reaching its highest price record of $64,800 at April 14, 2021, only to met its eventual downfall to $35,000 at January 22, 2022 [49], [50]. Being the first cryptocurrency, it is only natural for other cryptocurrencies that were created and are going to be created after Bitcoin to inherit the rapid movement of its price as a

characteristic. For a cryptocurrency to be properly used as a payment medium, volatility should be reduced or eliminated, if possible, by any means.

4.4 Setting Criterion for New Cryptocurrency System

The criteria for new cryptocurrency design are based on analysis results of primary data and secondary data, along with existing systems issues. There are 4 categories in the checklist, such as:

1. Convenience of use
   Inspired by reference [43] and the existing problem of standard cryptocurrency high volatility.
2. Compliance measures
   Criteria are defined according to the FATF's recommendations from reference [46].
3. Smart contract programming (Solidity and EVM)
   Differentiated as two separate categories, as Solidity and EVM have a unique set of system requirements for them to be able to perform accordingly. The criteria are based on the desired improvements on smart contract from respondents of the survey from reference [44].

The rest of this study will progress to fulfill the preset requirements in the checklist above, with hard fork and stablecoin approach to design the new cryptocurrency system. The complete list for all criteria is viewable in Table 2.

4.5 Comparing Hard Fork with Other Approaches

Hard fork is a variation of fork that is not backward compatible and can be taken advantage of to produce a new cryptocurrency. The notable cases of hard fork resulting in the creation of these forked currencies that happened since the birth of blockchain technology according to [51] are:

1. Bitcoin Cash (BCH), forked from Bitcoin (BTC) on January 8, 2017
2. Bitcoin Gold (BTG), forked from Bitcoin (BTC) on October 24, 2017
3. Litecoin Cash (LCC), forked from Litecoin (LTC) on February 2, 2018
4. Bitcoin SV (BSV), forked from Bitcoin Cash (BCH) on November 15, 2018
5. Bitcoin Candy (CDY), forked from Bitcoin Cash (BCH) on January 13, 2018

Back when Ethereum blockchain developers were forced to fork as a result of a cyberattack that caused loss of $50 million worth of Ether, Ethereum Classic (ETC) was created. Compared to the previous five, this one hard fork is unintentional. Blockchain splitting as an actual outcome of forking is intentional to create a new cryptocurrency while unintended hard fork is regarded as the consequences of a blockchain system hack. It is necessary to know the differences.

Even further, [51] implied that hard fork can be beneficial or disastrous for the preceding and/or succeeding crypto, depending on the size and perceived security level of the forked cryptocurrency. Commencing with hard fork can reduce the security of both old blockchain and new blockchain, especially in a PoW-based blockchain.

Reference [9] visualized the processes of hard fork along with another approaches that can be used to materialize the digital asset originally as an initial effort to develop crypto to replace the Republic of Cameroon fiat currency, albeit without implementation discussion of how the cryptocurrency is going to be put into development phase. Thus, some steps in hard fork crypto development were left with vague explanations. The methods of creating a new cryptocurrency apart from hard fork are:

1. *Token approach*
   A token is a basic form of cryptocurrency as mentioned earlier in this paper. Unlike coin, a token is created by using a method proposed by the founder of Ethereum blockchain, Vitalik Buterin and Fabian Vogelsteller, the programmer that contributed to the development of Ethereum's smart contract. The focus of the method is the application of ERC20 Token Standard as a protocol with an API (Application Programming Interface) allowing the development of a sub currency with interoperability in the Ethereum blockchain. The contract in Ethereum blockchain is preprogramed to allow the creation of new cryptocurrency tokens in the platform.
2. *Source code fork*
   This approach is self-explanatory, as the name suggests, the development of crypto using source code fork is done by copying, modifying, and reusing an existing cryptocurrency parent source code to start or develop another program. This is possible since blockchain is originally built on open source code.
3. *Software fork*
   A software or a project whose code simulates another software by observing the software behaviour or functionalities if rewritten can result in the creation of new cryptocurrency.

Source code fork and software fork approaches proposed by [9] were referring to the original work of [52] whose paper didn't contain any discussion about blockchain nor cryptocurrency, which means that the source code fork and software fork approach of developing cryptocurrency haven't been proven yet. Developing blockchain independently using software or source code is different from forking from them. This leaves only token approach and hard fork approach as the reliable methods to create cryptocurrency.

Token approach is more advantageous compared to hard fork in terms of cost, but since modification is limited to some extent, it is preferred to use hard fork. Hard fork is useful in correcting important security risks found in software of the original blockchain, to add new functionality, or to reverse transactions, just like what Ethereum did to reverse the hack on DAO by forking their own platform and created Ethereum Classic, where the ETC blockchain records unaltered history and the original Ethereum blockchain platform has altered history [51], [53]. Using this basis, the international trade cryptocurrency design in this paper will be based on hard fork approach.

4.6 Comparing Fiat Tokens with Other Stablecoin Types

The variety of stablecoins based on the actual assets they are tied to (with the exception of algorithmic stablecoins) are as follows [11]:

1. Fiat tokens (Tokenised funds)
   The most common form of stablecoins that are backed by real currencies (e.g., actual cash, electronic money, and reserve deposits). Crypto in this manner are issued by depositing equal amount of the real currencies. The stablecoins backed with this method can be converted back to fiat currencies anytime when the need arises. The example of fiat tokens are Tether (USDT), USD Coin (USDC), and TrueUSD (TUSD).
2. Off-chain collateralized stablecoins
   Stablecoins that are backed by assets other than cash. Two parties with mutual trust are required to be responsible for realizing these collateralized stablecoins, with custodians being the keeper of the collateral and issuers in charge of allowing redemption. The example of off-chain collateralized Stablecoin is Sweetbridge (SWC).
3. On-chain collateralized stablecoins
   Cryptocurrency is backed by other cryptocurrency in this collateralization method. It operates generally in decentralized manner, where collaterals are recorded in distributed ledger and custody of the network participant. The example of on-chain collateralized stablecoins are Dai (DAI), BitUSD (BITUSD), and MinexCoin (MNX).
4. Algorithmic stablecoins
   This is the only stablecoins not backed by an underlying asset. Instead, maintaining price stability for a cryptocurrency is done through using algorithms coded in blockchain. Furthermore, the supply of crypto is adjusted to suit demand. Due to its total reliance to algorithmic functions and exclusion of underlying asset, it is the most decentralized stablecoin compared to other types of stablecoins and so, immune to outside disturbances like political entities or legal regulation. The example of algorithmic stablecoins are Steem (STEEM) and NuBits (USNBT).

Fiat tokens are the most centralized form of stablecoin ecosystem. The application of DLTs in fiat tokens has a potential to perform efficient value transfer without using centralized intermediaries, enhanced transparency and along with automation of the processes, can result in a much faster, cost-effective, and frictionless transactions. Enhanced transparency reduces information asymmetries which improve price consistency between the tokens and the tied assets with price discovery mechanism. However, the apparent weakness of fiat tokens is that it is prone to DLT networks related issue, especially for permissionless blockchain, where the participants can fork if they disagree with the original protocol [54]. More importantly, since the price of fiat tokens are tied to outside currency, should the fiat currency value decline, the value of the crypto will also decline, especially with the feature of better price discovery mechanism stated above.

Reference [11] implied further about the major differences between off-chain and on-chain collateralization methods. Off-chain collateralized stablecoins' system is akin to that of finance system with intermediaries, making it less common to be used as stablecoins backing method. There is no point in using cryptocurrency if the core system is intermediated, so off-chain collateralization won't be used in designing crypto for international trade. As for on-chain collateralization, backing crypto with another crypto increases risk of volatility, and so, overcollateralization is necessary to reduce the volatility, or the stablecoins won't live up to its namesake. But again, this method is not ideal to

create crypto for international trade as overcollateralization requires a relatively large sum of reserve assets. Thus, resource-wise, on-chain collateralized stablecoins are not ideal to create a crypto with good value stability.

According to reference [10], algorithmic stablecoins, being the most advanced form of stablecoin require users to understand the consequences of options to reach a consensus. It is difficult in application to carry out this task in relation to the governance of permissionless DLT networks, which means updating the algorithm to deal with supply and remuneration of stablecoins is only feasible in theory, but not in practice.

In regard to efficiency and effectiveness, fiat tokens are deemed the most reliable approach of collateralizing the new cryptocurrency that this current research wish to design for international trade.

4.7 Crypto Design Framework for Solutions

Existing issues in the currently implemented systems are going to be solved through proposed design using hard fork and stablecoin methods (Sub section 4.7 and its subsub sections about designing cryptocurrency as solutions answer research question #1: How blockchain hard fork can be used to create new blockchain as the initial step of designing a new cryptocurrency?).

The hard fork method can solve a series of issues stated before, namely:

1. Payment systems in international trade. Blockchain can remove the need of banks as intermediaries for transactions.
2. Blockchain development requires expertise. Inexperienced programmers can learn how to create a cryptocurrency without having to develop their own blockchain platform by using hard fork development method.

While fiat tokens method which is also included inside the framework, can solve:

1. Tying a crypto to a fiat currency as collateral can control the price flow of the crypto, and also solve liquidity issue of the crypto, as the crypto can be converted to the fiat currency anytime when the need arise.

The solution framework is drawn in BPMN 2.0 format by The Object Management Group® (OMG®) [28]. The about to be proposed cryptocurrency design framework is expected to solve all issues that exist in the current systems simultaneously. The framework consists of step by step processes adapting the hard fork method and stablecoin method.

4.7.1 Choosing blockchain to fork from

Forking blockchain is not just merely the act of duplicating an existing blockchain, but to modify the new blockchain that resulted from splitting an existing blockchain. Therefore, choosing which blockchain to fork from should be treated with utmost consideration of how it will affect the cryptocurrency development phase in entirety. It is preferable to choose blockchain platform that has smart contract function to support intentional forking for crypto creation.

This design of cryptocurrency will specifically use permissionless blockchain as every involved party is equal in the network, ensuring fairness in reading/writing/auditing the blockchain [55]. Permissioned blockchain is the complete opposite of permissionless blockchain as some parties are in charge as central authority. On the other hand, private blockchain is unsuitable for international trade ecosystem where many parties are involved. The distinctions between permissionless blockchain, permissioned blockchain, and private blockchain have been pointed out in Chapter 2 with past research by reference [18].

4.7.2 Creating proposal of elements to modify

Smart contract features from preceding token may be removed partially or kept as whole, depending on how the developers deemed fit. All of these details, including the project information is to be included in a written proposal, commonly known as project whitepaper or litepaper. Whitepaper includes the mission of the project and all technical details necessary to inform the future participants of the project. Litepaper differs from whitepaper in regards that it avoids unneeded technical information. Reference [56] summarizes what could be written in a litepaper to keep the readers attention span from waning while feeding them all the information needed to decide on partaking in the new crypto project, such as:

1. An introduction to the project, which contains a quick summary of the project that can urge the readers to continue reading the rest of the litepaper contents.
2. How the project can solve a problem (value proposition). In the case of this study, how a crypto development can solve the difficulties within conventional international trade payment system.
3. Actual data to support the claim of the existence of the problem. Proven past researches of the flaw in conventional international trade payment scheme is needed to prove that the problem stated in the litepaper

is an actual problem–not a bluff created for marketing purpose.
4. Tokenomics. Token name, ticker symbol, total supply, sale dates, minimum sale target (Soft Cap), maximum sale target (Hard Cap), etc. that can describe the token.
5. Team, vision, and roadmap. Team identity, vision of the project and roadmap should be included to provide general view of what direction the project is going to move forward to in the future and to convince readers of the project legitimacy.
6. Website and contact details. The fruit of community building in previous phase of development is to give members accessibility to the new crypto project so the members can reach out people in charge of the development with ease.
7. Downloadable software (optional). If a crypto project has downloadable softwares as a requirement for participation, links must be included in the lite paper to prevent community members to accidentally downloading a malicious software.

4.7.3 Building communities

The best bet to build communities to promote a new crypto project is to participate in online discussions. Some website and social platforms are considered pivotal in spreading news of new cryptocurrency projects. Depending on enthusiasm or response by the crowd, the project may be cancelled or proceeds to the next phase of development. According to [57], these platforms are:

1. Bitcointalk—The first known cryptocurrency forum, which used to be limited to the discussion of Bitcoin as it was the only cryptocurrency to exist during the time of this forum's foundation. Bitcointalk was founded by Satoshi Nakamoto who also founded Bitcoin. Many groundbreaking ideas that shaped the current blockchain influenced independent financial system were proposed by members of this forum.
2. Twitter—Currently the biggest platform for worldwide cryptocurrency enthusiasts. Twitter enables direct interaction between public and crypto project leaders and fintech innovators. Unfortunately, scammers also take advantage of the vast reach of Twitter to steal from unwary crypto investors.
3. Bitcoin Garden Forum—This platform categorized sections for different use cases of Bitcoin and altcoins (portmanteau of alternative and coin, a term commonly associated with cryptocurrencies that are birthed after Bitcoin). The topic also varies. From amusement related topics to a more serious context like blockchain quality refinement.
4. Reddit—Much like Bitcoin Garden Forum, topics are grouped by sections called subreddit (symbolized with "r/"). The most popular subreddit of all time is r/Bitcoin. Other prominent subreddits are r/bitcoin_uncensored, r/BitcoinBeginners, r/CryptoMarkets and r/BitcoinMarkets, among many others. Reddit is known for spreading crypto memes, and perhaps, that is the favorite part of becoming participant of the forum.
5. Telegram—Peer-to-peer communication in crypto community is never better with Telegram rigorous efforts in protecting its users' personal information and chat data. There is a large selection of groups and channels related to the discussion of Bitcoin and altcoins that the public can access, although some groups are only available to access with invitations from the groups' administrators.
6. Social trading platforms—People who wills to invest in cryptocurrency are the main target of these platforms. Investors will be taught to weighing on the risks and rewards based on market trends, discussing latest crypto related events and price movements. Cointelegraph's Markets Pro (https://pro.cointelegraph.com) is an example of social trading platform.
7. Events and conferences—Cryptocurrency ecosystem mostly circulates around online spaces for communal activities, but showing presence occasionally in face-to-face meetings, conferences, or any other forms of formal or informal gatherings can raise public awareness of the cryptocurrency projects. Despite geographical distances being inevitable obstacle in holding offline events, both online and offline activities are rising considerably.

4.7.4 Vote on the date of fork

Community members are given chance to contribute for the project though limited to some extent. Developers of the new crypto gather vote from members to decide on what time would be the best for forking the chosen existing blockchain. Once decided, the date will be announced on all the social platforms the developer team use for spreading updates about the new crypto.

4.7.5 Development of news updates

Issuing proposal of the project gives revelation of many vital information needed to be aware of the reliability of the crypto project. Once

this is made known to the community built before writing the proposal, it will be easier to tell how much the project can pique the interest of the community members. Regardless of the response of the members, the developer can choose to continue the project or abandon it. However, proceeding with the project if majority of the members show no interest to the continuation of the project can affect the outcome negatively. Passive members may not invest on the project at all, which is very risky if the developer insist on continuing. On the contrary, enthusiasm shown by community members may drive the project into positive direction where the usage of the new crypto may last longer.

4.7.6 Adopt and apply hard fork

Hard fork will commence on the date that has been mutually decided by all community members through voting. Every participant can anticipate and prepare for the upcoming fork, knowing the precise date for the blockchain to split. Transparency of this information gives them time to prepare the funds needed to purchase the new cryptocurrency.

4.7.7 Creation of new cryptocurrency

Once the hard fork is executed, the creation of cryptocurrency through modification of smart contract and several elements can commence. Every aspect of the development that were informed in the proposal are going to be put into realization at this point.

Initial Coin Offering or ICO is infamous for being a vehicle of scams and fraud [58]. To gain the complete trust from the members and ensure them that the new cryptocurrency project is not an attempt to scam the investors, certain measures can be taken. This is entirely optional but can be beneficial for both sides if applied. Investors can consider the new crypto project to be trustworthy and the development team can gain better reputation for conducting this measure. These measures are smart contract audit and KYC.

Smart contract audit was proposed back when vulnerabilities were discovered in Ethereum based smart contract. In 2016, a hacker successfully stole 3.6 million ETH tokens, worth 50 million USD at the time of the security breach [59]. Publicizing the audited report of the smart contract for new token to investors can convince them that errors are nonexistent in the smart contract, making it save to use the new crypto for transactions.

As for KYC, according to reference [60], the KYC processes for investors comprises of:

1. The investors send specific amount of fund to the smart contract. The new tokens are not immediately sent to the investors as they have to go through a series of verification process.
2. Investors input their personal information in the web designated by the crypto development team.
3. Afterwards, the investors provide their identity card or residence permit, including secret PIN to prove the authenticity of their identity.
4. These information are stored in eID provider's app, which is shared to the KYC provider for further verification.
5. Post verification, it the result is approved, the information is going to be stored inside blockchain. The investors can check in the web where they initially input their personal information to ensure that the verification result is correctly recorded.
6. The developers then decide whether to transfer the new token to the investors or not, based on the result of the KYC process. If the developers reject the KYC result, the funds that investors transferred will be returned shortly after. If the developers are satisfied with the KYC result, the new token are transferred to the investors. Thus, completing the exchange process.

For the crypto design framework that this research develops, the researcher proposes for the investors KYC processes to take place before starting the ICO and so, the investors only send their funds to the smart contract after the identity verification has been approved by the development team as the ICO organizer.

4.7.8 Begin ICO

Reference [34] stated that the technology that backs ICOs are still in constant development, making it hard for literatures proposed by various researchers to reach a consensus on the definition. Based on definitions and classifications of tokens compiled from various sources, ICO rounds consist of three round that commence in succession [36], [61]. It is up to the crypto development team to decide what rounds to run for their ICO campaign.

1. Private sale prioritizes major investors to take part instead of smaller investors like individuals. Private sale is targeted to corporations or a group of individual investors that participate as a consortium. This round is not open for public and secrecy is maintained. The benefits offered to investors are the greatest at this phase.
2. Pre-sale gives chance for investors to buy crypto before official sales. Pre-sale tokens are sold at a lower price, among other bonuses given to the investors.
3. Crowdsale is when ICO campaign is open for public. The price of the offered token is more

expensive compared to the previous phases of ICOs, but this is where the developers should advertise the ICO aggressively to achieve expected sales.

The framework provides three alternatives of ICO to be held for the ICO project team. Alternative 1 consists of all three phases, whereas Alternative 2 consists of pre-sale, followed by crowdsale, and lastly, ICO phase in Alternative 3 jumps right in to crowdsale.

Crypto developers have a target that they seek to achieve in ICO called Soft Cap (SC), indicated by minimum limit for fund collection and Hard Cap (HC), the maximum possible target to reach [62]. Both are defined by the developers prior to preparation of the crypto project proposal.

Launchpad also plays crucial role in execution of ICO. But ICOs held at crypto launchpad is exclusively referred to as IDO (Initial DEX Offering). Crypto launchpad is a platform that allows blockchain related projects, especially introduction of new cryptocurrency in an attempt to raise capital while giving early-access to crypto sales for certain group of investors [63]. Crypto launchpad also provides another benefit of early listing in Decentralized Exchanges (DEXs) as opposed to regular ICO which only facilitates selling crypto before an exchange listing [64].

Depending on what cryptocurrency exchange environment a crypto project chooses to enlist to, crypto launchpad may be needed or not. If a new crypto project targets to enlist to Centralized Exchanges (CEXs), the project won't need to use launchpad services, but if the project targets DEXs, then crypto launchpad will be helpful for early listing to DEXs.

4.7.9 Finishing

Decentralization of a cryptocurrency is useless if it remains secluded to some people. After all, the creation of crypto in this research is proposed to establish a scheme of payment suitable for international trade. Therefore, certain actions are to be taken to make sure that the crypto is usable. The foundation of creating financial mechanisms for crypto according to [36] includes:

1. Markets. Decentralization makes crypto almost immune to regulations. This cause freedom to use the crypto for many purposes with no proper limitation like what centralized markets do to financial instruments within their environment.
2. Exchanges. As the market for crypto differs from centralized market, crypto also has exclusive exchange platforms. More than hundreds of crypto exchanges exist. The more the number of exchanges that the new crypto enlist to, the better the accessibility of the crypto given to its holders.
3. Wallets. Digital crypto wallet is used for receiving, sending, or storing digital assets. Most crypto have its official wallet and should be compatible with third-party wallets.

Last but not least, to control the volatility of the newly-developed crypto token, the crypto must be collateralized in the simplest method of creating stablecoins. That is, with fiat tokens collateralization method. The developers must prepare fiat currency to back the crypto so that the price won't fluctuate aggressively in order for it to be suitable as exchange medium for international trade.

The entire explanations about the proposed cryptocurrency design are visualized in two versions with BPMN, one with collapsed subprocesses and the other one with expanded subprocesses, as shown in Figure 2 (collapsed) and Figure 3 (expanded).

4.8 Cryptocurrency Design Simulation

The conceptual design of new cryptocurrency using hard fork and stablecoin is going to be simulated according to steps depicted previously. It is important to note that most of the information provided in the simulation are only there to support the explanation of each step of the cryptocurrency design, meaning they do not actually represent actual condition as the design is yet to be implemented.

4.8.1 Choosing Litecoin as permissionless blockchain to fork from

The blockchain chosen for the project is Litecoin blockchain, a permissionless blockchain [55]. Litecoin blockchain is built from Bitcoin source code in 2011. Its native crypto is similarly named after the blockchain, Litecoin with ticker symbol LTC. The reasons for choosing this specific blockchain to fork from are:

1. A hard fork of Litecoin blockchain has been done in the past
   Back on February 2, 2018, the Litecoin blockchain has been forked by another project called Litecoin Cash (LCC). This proved that forking of the system was possible [65].
2. Multiple forking of similar blockchain is possible
   A blockchain platform that has been forked previously can be forked again, as shown by Bitcoin blockchain which was forked by Bitcoin Cash on January 8, 2017, and a few months later Bitcoin Gold also forked from Bitcoin blockchain on October 24, 2017 [51]. Using this principle, the Litecoin blockchain

that has been split into Litecoin and Litecoin Cash blockchains after the hard fork can be split even further.

One half of the split blockchain from Litecoin blockchain will be named MOCK for this simulation, representing the new blockchain while the other half will be left as is (Litecoin blockchain). The word MOCK will be used from this point onward to describe the international trade cryptocurrency design project.

4.8.2 Writing litepaper as proposal of elements to modify

For the simulation, technical information will be limited to some extent, and so, litepaper is more fitting to use than whitepaper. Please note that the information contained in the passages below are for simulation purpose only and might be different in actual future implementation. Information in MOCK project litepaper comprises of:

1. An introduction to the project
   MOCK is a stablecoin tied to Kuwaiti Dinar (KWD), the world strongest circulating currency.
2. How the project can solve a problem (value proposition)
   MOCK is specifically developed to address various issues in international trade regarding payment, from fees, processing time, and the processes itself. The need for bank as intermediated central authority can be removed by using the decentralized digital currency MOCK.
3. Actual data to support the claim of the existence of the problem
   Possibly every argumentation about the current payment system used in international trade, from monetary settlement using banks, SWIFT system, etc. that have been mentioned continuously in background of study and literature reviews are going to be included in this part of the litepaper (e.g., slow processes in bank remittance, faster settlement in SWIFT requires higher fees, etc.)
4. Crypto composition
   Tokenomics is a generic term that is often interpreted as cryptocurrency supply composition, but since MOCK is sourced from Litecoin blockchain, it is classified as coin-type cryptocurrency rather than token-type cryptocurrency, meaning the term Tokenomics doesn't fit, and so, MOCK's composition will simply be referred as crypto composition to avoid ambiguity. Another evidence to support this classification is the absence of smart contract in the blockchain, which is also the reason why contract address is not available. Litecoin blockchain is an offshoot of Bitcoin blockchain, so MOCK undoubtedly inherits traits of their predecessors, until some modification take place. Ticker symbol serves as MOCK's identifier in the cryptocurrency market. The crypto supply of 500 million MOCK is divided into two components. Among these components is tokenised funds or a crypto pegged by fiat tokens to turn 117.43 million MOCK into a stablecoin, while the remaining coins are open for sale as fair launch supply, meaning the 382.57 million MOCK is going to be allocated for conducting ICO and be treated as a regular cryptocurrency. MOCK can be purchased using ETH where 0.0005 ETH equals 1 MOCK. The minimum number of coins sold required for the project to be considered a success in ICO is 76.51 million MOCK while the highest amount possible is capped at 382.57 million MOCK, exactly the amount of fair launch supply. MOCK doesn't use crypto launchpad as the project is aimed to be listed on Centralized Exchanges. For quick summary of the composition, see Table 3.

Table 3: Composition of MOCK Crypto Project (Simulation)

Project name	MOCK
Ticker symbol	MOCK
Contract address	N/A
Crypto type	Coin: Litecoin/Bitcoin fork
Crypto supply allocation	500 million MOCK
Tokenised funds (stablecoin)	117.43 million MOCK
Fair launch supply	382.57 million MOCK
Purchase medium	ETH (1 MOCK = 0.0005 ETH)
Soft Cap (20% of fair launch supply)	76.51 million MOCK = 38.26 ETH
Hard Cap (All of fair launch supply)	382.57 million MOCK = 191.29 ETH
Launchpad	N/A

5. Team, vision, and roadmap
   MOCK project is handled by three developers. The project has a vision of creating an ideal finance ecosystem without needing intermediaries. The roadmap of MOCK project consists of three phases plan, as illustrated in Table 4.

Table 4: Roadmap of MOCK Crypto Project (Simulation)

Roadmap Phase 1	Roadmap Phase 2	Roadmap Phase 3
Create a team of administrators	Update website interface	Major security audit
Website launch	Conduct a massive social medias campaign	Hold an event to socialize MOCK to international trade businessmen
Create social media accounts: Twitter, Telegram, etc.	Request for collaboration with WTO	Meet with international regulatory entities to discuss regulatory framework for MOCK implementation as international trade exchange medium
Begin ICO phase	Request for collaboration with international banks	
Prepare for market listings at Coin Market Cap and CoinGecko	Get listed on markets: Coin Market Cap and CoinGecko	
Prepare for exchange listings at Binance and Kraken	Get listed on exchanges: Binance and Kraken	Build a physical office
Prepare for wallet listing at TrustWallet	Get listed on TrustWallet	Establish MOCK as an enterprise
Amass 2,500 Telegram members	Amass 10,000 Telegram members	Join larger crypto and finance communities
Reach 1,000 MOCK holders	Reach 2,500 MOCK holders	Reach 10,000 MOCK holders

6. Market, exchange, and wallet
   MOCK will enlist to Coin Market Cap and CoinGecko crypto markets. As for exchanges, MOCK will use Binance and Kraken. TrustWallet will be the wallet of choice for this crypto project.
7. Website, contact details, and downloadable software (optional)
   This part of the litepaper information doesn't need to be simulated as it is self-explanatory. Website and contact details serve as the basis of trust that members have toward the project. MOCK doesn't have any downloadable software.

4.8.3 Spreading news through online communities

MOCK will build communities to gain support on the upcoming project by creating various accounts on social medias such as, Twitter account at @mockcrypto, subreddit on Reddit named r/mockcrypto, Telegram group on t.me/mockcryptoofficial and Telegram channel on t.me/mockcryptochannel. The written litepaper can be spread through these social medias. Of course, these online communities are nonexistent as they are for the crypto design simulation.

4.8.4 Using vote to decide on the date of fork

Votes are gathered on MOCK's official Telegram channel with other social media platforms (Twitter and Reddit's subreddit) are used as a mean of directing the visitors to Telegram channel to participate with the voting. MOCK's development team gave freedom to the voters to choose one exact date out of three options given to commence fork. The options are June 10, 20XX; June 15, 20XX; or June 20, 20XX. Majority of the voters decided to commence fork on June 20, 20XX.

4.8.5 Updating the project progress

Vote results are revealed to the community members, followed by announcement by the MOCK's development team about the latest update of the project, like how many members have been amassed in social platforms. The project leader also delivers a short, recorded speech about the future direction of the project. By doing so, the responses from the community members may vary, and they can be used to predict how the project execution will turn out.

4.8.6 Commencing hard fork of Litecoin blockchain

Developers will fork the Litecoin blockchain on the decided date to produce a new blockchain that is going to be used as the basis for MOCK's blockchain creation. Community members, especially investors can anticipate the forking since the information of the forking time was revealed to the investors.

4.8.7 Postfork modification and addition of KYC

MOCK's crypto composition that the developers designed are realized through the modification of existing programming elements formerly owned by Litecoin blockchain to fit in with the prescripted conditions. The original information of Litecoin blockchain can be found in

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2011 Litecoin whitepaper [65]. Any specified information in MOCK's crypto composition is intended for overwriting what was originally Litecoin's crypto composition contained in one half of the split blockchain (e.g.: Litecoin's coin supply is 84 million LTC while MOCK's coin supply is at 500 million MOCK. The former must be overwritten by the latter to realize the new cryptocurrency design.).

The other existing functions in Litecoin's original program not associated with its native cryptocurrency are kept as they were in this new blockchain for MOCK. The functions are:

1. Mining algorithm: PoW Scrypt
   Scrypt (pronounced "ess crypt"), not to be confused with script, is a Proof-of-Work (PoW) algorithm created as an alternative to SHA256 which is commonly used in Bitcoin mining process [66]. Founded by Colin Percival in 2009 as a protective measure for cryptocurrency with password-based key derivation function, Scrypt was first implemented on crypto Tenebrix in 2011 and has been adapted by Litecoin as mining mechanism in the same year. Scrypt's mining process is mainly done to GPU (Graphic Processing Unit) as GPU has better processing capability for certain algorithms compared to CPU (Central Processing Unit).
2. Average transaction time of 2.5 minutes
   Litecoin's processing speed to complete a transaction is not tweaked by MOCK's developer as it is already fast enough compared to settlement process by bank.

Following postfork modifications, the next step is regarded as optional but nevertheless still important as it is for anticipating the launching of ICO. Normally the optional items to be fulfilled are KYC and smart contract audit, but smart contract audit is unnecessary for MOCK since the blockchain doesn't base itself on smart contract. MOCK's KYC processes are done according to the steps provided by [60] which has been outlined in cryptocurrency design framework explanations. The only difference in the KYC procedure applied by MOCK is the exclusion of smart contract, so developers instruct investors to direct fund transfer to the developers' private crypto wallet address after completing KYC. Following the changes, below are the processes of KYC that MOCK development team will commence:

1. Investors input their personal information in the web designated by the crypto development team.
2. Afterwards, the investors provide their identity card or residence permit, including secret PIN to prove the authenticity of their identity.
3. These information are stored in eID provider's app, which is shared to the KYC provider for further verification.
4. Post verification, it the result is approved, the information is going to be stored inside blockchain. The investors can check in the web where they initially input their personal information to ensure that the verification result is correctly recorded.
5. The developers inform the KYC result to the investors. If the developers approved it, then investors are instructed to send specific amount of fund to the developers' private wallet address. The minimum amount and the maximum amount of fund that the investors are allowed to send is at 1 ETH and 20 ETH respectively, so any amount between or equal to 1 ETH and 20 ETH is acceptable.
6. Investors with accepted KYCs are given the MOCK coin according to the amount they initially sent to the developers. Every single MOCK worth 0.0005 ETH. If the investors sent 3 ETH, then 6,000 MOCK will be sent to the investors' wallet address, or if the amount is 5 ETH, then it will be 10,000 MOCK sent to the investors. Every investors can purchase from 2,000 MOCK to 40,000 MOCK. Despite the Soft Cap and Hard Cap target, purchase amount is limited for every investor to prevent some individuals or groups from monopolizing the supply of MOCK.
7. However, if the KYC result isn't satisfactory, then the investors won't be instructed to send required amount of ETH tokens to the developers. Thus, the exchange never takes place if the investors fail the KYC.

Part of the KYC processes, particularly the last three, are tied with ICO phase of MOCK cryptocurrency design simulation.

4.8.8 Massive crowdsale for ICO

While not actually being officially listed on crypto exchanges, CEXs can assist new cryptocurrency projects to start ICO on CEX platforms. The ICO results will determine the listing status of the crypto projects in the future. For MOCK, the developers will commence with crowdsale to massively collect funds from investors

right from the start. Reaching Soft Cap is essential for MOCK to be officially listed on Binance and Kraken, the CEX platforms of choice. The purchase condition has been explained specifically in the previous subsub section about postfork modification and KYC procedures.

4.8.9 Official listings and collateralization

If MOCK's ICO was a success, the next phase will follow major platforms that MOCK is going to be listed on, such as Coin Market Cap and CoinGecko for the cryptocurrency markets, Binance and Kraken for exchanges, and TrustWallet for the official MOCK crypto wallet. While Binance and Kraken are used to conduct ICO crowdsale campaigns, the actual exchanges listing process can only be completed after the ICO is considered successful. TrustWallet is an ETH compatible wallet, the currency of exchange that MOCK's development team chose to trade MOCK with. It is only natural that MOCK's official crypto wallet partner should be TrustWallet to make exchanging ETH to MOCK and vice versa convenient.

To wrap things up, 117.43 million MOCK that isn't offered at ICO is going to be tied with the fiat currency Kuwaiti Dinar (KWD) as an attempt to stabilize price flow, turning it into a stablecoin. Why KWD is used to collateralize the crypto is because as of March 5, 2022, it is still the strongest circulating fiat currency in the world [67]. The relatively small fluctuation range of KWD makes it the best fiat currency to be tied with MOCK to realize its ultimate purpose of supporting international trade payment process as a stable digital currency. KWD exchange rate has never fell below USD rate with the average exchange rate between October 23, 2021–April 20, 2022 of 1 KWD = 3.3008 USD [68]. It is so powerful that it may be a permanent solution to the fiat tokens stablecoin method weakness of price reflection to fiat money (This paragraph answers research question #2: What type of stablecoin is the most suitable to stabilize the price of the cryptocurrency that will be designed, to make it appropriate for use as payment medium in international trade?).

Since users demand and reserve currency availability are the very determinant of stablecoin maximum supply changeability, the collateralized 117.43 million MOCK supply may increase in number depending on these factors, and in the end might increase the overall coins' supply to exceed 500 million MOCK. Most existing stablecoins do not have a concrete maximum supply value and the limit changes over time depending on the aforesaid determinants. Examples of this particular characteristic of stablecoin is going to be discussed in a separate section comparing MOCK with other existing stablecoins.

4.9 Checking Criteria Fulfillment for New Cryptocurrency Design

After proposing cryptocurrency design and simulation so far, this study will take a look back to the checklist created prior to set requirements for an ideal cryptocurrency system, including blockchain. What requirements have been fulfilled in the new cryptocurrency design and simulation are contained in Table 2.

"Convenience of use" aspect of cryptocurrency design is partially fulfilled with the design complied to the condition of enlisting to more than one cryptocurrency exchanges, namely Binance and Kraken, and backing MOCK with KWD, the world's strongest fiat currency. "Compliance measures" aspect is also partially fulfilled with the MOCK project using permissionless blockchain and Centralized Exchanges (CEXs) to realize centralized cryptocurrency ecosystem and by enforcing KYC protocols to investors as a preventive measure to tackle AML/CTF possibility.

Other conditions represented with question marks instead of a direct "Yes" or "No" statement mean that those conditions fulfillment can only be made sure of by implementing the project design, and since simulation has a limited capability to gauge the system's true potential and actual implementation has yet to be carried out because it is out of the research scope of this study, these parts will be represented by question marks to show the ambiguity of its fulfillment status.

"Smart contract programming (Solidity)" and "Smart contract programming (EVM)" aspects are entirely excluded since the cryptocurrency MOCK is based on forking of Litecoin blockchain, which doesn't use smart contract technology as it rooted from Bitcoin source code originally. All indicators for these aspects are marked "No" for this reason.

4.10 Comparison Between the Newly Designed Cryptocurrency and Other Existing Cryptocurrencies

MOCK's design is going to be compared with several existing cryptocurrencies with TrueUSD (TUSD), Tether (USDT), USD Coin (USDC), and Rupiah Token (IDRT) representing fiat tokens stablecoins, and Bitcoin, Ether, and XRP representing regular cryptocurrencies not tied with

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fiat assets. The following paragraphs are describing each crypto in the order they are mentioned.

TrueUSD with ticker symbol TUSD is a stablecoin tied to USD issued in 2018 and in terms of operations, compliance, and banking relations are supported by TrustToken, a platform providing collateralization services for cryptocurrency [69]. TrueUSD is registered and regulated with the Financial Crimes Enforcement Network (FinCEN) and as a result, is applying KYC/AML risk-based compliance program to comply with FinCEN's requirements. TrueUSD is live on Ethereum, Tron, BNB Chain (formerly Binance Chain), and Ava blockchain platforms. TrueUSD's smart contract has been audited by CertiK, an international company specializing in blockchain security which declared that the smart contract is given a satisfactory security score of 92.9 out of 100 with the overall rating classified as GOOD [70]. TrueUSD is exchangeable at more than seventy exchanges around the world, like Binance, Huobi, Bittrex, HitBTC, etc. and is integrated with various platforms such as Crypto.com, Vodi, Celsius, and Nexo to store TUSD on. As of April 23, 2022, the circulating supply of TrueUSD according to CoinGecko is 1.3 billion TUSD [71]. Since its inception, TrueUSD project also issued another tokenised products, namely TrueGBP (TGBP) tied to British Pounds (GBP), TrueCAD (TCAD) tied to Canadian Dollars (CAD), and TrueAUD (TAUD) tied to Australian Dollars, and the project aspires to create more tokenised funds for other fiat currencies [72].

Tether with ticker symbol TUSD has been mentioned continuously in this study. Launched in 2014, it has since earned a reputation for being the first stablecoin which inspired many other cryptocurrencies to be tied with fiat currencies. As the original stablecoin, it is hosted primarily on Bitcoin blockchain via Omni Layer protocol to create a decentralized environment for Tether and is issued and owned by Tether Limited, a Hong Kongese company [73]. Tether also tokenised Euro, with this variant having ticker symbol EURT [10]. Tether's smart contract passed security qualifications to be listed on digital asset exchanges according to audit result by CertiK, which declared that the smart contract with a total score of 93 out of 100 [74]. Being the oldest stablecoin, Tether is easy to access across many exchanges (i.e., Coinbase, Kraken, and KuCoin) and wallets (i.e., FTX and Poloniex) [75]. According to CoinGecko, as of April 23, 2022, Tether's circulating supply is 83.11 billion USDT [76]. Tether is notorious for suffering from theft of $31 million worth of USDT by unknown perpetrator(s) in 2017 [77], raising doubt from crypto communities of its security effectiveness.

USD Coin with ticker symbol USDC is created by Centre, a consortium project by Coinbase, a crypto exchange and Circle, a payment technology company in 2018 [78]. Like TrueUSD and Tether, USD Coin is pegged to USD. USD Coin is built to be compatible with various blockchains namely Ethereum ERC20, Algorand ASA, Avalanche ERC20, Flow FT, Hedera SDK, Solana SPL, Stellar, and TRON TRC20. The stablecoin uses Verite, a decentralized open-source identity protocol to conduct secure settlement processes that abide to KYC/AML. USD Coin is available on more than fifty exchanges, like Airswap, Biki, Binance, Hotbit, SimpleSwap, Coinbase and many more, and also with twenty crypto wallets as official partners such as AlphaWallet, AtomicWallet, and TrustWallet among many others, the token has displayed its great accessibility across many platforms. As of April 23, 2022, the circulating supply of USD Coin according to Coin Market Cap is 49.89 billion USDC [79]. Despite the massive environment it is built on, Centre's USD Coin smart contract is not audited.

Rupiah Token with ticker symbol IDRT is a stablecoin pegged to Indonesian Rupiah (IDR) issued by PT Rupiah Token Indonesia, a company founded by Jeth Soetoyo, an Indonesian entrepreneur in 2019. Rupiah Token is built on Ethereum blockchain [80]. It has the speed, security, transparency, and other benefits that any ERC20 tokens will inherit from Ethereum blockchain. Rupiah Token's smart contract has been audited by CertiK, which declared that the smart contract passed security qualifications to be listed on digital asset exchanges with a perfect security score of 100 out of 100 [81]. Rupiah Token has been listed on Pintu, Uniswap, and Binance as exchanges and are currently using Krystal and TrustWallet as the token's official crypto wallets. As of April 23, 2022, the circulating supply of Rupiah Token is 282.91 billion IDRT. This amount includes IDRB and IDRTL, with both are IDRT's counterparts on BNB Chain and Luniverse blockchain platforms respectively [82]. Rupiah Token's live price can be viewed at Coin Market Cap and CoinGecko.

Bitcoin, Ether, and XRP as three major cryptocurrencies are famous for having independent blockchain platforms—Bitcoin on Bitcoin blockchain, Ether on Ethereum blockchain, and XRP on Ripple blockchain. Bitcoin is the only one

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among the three who doesn't function on a smart contract technology, as Ethereum is the first to introduce that technology. Ether on the other hand has unlimited supply of tokens with the current circulating supply at 120.49 million ETH. Bitcoin is capped at 21 million BTC while XRP is limited to 100 billion XRP. So far, Bitcoin holders and the market has accumulated amount of 19 million BTC while almost half of the entire XRP supply equals 48.11 billion XRP is circulating around the market and investors. The information of these cryptocurrencies circulation and total supply is taken from Coin Market Cap as of April 23, 2022 daily update [83]. BTC, ETH, and XRP's greatest drawback is the absence of fiat assets as reserve currencies which left volatility issue in these traditional cryptocurrencies remained unsolved.

The collective summary for all cryptocurrencies discussed in this sub section are illustrated below in Table 5 for the existing stablecoins and Table 6 for the existing regular cryptocurrencies. Each of them is to be compared with MOCK design.

Table 5: MOCK vs. Existing Fiat Tokens

	MOCK	Bitcoin	Ether	XRP
Ticker symbol	MOCK	BTC	ETH	XRP
Fiat collateral	KWD	N/A	N/A	N/A
Blockchain	Bitcoin (through Litecoin)	Bitcoin	Ethereum	Ripple
Smart contract	No	No	Yes	Yes
Audit score	N/A	N/A	Not Audited	Not Audited
Circulating supply (in billions)	N/A	0.019 BTC	0.12 ETH	48.11 XRP
Supply limitation	Partially unlimited	Unlimited	Unlimited	Unlimited

Table 6: MOCK vs. Existing Standard Cryptocurrencies

	MOCK	TrueUSD	Tether	USD Coin	Rupiah Token
Ticker symbol	MOCK	TUSD	USDT	USDC	IDRT
Fiat collateral	KWD	USD	USD and EUR	USD	IDR
Blockchain	Bitcoin (through Litecoin)	Ethereum, TRON, BNB Chain & Ava	Bitcoin	Ethereum, Algorand, TRON, etc.	Ethereum (as IDRT), BNB Chain (as IDRB), Luniverse (as IDRTL)
Smart contract	No	Yes	Yes	Yes	Yes
Audit score	N/A	92.9/100 by CertiK	93/100 by CertiK	Not Audited	100/100 by CertiK
Circulating supply (in billions)	N/A	1.3 TUSD	83.11 USDT	49.89 USDC	282.91 IDRT
Supply limitation	Partially unlimited	Unlimited	Unlimited	Unlimited	Unlimited

From the summary, one notable similarity between every stablecoin is the lack of supply limitation. Every whitepaper of TrueUSD, Tether, USD Coin, and Rupiah Token and circulating information across the internet and cryptocurrency markets where the comparison is sourced from didn't show that there is actual limit to stablecoins supply, more specifically fiat tokens or tokenised funds, indicating that supply can be increased when there is demand and adequate amount of reserve fiat money. Last but not least, MOCK is designed to have a split composition where one half is pegged to Kuwaiti Dinar (KWD) as its reserve asset, whereas the other half is launched through standard ICO procedure like a regular cryptocurrency (This paragraph answers research question #3: What differs the newly designed cryptocurrency from another existing cryptocurrency that makes it a possible alternative of transaction system for international trade?).

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4.11 Designing Crypto-based International Trade Payment System

4.11.1 Current international trade payment processes

International trade processes are revolving around corporate, banks, governing bodies, and facilitators as the core entities, where banks play important role in concluding payment processes within international trade. That is, until disruptors appeared and display potential in changing how international trade works. In entirety, the current international trade ecosystem, or dubbed trade finance by many, involves a series of process that could be categorized in five groups depicted in Figure 4, including the colours they are visualized with, such as:

1. Physical shipment of goods (marked with green arrows)
   Exporter (seller) sends the goods requested by the importer (buyer) to freight forwarder, which will undergo an inspection by an authorized inspector before being dropped at the export terminal. The goods are going to depart for shipment with the destination at the terminal of the importer's country. After all necessary conditions are fulfilled, the goods will be sent directly to the importer from the terminal. The overall shipping process is very linear.
2. Transfer of instruction and documents (marked with blue arrows)
   Documented information of goods accompanies the moving goods for exporting country customs to check. Prohibited goods are immediately disposed. The customs also collect tariffs from the exporter before allowing the goods to depart for shipment. Upon arrival, the importing country customs also follow similar procedures, before declaring that the arrived goods can depart to be sent to the importer. Invoice is however, sent separately from the exporter to the importer with the help of invoicing platform. Both the importer and the exporter can also communicate via banks of each respective country regarding documents required by both banks, with a correspondent bank acting as the mediator between banks from both countries—facilitated by SWIFT system for sending messages. Physical documents delivery is performed by document couriers across borders. The couriers also carry goods' insurance documents from the exporting country to the importing country.
3. Risk mitigation and compliance (marked with purple arrows)
   Insuring goods is necessary for the exporter to transfer the risk of financial loss to the insurance company, as unpredictable accidents that can affect the goods' condition negatively may happen during shipment. For compliance, the exporter and the importer are obligated to communicate with each other using representative banks as intermediaries as a proof of complying to the regulations enforced by the exporter's bank and the importer's bank. Banks must supervise the whole trade process by checking documents to determine whether to proceed with payment or not. Disobedience may result in trade processes being halted, failure of goods delivery to the importer, and payments to the exporter being denied.
4. Financing (marked with orange arrows)
   With strict rules to abide by, banks are also offering benefits to the exporter and the importer. As a legal financial authorities, banks are allowed to disburse a specific amount of bank loans for customers engaged in international trading activities. The interconnected processes across multiple layers might cause some delay to certain stage within the process. For example, if the import customs declare the goods as being hazardous, thus stopping the goods from being delivered to the importer, payment cannot be forwarded to the exporter's bank. The delay may cause both the exporter and the importer to be unable to pay suppliers within agreed credit terms, as the consequence of disrupted cashflow. To prevent this from occurring, bank loans can be used to pay the suppliers on time and with this backup funds, the good business relationship between the exporter and the importer can be maintained.
5. Payment (marked with red arrows)
   Documents required by the banks mentioned before are instrumental in payment execution in international trade. The importer sends a specific amount of funds from the importer's bank as requested by the exporter in the invoice received via invoicing platform, to the exporter's bank. SWIFT system acts as the bridge for the banks in communicating messages across countries, while correspondent bank performs currency swap from the importer's country currency to the exporter's country currency before finishing the settlement process. Once the exporter's bank informs the exporter that the funds have been received and the importer is made known that the goods had arrived safely, all parties are

relieved of obligatory duties and the transaction is considered complete.

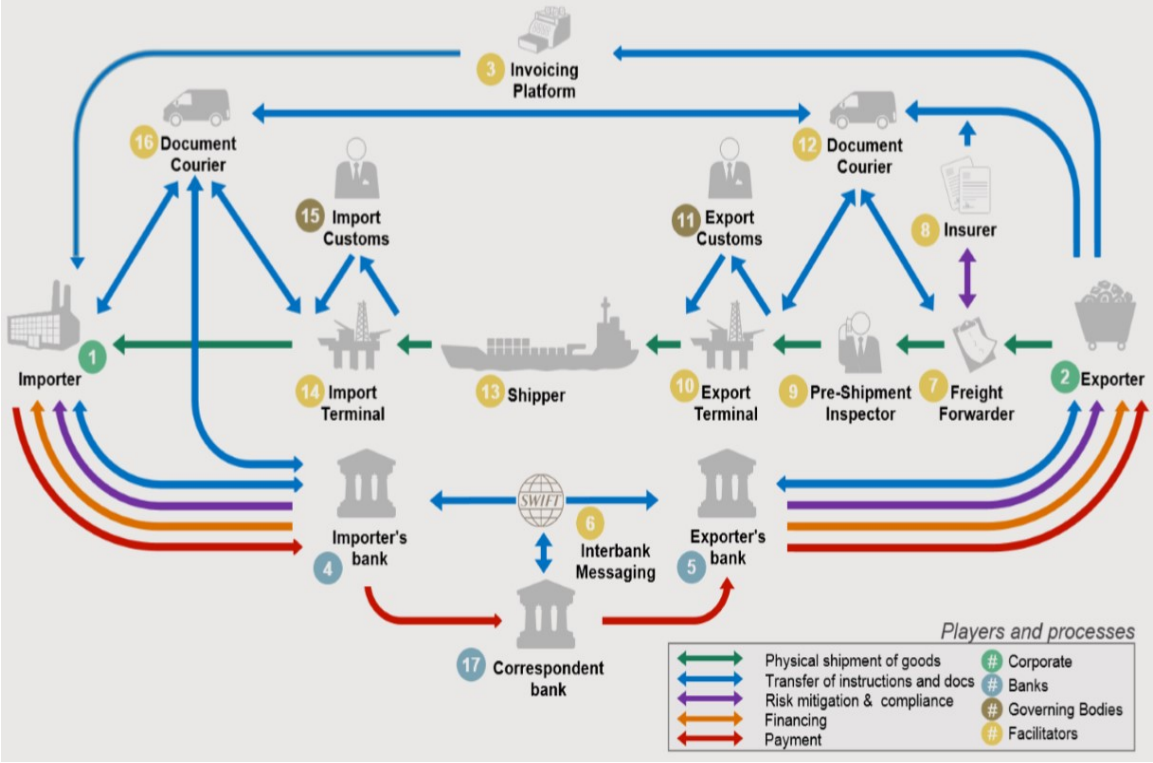

Figure 4: International Trade Chain of Activities and the Entities Involved Within [30]

International trade environment is not cost effective and has lengthy process sequences with too many parties involved in the practice, especially the facilitators, as using the service from different parties produce costs for the exporter and/or the importer to bear responsible with. Obviously, goods shipment related costs are inevitable, but with banks' working mechanisms, it only added unnecessary duties for the exporter and the importer to fulfill, like documentary obligations for the banks, and service charges to execute payment which varies depending on the speed of execution with SWIFT system. The faster it is, the more costly it is. Based on these inconveniences, blockchain and cryptocurrency system designed in this study is aimed at narrowing the bureaucracy of the currently existent international trade, fulfilling the disruptor entity role as described by [30].

4.11.2 International trade payment protocol with blockchain and cryptocurrency

The point of using blockchain with cryptocurrency as a payment protocol is to simplify the current international trade processes with the depiction has removed banks from being the central authority for payment processing and the replacement is blockchain with cryptocurrency system as designed prior. The simulation of the processes will use MOCK, the exemplary crypto designed in this study (This simulation also provide the answer to research question #4: How cryptocurrency as an exchange medium and blockchain as the technology that backs cryptocurrency can solve the issue of intermediation in international trade?).

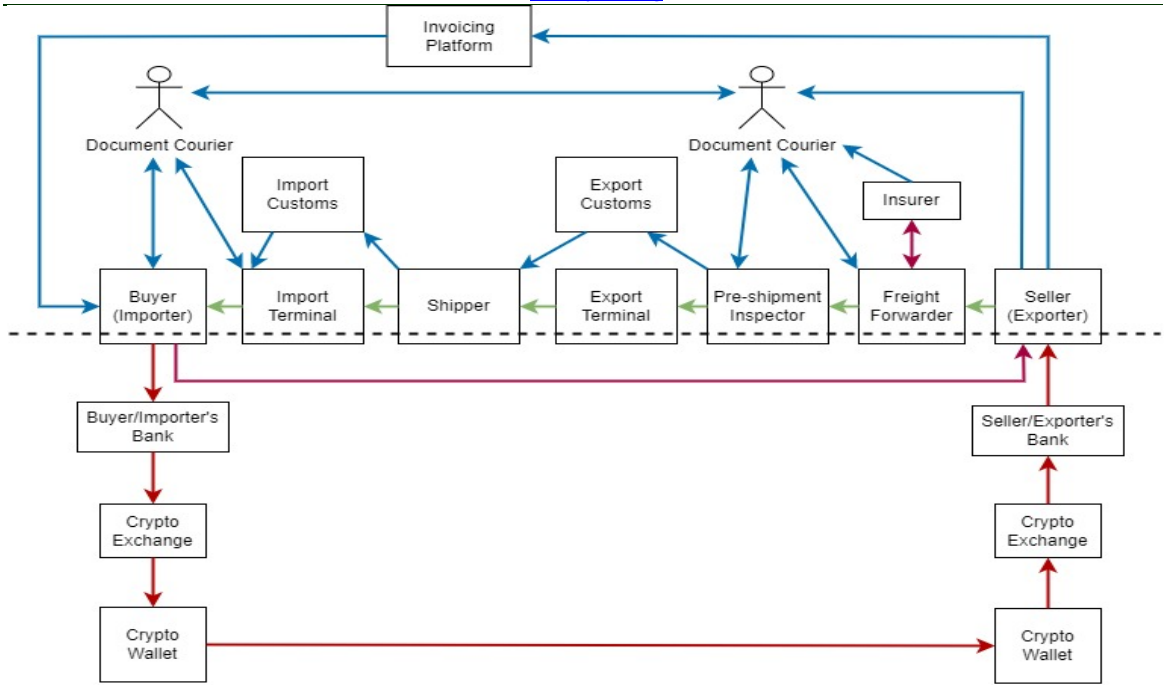

Figure 5: Simplified International Trade Activities with Blockchain and Cryptocurrency

To distinguish what has changed and what remains unaffected by the application of the blockchain and cryptocurrency design, Figure 5 is separated into two parts by dashed line. The upper half is part of the international trade activities involving goods delivery and the lower half is the payment processing using blockchain with cryptocurrency system. The processes grouping is indicated in a similar fashion to the currently implemented international trade activities according to previous study by [30] as follows:

1. Physical shipment of goods (marked with green arrows)
   The overall shipping process in this design is very linear and similar to the current international trade activities.
2. Transfer of instruction and documents (marked with blue arrows)
   Instruction and documents transfer devoid of banks interference in payment process is almost entirely similar to the current international trade activities, with the difference lies in the document courier role being diminished as carrying documents from banks are not needed, and since messaging between banks do not exist in this scenario, SWIFT system is unneeded. The overall process still remains the same for the most part but is slightly shortened with the absence of banks.
3. Risk mitigation and compliance (marked with purple arrows)
   Mitigating risk related with goods delivery is still essential in this newly designed international trade system. However, the compliance situation in this design has experienced major change as it is one-sided, where the importer is obligated to send transaction hash (payment proof of settlement with cryptocurrency) to the exporter.
4. Payment (marked with red arrows)
   Removing banks as intermediaries in reality only diminish them from the payment authorization and execution, but to properly use cryptocurrency as payment medium in international trade, swapping currency is necessary. The importer must convert the local fiat currency into MOCK via crypto exchange platform, store them in crypto wallet, and use the crypto wallet to send MOCK to the exporter's crypto wallet. The importer can show the transaction hash associated with the payment to the exporter as a proof that payment has been executed, as stated in the compliance process. The payment can be considered as settled at this point, but if desired by the exporter, the received MOCK can be converted into the exporter's desired currency with crypto exchange and transfer the converted currency into the exporter's bank.

Of all the processing groups, financing process, previously illustrated with orange arrows

in the currently used international trade system, is notably absent from the new design. This is because a proper financial backup for the importer and the exporter is not present with the removal of banks as intermediaries, and as such, spawns a new threat to the business parties involved in a decentralized international trade environment.

4.12 Findings and Discussion

This study has obtained several findings concerning the designed system and the existing system, including the benefits and the potential flaw that opens a room for further study. The findings are as follows:

1. Cryptocurrency design approach of hard fork proposed by reference [9] didn't explicitly state ICO as a part in the cryptocurrency creation process with existing blockchain fork, which implied that hard fork is not limited to the forking of Bitcoin blockchain or any blockchain based on Bitcoin's source code like Litecoin, but is also possible to do with a smart contract based blockchain like Ethereum.
2. The most ideal reserve asset type to use for backing cryptocurrency is fiat currency, being the most effective and efficient compared to other methods to produce stablecoin, yet its symmetrical value is its strength as well as its weakness. The rise and decline of fiat tokens value are determined by the monetary value of the currency it is pegged to. This study proposed to tie MOCK, the designed cryptocurrency in this paper with Kuwaiti Dinar (KWD), the strongest currency in the world to strengthen the weakness.
3. Stablecoin supply is never intended to be limited since its initial development, as evidenced by TrueUSD, Tether, USD Coin and Rupiah Token in the dissection of these stablecoins discussed before. As the reserve asset for stablecoin, fiat money is never limited in amount and is issued regularly to keep the purchasing power of its users and the fiat money market value relatively stable to prevent economic collapse. Stablecoin seemingly uses similar principle, and this might be the reason why stablecoin supply is not limited, as it is regarded as a crypto equivalent of fiat currency.
4. ICO is usually targeted to investors seeking capital gain in investment, but stablecoin is offering value stability right from the beginning, thus removing the chance of earning significant capital gain since stablecoin is tied to fiat currency(s). Issuing a stablecoin with the entire supply pegged to fiat currency(s) turns the crypto into an exchange medium, limiting its use outside of transactional purposes. If this is the case, then the stablecoin can be listed to markets and exchanges immediately by skipping ICO.
5. With respect to findings number 2 and 3, to extent the use of stablecoin into a cryptocurrency capable of following the cryptocurrency market trends and simultaneously usable as a fiat currency equivalent for cryptocurrency, the design of MOCK proposed a split composition of the cryptocurrency supply, where one half is tied to KWD as the reserve money, and the other half is not backed by fiat asset, making it possible to use as an investment tool. This half is also possible to be sold in ICO as it doesn't contain the stablecoin property. The detailed illustration is explained in the simulation of MOCK process of stablecoin design with hard fork approach. Currently there is no cryptocurrency, at least the major ones that is developed with this design, opening the possibility for a future research.
6. International trade requires an intensive care to prevent MOCK from being misused as a tool of crime, as seen commonly in many cryptocurrencies before it. To assist the joint-effort to be realized, more parties' involvement is necessary, thus permissionless blockchain is the most suitable blockchain type to use for the newly designed international trade environment as it allows regulators and authorized entities to participate in developing consensus that mutually benefits every stakeholders.
7. Total decentralization and removal of intermediaries are not possible within international trade chain of activities. Physical goods and its underlying documents are part of the ecosystem that cannot be replaced by any means whatsoever, and so, only the payment related aspects of international trade can be decentralized with blockchain. More importantly, banks help in the process of swapping fiat currency to cryptocurrency and vice versa for the exporter and the importer. Certain parts of the world still forbid crypto from being used, making it reasonable for some parties to prefer possession of real world currencies to virtual assets like cryptocurrency.
8. Despite the obvious benefit of shortening processes in international trade, the designed system is not without a flaw. While payments speed may increase significantly by using cryptocurrency, the process of shipping goods

is almost unaffected by the change in activity sequences. It is hard for the importer to know the right time to make payment, and the exporter can choose to halt the processes of shipment if the exporter is unsure of when the payment is going to be made. The irreversible nature of cryptocurrency transaction also poses a risk to the importer that have completed payments but haven't received the goods bought from the exporter as the exporter has gained the upper hand in this situation. Although this may taint the exporter's reputation, cancelling the shipment of goods may be done by the exporter. This possible flaw indicates that the presence of another watchful eye is needed to make sure that both the exporter and the importer can be benefited mutually.

5. CONCLUSION

5.1 Differences with Previous Works

Reference [9] proposed four different approaches to develop cryptocurrency to replace Cameroon's national currency, namely token approach, hard fork approach, source code fork, and software fork approach. The past research discussed the technical aspects of development, albeit with not actual implementation. In contrast with the findings by this literature, the current study ceases to discuss detailed technical aspects in proposing cryptocurrency as payment medium in international trade and only adapt hard fork as the only approach of development.

Eurosystem, the European Central Bank discussed taxonomy of stablecoins through their occasional paper series [10] which mentioned the differences between tokenised funds, off-chain collateralized stablecoins, on-chain collateralized stablecoins, and algorithmic stablecoins and their possible implications toward modern monetary system. Tokenised funds, also known as fiat tokens, are the safest approach to stabilize cryptocurrency, which is adapted by the current study in attempt to make cryptocurrency a suitable payment medium for international trade yet is only illustrated in the proposed framework with simulation, albeit very limited in technical discussion.

5.2 Answering Research Questions

The conclusions provide answers to a series of research questions previously stated in this paper.

1. How blockchain hard fork can be used to create new blockchain as the initial step of designing a new cryptocurrency?

The processes are carried out by expanding the 7 phases of hard fork approach for crypto development by [9] into a more detailed design, starting from choosing which blockchain platform to fork from, followed by creating proposal of elements to modify which will be documented into the form of whitepaper or litepaper, with the former being technically informative and the latter being concise. At this point, news is spread to cryptocurrency enthusiasts to form communities sharing mutual interest toward the project. The community members will be given access to whitepaper/litepaper of the project and are offered to decide the date to commence hard fork with voting system. Developers will announce the result of the vote afterwards along with the date of the hard fork. After the fork is considered successful, developers of the crypto will adjust the program of the blockchain new split to realize ideas contained in the project proposal, along with application of KYC to filter participants. Then, ICO is going to be held with a direct crowdsale act to gather buyers of the new crypto. Lastly, the crypto will be listed on markets, exchanges, and wallets to shape the transaction ecosystem for the new crypto. The process of cryptocurrency design is concluded by tying it to a fiat currency to turn it into a stablecoin.

2. What type of stablecoin is the most suitable to stabilize the price of the cryptocurrency that will be designed, to make it appropriate for use as payment medium in international trade?

Off-chain collateralized stablecoins require supervision from appointed parties and is no different from the intermediated banking system, whereas on-chain collateralized stablecoins are pegged to another cryptocurrencies, making it less than ideal to rely upon for lowering volatility. Algorithmic stablecoins as the most advanced form of stablecoin are also hard to deal with as updating the algorithm to match the current supply and remuneration of stablecoins is difficult in practice, especially in a permissionless blockchain. This leaves fiat tokens as the last option to collateralize cryptocurrency. Fiat tokens use fiat money to be its reserve asset. With an almost symmetrical value to the fiat currency it is tied with, fiat tokens are capable of becoming a strong monetary weapon amongst cryptocurrencies.

3. What differs the newly designed cryptocurrency from another existing cryptocurrency that makes it a possible

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alternative of transaction system for international trade?

Bitcoin, Ether, and XRP are just regular cryptocurrencies with no backup assets and suffer from the risk of high volatility while the existing stablecoins like TrueUSD, Tether, USD Coin, and Rupiah Token are entirely tied to the fiat currencies they are associated with. MOCK, the designed stablecoin with blockchain hard fork approach have a split composition with one half pegged to KWD, world's strongest fiat money, while the other half remain uncollateralized and is treated like regular cryptocurrency. Stablecoins have undefined supply limit, but with the semi-collateralization of MOCK, the unpegged half of MOCK's supply has a defined limit and is a subject to cryptocurrency market trends. The pegged half, being tied to KWD, has almost no risk of falling in price, which may earn it a potential superiority above every stablecoin in existence, should the design be realized into actual implementation.

4. How cryptocurrency as an exchange medium and blockchain as the technology that backs cryptocurrency can solve the issue of intermediation in international trade?

When MOCK is applied in a simulation case of international trade activities chain using blockchain and cryptocurrency, it relieves banks from the rights of authorizing the processes of international trade and executing payments. The processes become much simpler compared to the intermediated system. Instructions and documents transfer are only required between international trade entities in charge of goods shipment, while in the current system, banks also participate in collecting documents, which only prolong the unnecessary. Compliance is fulfilled by simply sending transaction hash as a proof of payment to the exporter, although risk mitigation remains the same as goods insurance is vital in international trade. Settlement processes are expected to be quicker with cryptocurrency exchanges replacing banks. In regard to settlement, banks are still needed to swap currency to crypto and vice versa. Shipping processes in the newly designed system are similar to the current international trade system.

5.3 Limitations in the Research

Information surrounding cryptocurrency mostly circulates around the internet. Constant web surfing is obviously the only way to connect with the information. Even books and journals that researched on crypto took information from the internet, which is not surprising since cryptocurrency was born as a virtual entity. Past researchers have differing views of crypto and its enablers, making defining it for a common understanding to be hard. This study circumvents this by gathering many sources that can build proper argumentation for the progress of the research, without forsaking credibility of the information.

Another challenge is that the only reliable sources for extracting information about cryptocurrencies mentioned throughout this paper is from their official website, whitepaper or litepaper, and blockchain platforms. Despite the immutability of blockchain, some aspects within the programming can be altered, if the programmer is skilled enough, like the total supply of stablecoins. Thus, there is a possibility of inconsistencies of the information provided as cryptocurrency project itself is not directly regulated by any official regulatory firm, giving a room for the developers to manipulate the continuation of the project to their favor and possibly altering some specifications of the crypto while avoiding suspicion from the unwary crypto holders. The best way to ensure the reliability of the information retrieved is by referencing only from reputable cryptocurrencies with massive community supporters, like Bitcoin and Ether. Ultimately, when referencing to an existing crypto project in an academic research, constant research and updates must be done since the relevance of the information of the crypto project can expire in a short amount of time.

5.4 Recommendations for Future Research

This research focuses on developing framework for crypto-based transaction environment in export-import activities. The contents of this research serve to provide a firm conception of how cryptocurrency can tackle issues within conventional international trade payment methods that rely greatly on the presence of intermediaries, which the researcher believe to be the cause of complexities in the conventional payment method.

However, as the final design still possesses some flaws, further study is strongly suggested by the researcher. Coming up with a method to balance the speed of payment using crypto and the speed of shipment process is a priority to prevent entities involved in the blockchain-focused international trade to be aggrieved at the outcome of being harmed by the practice of decentralized international trade system. Moreover, limiting banks functions in the system leaves another big hole to fill in. There are no entities capable of acting as a helping hand for the exporter and the

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importer to borrow money from. DeFi (Decentralized Finance) lending, a form of loan using cryptocurrency might be just the solution to fill the gap. Future research should include this as a consideration for improvement as well, or even better, bringing everything together and putting them into an actual implementation rather than a concept design.

REFERENCES:

[1] i-SCOOP, "Industry 4.0 and the Fourth Industrial Revolution Explained." https://www.i-scoop.eu/industry-4-0/#:~:text=Industry 4.0 has been defined,and creating the smart factory". (accessed Feb. 16, 2022).

[2] UpKeep, "What is the Difference between Industry 3.0 and Industry 4.0?," 2019. https://www.upkeep.com/answers/preventive-maintenance/industry-3-0-vs-industry-4-0 (accessed Feb. 16, 2022).

[3] Organisation for Economic Co-operation and Development, "International Trade Statistics: Trends in Second Quarter 2021," 2021. https://www.oecd.org/trade/morenews/international-trade-statistics-trends-in-second-quarter-2021.htm (accessed Feb. 16, 2022).

[4] OEC, "Indonesia Economics." https://oec.world/en/profile/country/idn (accessed Oct. 29, 2021).

[5] S. V Scott and M. Zachariadis, "The Society for Worldwide Interbank Financial Telecommunication (SWIFT): Cooperative governance for network innovation, standards, and community," 2013.

[6] C. A. Anisiuba *et al.*, "Analysis of Cryptocurrency Dynamics in the Emerging Market Economies: Does Reinforcement or Substitution Effect Prevail?," *SAGE Open*, vol. 11, no. 1, 2021, doi: 10.1177/21582440211002516.

[7] A. Daniels, "Blockchain and Shareholder Voting: A Hard Fork for 21st Century Corporate Governance," *Univ. Pennsylvania J. Bus. Law*, vol. 21, no. 2, p. 405, 2018, [Online]. Available: https://scholarship.law.upenn.edu/jbl/vol21/iss2/4/.

[8] J. A. Fitzhan, J. Cleine, Y. F. Viriando, G. Wang, and Sfenrianto, "Opportunities and Challenges Blockchain-based Smart Contracts in Indonesia," *Int. J. Emerg. Trends Eng. Res.*, vol. 8, no. 2, pp. 251–258, Feb. 2020, doi: 10.30534/ijeter/2020/02822020.

[9] G. Bell Bitjoka, B. Thomas, and F. Yves Mbarga, "Study in View of Development of a National Cryptocurrency," *Am. J. Comput. Sci. Technol.*, vol. 3, no. 3, p. 46, 2020, doi: 10.11648/j.ajcst.20200303.12.

[10] D. Bullman, J. Klemm, and A. Pinna, "Occasional Paper Series In Search for Stability in Crypto-assets: Are Stablecoins the Solution?," *Bull. Am. Acad. Arts Sci.*, vol. 230, no. 230, pp. 1–55, 2019.

[11] L. Fantacci and L. Gobbi, "Stablecoins, Central Bank Digital Currencies and US Dollar Hegemony," *Accounting, Econ. Law A Conviv.*, 2021, doi: 10.1515/ael-2020-0053.

[12] A. Hertig and Coindesk, "What Is Proof-of-Work?," 2020. https://www.coindesk.com/learn/2020/12/16/what-is-proof-of-work/ (accessed Apr. 08, 2022).

[13] H. Anwar and 101 Blockchains, "Blockchain Proof Of Concept: Enterprise POC Guide," 2021. https://101blockchains.com/blockchain-proof-of-concept/ (accessed Apr. 08, 2022).

[14] M. Li, A. L. Porter, and A. Suominen, "Insights into relationships between disruptive technology/innovation and emerging technology: A bibliometric perspective," *Technol. Forecast. Soc. Change*, vol. 129, pp. 285–296, 2018, doi: 10.1016/j.techfore.2017.09.032.

[15] M. Abdel-Basset, V. Chang, and N. A. Nabeeh, "An intelligent framework using disruptive technologies for COVID-19 analysis," *Technol. Forecast. Soc. Change*, vol. 163, p. 120431, 2021, doi: 10.1016/j.techfore.2020.120431.

[16] M. S. R. A. Hamid, N. R. Masrom, and N. A. B. Mazlan, "The key factors of the industrial revolution 4.0 in the Malaysian smart manufacturing context," *Int. J. Asian Bus. Inf. Manag.*, vol. 13, no. 2, pp. 1–19, 2022, doi: 10.4018/IJABIM.20220701.oa6.

[17] L. Ante, "How Elon Musk's Twitter Activity Moves Cryptocurrency Markets," *SSRN Electron. J.*, no. 16, pp. 1–13, 2021, doi: 10.2139/ssrn.3778844.

[18] C. Cachin and M. Vukolic, "Blockchain Consensus Protocols in the Wild," 2017, [Online]. Available: https://arxiv.org/abs/1707.01873.

[19] J. Polge, J. Robert, and Y. Le Traon, "Permissioned blockchain frameworks in the

industry: A comparison," *ICT Express*, vol. 7, no. 2, pp. 229–233, 2021, doi: 10.1016/j.icte.2020.09.002.

[20] S. Nakamoto, "Bitcoin: A Peer-to-Peer Electronic Cash System," p. 9, 2008.

[21] V. Buterin, "Ethereum Whitepaper," 2013. https://ethereum.org/en/whitepaper/ (accessed Jul. 10, 2021).

[22] A. Rejeb, K. Rejeb, and J. G. Keogh, "Cryptocurrencies in Modern Finance: A Literature Review," *Etikonomi*, vol. 20, no. 1, pp. 93–118, 2021, doi: 10.15408/etk.v20i1.16911.

[23] D. Tapscott and A. Tapscott, *Blockchain revolution : how the technology behind bitcoin and other cryptocurrencies is changing the world*. 2018.

[24] F. Dzulfikar and A. Susanto, "Implementation of Smart Contracts Ethereum Blockchain in Web-Based Electronic Voting (e-voting)," *J. Transform.*, vol. 18, no. 1, p. 56, 2020, doi: 10.26623/transformatika.v18i1.1779.

[25] X. Chen and K. Zhang, "Extending blockchain functionality with statechain," *Proc. Int. Conf. Parallel Distrib. Syst. - ICPADS*, vol. 2017-Decem, pp. 240–247, 2018, doi: 10.1109/ICPADS.2017.00041.

[26] D. Mechkaroska, V. Dimitrova, and A. Popovska-Mitrovikj, "Analysis of the Possibilities for Improvement of BlockChain Technology," *2018 26th Telecommun. Forum, TELFOR 2018 - Proc.*, no. February, 2018, doi: 10.1109/TELFOR.2018.8612034.

[27] C. E. Kendig, "What is Proof of Concept Research and how does it Generate Epistemic and Ethical Categories for Future Scientific Practice?," *Sci. Eng. Ethics*, vol. 22, no. 3, pp. 735–753, 2016, doi: 10.1007/s11948-015-9654-0.

[28] The Object Management Group, *Business Process Model and Notation (BPMN) Version 2.0*, no. January. 2011.

[29] EduMaritime, "International Chamber of Commerce (ICC) Academy - Certifications in Int'l Trade & Finance," 2021. https://www.edumaritime.net/icc-academy (accessed Dec. 03, 2021).

[30] S. Ramachandran, J. Porter, R. Kort, R. Hanspal, and H. Garg, "Digital Innovation in Trade Finance: Have We Reached a Tipping Point?," *Bost. Consult. Gr.*, pp. 1–28, 2017, [Online]. Available: https://www.swift.com/resource/digital-innovation-trade-finance.

[31] W. Bolt, K. Mavromatis, and S. van Wijnbergen, "The Global Macroeconomics of a Trade War: The EAGLE Model on the US-China Trade Conflict," *SSRN Electron. J.*, 2019, doi: 10.2139/ssrn.3338903.

[32] A. Grath, *The Handbook of International Trade and Finance: The complete guide for international sales, finance, shipping and administration*, 4th ed. Kogan Page Limited, 2016.

[33] D. A. Zetzsche, D. W. Arner, and R. P. Buckley, "Decentralized Finance," *J. Financ. Regul.*, vol. 6, no. 2, pp. 172–203, 2020, doi: 10.1093/jfr/fjaa010.

[34] R. Amsden and D. Schweizer, "Are Blockchain Crowdsales the New 'Gold Rush'? Success Determinants of Initial Coin Offerings," *SSRN Electron. J.*, 2018, doi: 10.2139/ssrn.3163849.

[35] C. F. Breidbach and S. Tana, "Betting on Bitcoin: How social collectives shape cryptocurrency markets," *J. Bus. Res.*, vol. 122, no. September 2020, pp. 311–320, 2021, doi: 10.1016/j.jbusres.2020.09.017.

[36] M. Quest, *Cryptocurrency Master: Everything You Need To Know About Cryptocurrency and Bitcoin Trading, Mining, Investing, Ethereum, ICOs, and the Blockchain*. 2018.

[37] Google Cloud, "CoinGecko: Positions itself to launch corporate and institutional digital currency data services with BigQuery." https://cloud.google.com/customers/coingecko (accessed Jan. 18, 2022).

[38] CoinMarketCap, "About CoinMarketCap." https://coinmarketcap.com/about/ (accessed Jan. 18, 2022).

[39] H. Nabilou, "The dark side of licensing cryptocurrency exchanges as payment institutions," *Law Financ. Mark. Rev.*, vol. 14, no. 1, pp. 39–47, 2020, doi: 10.1080/17521440.2019.1626545.

[40] W. Vermaak and CoinMarketCap, "Best Crypto Exchanges in Indonesia," 2021. https://coinmarketcap.com/alexandria/article/best-crypto-exchanges-in-indonesia (accessed Jan. 18, 2022).

[41] S. He *et al.*, "A Social-Network-Based Cryptocurrency Wallet-Management Scheme," *IEEE Access*, vol. 6, no. c, pp. 7654–7663, 2018, doi: 10.1109/ACCESS.2018.2799385.

[42] L. Conway, "Best Bitcoin Wallet," 2021. https://www.investopedia.com/best-bitcoin-wallets-5070283 (accessed Jul. 10, 2021).

[43] O. Alqaryouti, N. Siyam, Z. Alkashri, and K. Shaalan, "Cryptocurrency Usage Impact on Perceived Benefits and Users' Behaviour," pp. 123–136, 2020, doi: https://doi.org/10.1007/978-3-030-44322-1_10.

[44] W. Zou *et al.*, "Smart Contract Development: Challenges and Opportunities," *IEEE Trans. Softw. Eng.*, vol. 47, no. 10, pp. 2084–2106, 2021, doi: 10.1109/TSE.2019.2942301.

[45] U. W. Chohan, "Assessing the Differences in Bitcoin & Other Cryptocurrency Legality Across National Jurisdictions," *SSRN Electron. J.*, 2022, doi: 10.2139/ssrn.3042248.

[46] Financial Action Task Force, "Guidance for a Risk-based Approach to Virtual Currencies," no. June, 2015, [Online]. Available: https://www.fatf-gafi.org/documents/documents/guidance-rba-virtual-currencies.html.

[47] Federal Bureau of Investigation, "Scams and Safety: Letter of Credit Fraud." https://www.fbi.gov/scams-and-safety/common-scams-and-crimes/letter-of-credit-fraud?__cf_chl_jschl_tk__=pI80ZHSQjnzX2AEVUW2i0ThObYWkk1KjGsI76TciKqs-1641034548-0-gaNycGzNCJE (accessed Jan. 01, 2022).

[48] Y. Cai, T. Chevapatrakul, and D. V. Mascia, "How is price explosivity triggered in the cryptocurrency markets?," *Ann. Oper. Res.*, vol. 307, no. 1–2, pp. 37–51, 2021, doi: 10.1007/s10479-021-04298-4.

[49] D. Van Boom and Cnet, "Bitcoin's first ETF hits the New York Stock Exchange on Tuesday," 2021. https://www.cnet.com/personal-finance/crypto/bitcoins-first-etf-hits-the-new-york-stock-exchange-on-tuesday/ (accessed Feb. 03, 2022).

[50] C. Ostroff and The Wall Street Journal, "Bitcoin Price Falls Below $35,000 in Tandem With Stock Selloff," 2022. https://www.wsj.com/articles/bitcoin-price-falls-below-40-000-in-tandem-with-tech-selloff-11642765835 (accessed Jan. 23, 2022).

[51] S. Ramos, F. Pianese, T. Leach, and E. Oliveras, "A great disturbance in the crypto: Understanding cryptocurrency returns under attacks," *Blockchain Res. Appl.*, vol. 2, no. 3, p. 100021, 2021, doi: 10.1016/j.bcra.2021.100021.

[52] L. Nyman, *Understanding Code Forking in Open Source Software: An Examination of Code Forking, Its Effect on Open Source Software, and How it is Vieweed and Practiced by Developers*, no. February 2015. 2015.

[53] P. Vigna and The Wall Street Journal, "The Great Digital-Currency Debate: 'New' Ethereum Vs. Ethereum 'Classic,'" 2016. https://www.wsj.com/articles/BL-MBB-52061 (accessed Apr. 16, 2022).

[54] OECD, "The tokenisation of assets and potential implications for financial markets," *OECD Blockchain Policy Ser.*, 2020, [Online]. Available: http://www.oecd.org/finance/The-Tokenisation-of-Assets-and-Potential-Implications-for-Financial-Markets.htm.

[55] A. Banerjee, "Blockchain with IOT: Applications and use cases for a new paradigm of supply chain driving efficiency and cost," *Adv. Comput.*, vol. 115, pp. 259–292, 2019, doi: https://doi.org/10.1016/bs.adcom.2019.07.007.

[56] V. Heckstall, "What to Write in Your Litepaper," 2018. https://medium.com/verma-media/what-to-write-in-your-litepaper-1a0f13c384b0 (accessed Dec. 29, 2021).

[57] Cointelegraph, "Bitcoin forums: A beginners guide on where to discuss BTC." https://cointelegraph.com/bitcoin-for-beginners/bitcoin-forums-a-beginners-guide-on-where-to-discuss-btc (accessed Dec. 29, 2021).

[58] M. Tiwari, A. Gepp, and K. Kumar, "The future of raising finance - a new opportunity to commit fraud: a review of initial coin offering (ICOs) scams," *Crime, Law Soc. Chang.*, vol. 73, no. 4, pp. 417–441, 2020, doi: 10.1007/s10611-019-09873-2.

[59] D. He, Z. Deng, Y. Zhang, S. Chan, Y. Cheng, and N. Guizani, "Smart Contract Vulnerability Analysis and Security Audit," *IEEE Netw.*, vol. 34, no. 5, pp. 276–282, 2020, doi: 10.1109/MNET.001.1900656.

[60] N. K. Ostern and J. Riedel, "Know-Your-Customer (KYC) Requirements for Initial Coin Offerings: Toward Designing a Compliant-by-Design KYC-System Based on Blockchain Technology," *Bus. Inf. Syst. Eng.*, vol. 63, no. 5, pp. 551–567, 2021, doi: 10.1007/s12599-020-00677-6.

[61] Oddup, "Delving Into ICO Private Sales, Pre-Sales, And Crowdsales," 2019. https://medium.com/@oddup/delving-into-ico-private-sales-pre-sales-and-crowdsales-ded9db642cd0 (accessed Jul. 10, 2021).

[62] Zipmex, "Soft Cap Vs Hard Cap : Kenali Perbedaan Keduanya," 2021. https://zipmex.com/id/learn/soft-cap-vs-hard-cap-kenali-perbedaan-keduanya/ (accessed Dec. 30, 2021).

[63] S. Sanyal, "The Advent of Crypto Launchpad: What Investors Need to Know?," 2022. https://www.analyticsinsight.net/the-advent-of-crypto-launchpad-what-investors-need-to-know/ (accessed Apr. 19, 2022).

[64] J. Craig, "What is an IDO in Crypto: IDO vs. IEO vs. ICO Explained," 2022. https://phemex.com/blogs/what-is-a-dex-ido (accessed Apr. 21, 2022).

[65] Litecoin, "Litecoin Whitepaper." p. 4, 2011, [Online]. Available: https://whitepaper.io/document/683/litecoin-whitepaper.

[66] Zipmex, "Scrypt Mining: Cara Kerja dan Perbedaannya dengan ASIC," 2021. https://zipmex.com/id/learn/scrypt-mining-cara-kerja-dan-perbedaannya-dengan-asic/ (accessed Apr. 20, 2022).

[67] A. Kabra and The Teal Mango, "20 Strongest Currencies in The World 2022," 2022. https://www.thetealmango.com/featured/strongest-currencies-in-the-world/ (accessed Apr. 21, 2022).

[68] Exchange Rates UK, "Kuwaiti Dinar to US Dollar Exchange Rate," 2022. https://www.exchangerates.org.uk/KWD-USD-exchange-rate-history.html (accessed Apr. 21, 2022).

[69] TrueUSD, "TrueUSD Official Website." https://trueusd.com/trueusd (accessed Apr. 23, 2022).

[70] CertiK, "CertiK Audit Report For TrueUSD (trueusd.com) TUSD," 2018, [Online]. Available: https://certik-public-assets.s3.amazonaws.com/CertiK-Audit-for-TrueUSD.pdf.

[71] CoinGecko, "TrueUSD (TUSD) Price at CoinGecko." https://www.coingecko.com/en/coins/true-usd (accessed Apr. 23, 2022).

[72] TrueUSD, "TrueUSD Whitepaper," no. 2, p. 6, 2019, [Online]. Available: https://www.allcryptowhitepapers.com/wp-content/uploads/2018/05/true-usd-whitepaper.pdf.

[73] Tether Limited, "Tether Whitepaper," p. 20, 2014, [Online]. Available: https://assets.ctfassets.net/vyse88cgwfbl/5UWgHMvz071t2Cq5yTw5vi/c9798ea8db99311bf90ebe0810938b01/TetherWhitePaper.pdf.

[74] CertiK, "CertiK Audit Repot for Tether (USDT)," 2019, [Online]. Available: https://certik-public-assets.s3.amazonaws.com/CertiK-Audit-for-tether.pdf.

[75] Tether Limited, "Tether Official Website: Exchanges and Wallets." https://tether.to/en/tether-for-exchanges (accessed Apr. 23, 2022).

[76] CoinGecko, "Tether (USDT) Price at CoinGecko." https://www.coingecko.com/en/coins/tether (accessed Apr. 23, 2022).

[77] S. Schroeder, "$31 million worth of Tether stolen in latest crypto heist," 2017. https://mashable.com/article/tether-crypto-heist (accessed Apr. 23, 2022).

[78] Centre, "Centre Official Website." https://www.centre.io/ (accessed Apr. 23, 2022).

[79] CoinMarketCap, "USD Coin (USDC) Price at Coin Market Cap." https://coinmarketcap.com/currencies/usd-coin/ (accessed Apr. 23, 2022).

[80] PT Rupiah Token Indonesia, "Rupiah Token Whitepaper," vol. 2, no. December, p. 15, 2019, [Online]. Available: rupiahtoken.com.

[81] CertiK, "CertiK Audit Report For Rupiah Token (Rupiahtoken.com) IDRT," 2019, [Online]. Available: https://certik-public-assets.s3.amazonaws.com/CertiK-Audit-for-rupiahtoken.pdf.

[82] PT Rupiah Token Indonesia, "Rupiah Token (IDRT) Official Website." https://rupiahtoken.com/ (accessed Apr. 23, 2022).

[83] CoinMarketCap, "Coin Market Cap Daily Cryptocurrencies Market Updates." https://coinmarketcap.com/coins/ (accessed Apr. 23, 2022).

Table 2: Requirements Checklist for the New Cryptocurrency Design

No.	Description	Checklist (Yes/No)
	Convenience of use	
1	Variety of cryptocurrency exchanges to choose from (e.g., Binance, Coinbase Exchange, FTX, Kraken, and KuCoin)	Yes
2	Cryptocurrency project official website has concise and easy to understand information even for beginners	?
3	Cryptocurrency is backed by fiat currency	Yes
	Compliance measures	
4	Centralized cryptocurrency ecosystem	Yes
5	KYC (Know Your Customer) protocols	Yes
6	Project is under supervision of WTO (World Trade Organization)	?
7	Partners with major banks across the globe	?
8	Project developers are transparent with their identity	?
9	Limits daily or monthly transfer amount	?
10	Subject to territorial regulations	?
	Smart contract programming (Solidity)	
11	General-purpose library is adequate	No
12	Error logging/reporting function is available	No
13	Standard interface is available	No
14	Available support for security checking of data types	No
15	Convenient and secure way to call external functions	No
16	Good memory management	No
17	Global and local variables are sufficient	No
	Smart contract programming (EVM)	
18	Good debugging support	No
19	Byte code speed execution is fast enough	No
20	Stack size limit is loose	No
21	Compatible with traditional programming languages	No

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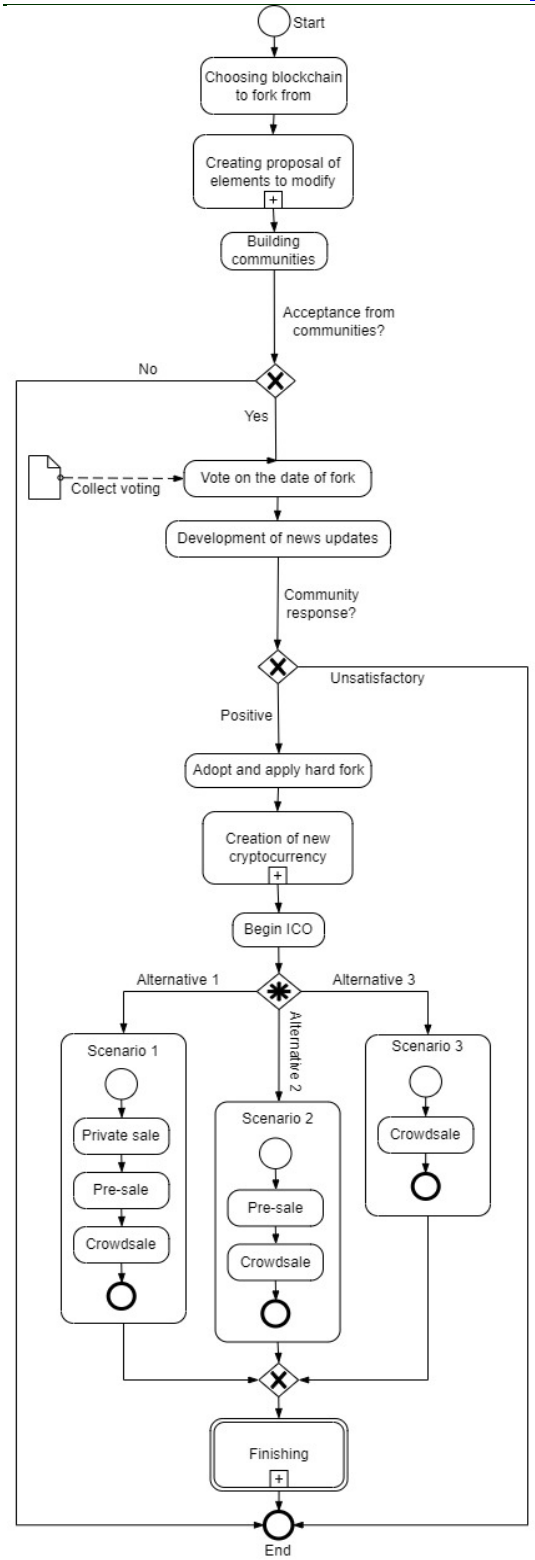

Figure 2: BPMN of Cryptocurrency Design Framework (Collapsed)

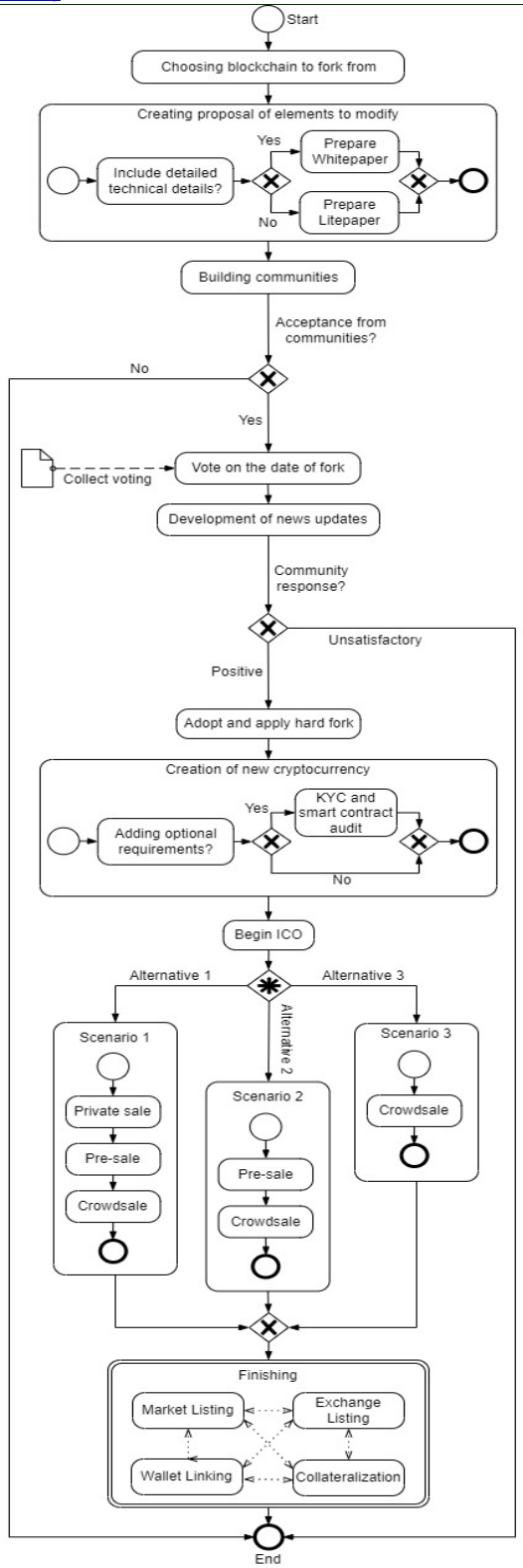

Figure 3: BPMN of Cryptocurrency Design Framework (Expanded)