Mine Crypto

A Project Report Submitted

In Partial Fulfillment of the
Requirements for the Degree of

MASTER OF COMPUTER APPLICATIONS

by

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to the

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DR. APJ ABDUL KALAM TECHNICAL UNIVERSITY

(Formerly Uttar Pradesh Technical University) LUCKNOW

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DECLARATION

I hereby declare that the work presented in this report entitled “Mine Crypto ", was carried out by me. I have not submitted the matter embodied in this report for the award of any other degree or diploma of any other University or Institute.

I have given due credit to the original authors/sources for all the words, ideas, diagrams, graphics, computer programs, experiments, results, that are not my original contribution. I have used quotation marks to identify verbatim sentences and given credit to the original authors/sources.

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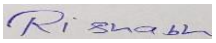
Name : 

Roll. No :1900290149081

Branch : Master of Computer Application

Letter Of Intent

Mobiloitte
BOTS.APPS.DIGITAL.AI.IoT
BLOCKCHAIN

LETTER OF INTENT

(Strictly Private and Confidential)

To,

Date: December 7, 2020

Rishabh Kumar,

Subject: Offer of Employment

This is with respect to your application and the subsequent rounds of interviews held with us. We are pleased to extend an offer to join **Mobiloitte Technologies (I) Pvt. Ltd.** as per the below terms and conditions:

Position: Trainee- Software Engineer
Date of Joining: December 8, 2020

You are requested to report at 10:30 AM on Zoom Meeting app in this pandemic. Post then, your joining location would be New Delhi Office.

Please refer to: -

- **Reference - 1** Job Acceptance and Commencement
- **Reference - 2** Agreed Terms & Conditions
- **Reference - 3** Employment Declarations
- **Reference – 4** All your Credentials.

Your employment with the Company will be governed by the attached terms of Employment. You are required to carefully read and understand these terms of employment as a part of accepting this Offer.

Further, at the time of joining you are required to provide all documentation identified in Reference - 5.

CERTIFICATE

Certified that **Rishabh Kumar** (**1900290149081**) has carried out the project work presented in this report entitled "**Mine Crypto** " for the award of **Master of Computer Application** from Dr. A.P.J. Abdul Kalam Technical University Lucknow under my supervision. The report embodies result of original work, and studies are carried out by the student himself and the contents of the report do not form the basis for the award of any other degree to the candidate or to anybody else from this or any other University.

Mr. Ankit Verma **External Examiner**

Assistant Professor

Dept. of Computer Applications

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Date:

ABSTRACT

The papers in this special issue focus on the emerging phenomenon of cryptocurrencies. Cryptocurrencies are digital financial assets, for which ownership and transfers of ownership are guaranteed by a cryptographic decentralized technology. The rise of cryptocurrencies' value on the market and the growing popularity around the world open a number of challenges and concerns for business and industrial economics. Using the lenses of both neoclassical and behavioral theories, this introductory article discusses the main trends in the academic research related to cryptocurrencies and highlights the contributions of the selected works to the literature. A particular emphasis is on socio-economic, misconduct and sustainability issues. We posit that cryptocurrencies may perform some useful functions and add economic value, but there are reasons to favor the regulation of the market. While this would go against the original libertarian rationale behind cryptocurrencies, it appears a necessary step to improve social welfare .

Rishabh Kumar
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CHAPTER 1

1. INTRODUCTION

1.1 PROJECT DESCRIPTION

Cryptocurrencies continue to draw a lot of attention from investors, entrepreneurs, regulators and the general public. Much recent public discussions of cryptocurrencies have been triggered by the substantial changes in their prices, claims that the market for cryptocurrencies is a bubble without any fundamental value, and also concerns about evasion of regulatory and legal oversight. These concerns have led to calls for increased regulation or even a total ban. Further debates concern inter alia: the classification of cryptocurrencies as commodities, money or something else; the potential development of cryptocurrency derivatives and of credit contracts in cryptocurrency; the use of initial coin offerings (ICO) employing cryptocurrency technology to finance start-up initiatives; and the issue of digital currencies by central banks employing cryptocurrency technologies.The project is based on "cryptocurrency". A cryptocurrency is a digital or virtual currency that is secured by cryptography, which makes it nearly impossible to counterfeit or double-spend. Many cryptocurrencies are decentralized networks based on blockchain technology—a distributed ledger enforced by a disparate network of computers.

1.2 Why Start Mining

Reasons to mine are numerous and varied. Your reasons may change over time as you learn about Bitcoin and follow its progress. It is helpful to understand others' motivations to be able to trust the Bitcoin network and the currency it supports. Many people get started mining by a natural extension of something else they are already doing. For example, Bitcoin mining is similar to other grid computing projects that have grown because they are fun and provide an opportunity to cooperate with others in solving a big problem. In the case of Folding@Home, a distributed-computing project focused on studying protein folding, users contribute their computer processing power to increase scientists ability to understand how proteins fold. Donors and teams compete and cooperate to see who can help the project the most. By mining bitcoins, you help to solve the problem of creating a currency and payment network that does not rely on a central issuing authority. Those who are involved in technology are used to constant innovation and realize it is important to stay informed as new technologies emerge. Bitcoin is a new combination of several novel 7 Introduction to Bitcoin Mining technologies(cryptography, peer-to-peer networks, distributed databases) and some users mine bitcoins to help build experience with these technologies. Since Bitcoin functions as a currency and mining can be operated as a business process, a large number of miners do it for profit. It is a tough business however because Bitcoin prices can fluctuate fairly widely and investment costs for a mining business can easily be in the tens of thousands of dollars. If you can operate efficiently, you may want to attempt to mine for profit but be sure to do your homework before making any big purchases. Mining is a way to get bitcoins and this appeals to those who might want to obtain bitcoins steadily without using services such as exchanges or by selling any good they produce or service they perform as a profession

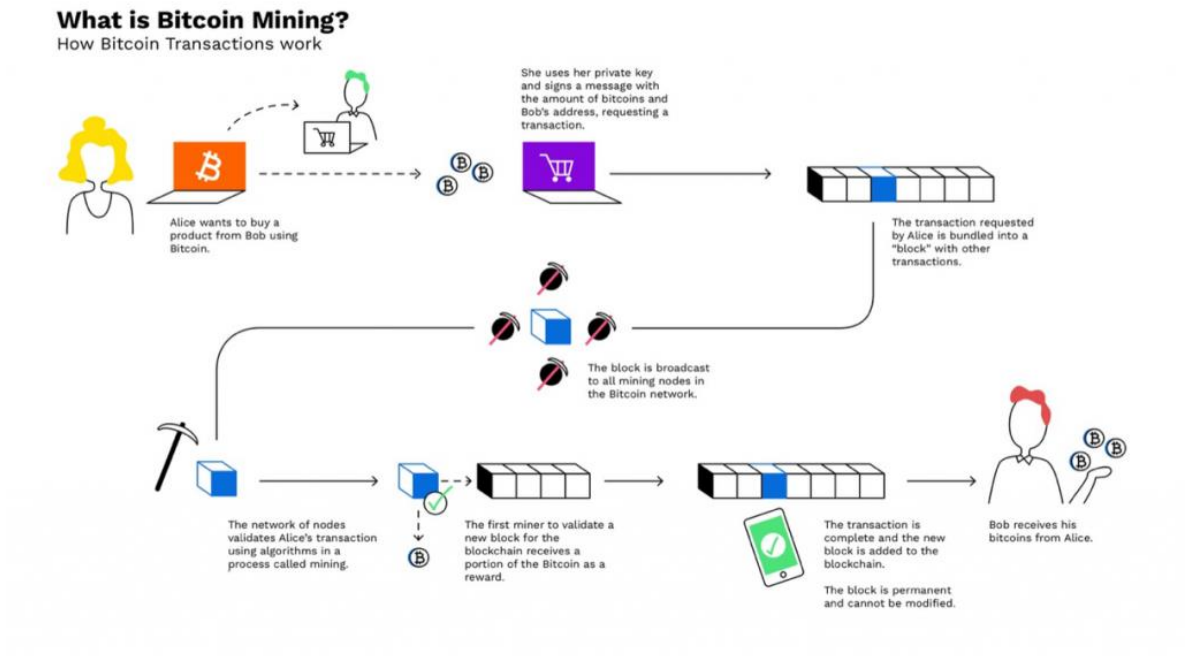


Fig-1 what is bitcoin mining

1.3 Hardware / Software requirement in the Project

Software

(i) Operating System - Windows XP /7/8/10 & mac os

Hardware

(i) RAM – Minimum 4gb.

(ii) Processor - Minimum i3 Processor .

(iii) Modem - Internet Connectivity

CHAPTER 2

LITERATURE REVIEW

Feasibility study is made to see if the project on completion will serve the purpose of the organization for the amount of work, effort and the time that spend on it. Feasibility study lets the developer foresee the future of the project and the usefulness. A feasibility study of a system proposal is according to its workability, which is the impact on the organization, ability to meet their user needs and effective use of resources. Thus, when a new application is proposed it normally goes through a feasibility study before it is approved for development.

The document provides the feasibility of the project that is being designed and lists various areas that were considered very carefully during the feasibility study of this project such as Technical, Economic and Operational feasibilities.

2.1. Technical Feasibility

The system must be evaluated from the technical point of view first. The assessment of this feasibility must be based on an outline design of the system requirement in the terms of input, output, programs and procedures. Having identified an outline system, the investigation must go on to suggest the type of equipment, required method developing the system, of running the system once it has been designed.

Technical issues raised during the investigation are:
Does the existing technology sufficient for the suggested one?
Can the system expand if developed?
The project should be developed such that the necessary functions and performance are achieved within the constraints. The project is developed within latest technology. Through the technology may become obsolete after some period of time, due to the fact that never version of same software supports older versions, the system may still be used. So, there are minimal constraints involved with this project. The system has been developed using Java the project is technically feasible for development.

2.2. Operational Feasibility

Proposed projects are beneficial only if they can be turned out into information system. That will meet the organization's operating requirements. Operational feasibility aspects of the project are to be taken as an important part of the project implementation. Some of the important issues raised are to test the operational feasibility of a project includes the following:

- Is there sufficient support for the management from the users?
- Will the system be used and work properly if it is being developed and implemented?
- Will there be any resistance from the user that will undermine the possible application benefits?

This system is targeted to be in accordance with the above-mentioned issues. Beforehand, the management issues and user requirements have been taken into consideration. So, there is no question of resistance from the users that can undermine the possible application benefits.

2.3. Economic Feasibility

The developing system must be justified by cost and benefit. Criteria to ensure that effort is concentrated on project, which will give best, return at the earliest. One of the factors, which affect the development of a new system, is the cost it would require.

The following are some of the important financial questions asked during preliminary investigation:

The costs conduct a full system investigation.
The cost of the hardware and software.
The benefits in the form of reduced costs or fewer costly errors.

Since the system is developed as part of project work, there is no manual cost to spend for the proposed system. Also, all the resources are already available, it gives an indication of the system is economically possible for development.

2.4. Behavioral Feasibility

An estimate should be made of how strong a reaction the user staff is likely to have towards the development of a computerized system. It is common knowledge that computer installation have something to do with Turnover, Transfers and changes in employee Job Status. Normal human psychology of human beings indicate that people are resistant to change and computers are known to facilitate change. Any project formulations should consider this factor also. Before the development of the Project titled "Delhi Metro", the need to study the feasibility of the successful execution of the project was felt and thus the following factors are considered for a Feasibility Study.

1. Need Analysis.
2. Provide the users information pertaining to the preceding requirement.

DATABASE MANAGEMENT

3.1. Server-Side

The APIs for developing applications using the DHTML client in DB2 Alphablox are available on the server-side, where a developer accesses them through Java™ calls (for example, in a Java script on a JSP page). The reason the Java APIs are called server-side APIs is because the code executes on the server before it is sent to the browser.
Executing code on the server is often more efficient, and also makes it easier to create web pages that work correctly on multiple browsers. The DHTML client is designed to keep the client and the server in sync without page refreshing. When you execute code on the server, only affected areas in the Blox UI is refreshed, not the whole page.

3.2. Client-Side

There are also times when you want to use the DHTML client's Client API for tasks that are best handled on the client. These are called client-side APIs because they are interpreted by the browsers. Often times you want to call some server-side code to change Blox properties on the server via some JavaScript™ code on the client when a user clicks a button or link on the page.
The DHTML client has a relatively straightforward API on the client-side.

3.3 Cryptocurrencies

According to Trautman, cryptocurrencies are a subset of digital currencies, which may either have centralized institutions or are based on a decentralized network . Bryans (2014) is of the idea that, for a centralized currency scheme, the digital currency is issued by one institution, which ensures that the digital coins can be exchanged back to fiat currencies or can be used to buy and sell digital goods. One example for this centralized digital currency is the Linden Dollar, issued by Linden Lab, which can be used in the online virtual world Second Life. It shares some characteristics with fiat currencies. Like in the traditional money system, a central institution serves as a source of trust.

However according to Karlstrom , decentralized currency schemes try to avoid central institutions as much as possible and are built on a network of transaction partners As long as the transaction partners can observe each other, they can build up trust based on their behaviors. If observation of the transaction partners is not possible, other mechanisms have to be found to establish reliable transactions. One solution lies in cryptocurrencies, which are decentralized currency schemes based on cryptography.

According to Bryans (2014) a cryptocurrency is a digital token produced by cryptographic algorithms. This token is then transported across cyberspace using protocols such as peer-to-peer networking. Its value is mainly derived from the demand and supply for such tokens and an important part of their appeal resides in the decentralization of the system of which they exist. The general discourse on cryptocurrencies has led to varying levels of support for the innovation, where some regulators have been very wary of it while the Financial Technology community have argued about the inevitable widespread use of cryptocurrencies . The main benefits as cited by Harvey include the security features, ease of use on mobile devices, relatively cheap costs of production and transmission via the block chain transmission protocol and low long-term inflation risks. Global financial corporations such as Citibank are developing their own cryptocurrency due to these perceived benefits of utilizing the aforementioned protocols (Madore, 2015).

Harvey also noted that the main issues with the adoption of cryptocurrencies include an early track record of illiquidity, high volatility and potentially nebulous uses. Harvey (2015) went on to say most of the issues surrounding the successful adoption of cryptocurrencies is marred in the confusion of whether they are digital or virtual currencies, and as such, how their values are determined.

There has been a proliferation of virtual currencies across the globe. These include Facebook Credits, Microsoft Points and Amazon coins. Harvey (2015) mentioned that unlike Bitcoins, as alluded to before, these currencies are issued by companies and are not linked to any claims on real assets. If a large company like Facebook does launch a currency to compete with traditional currencies, network effects could ensure that the currency is taken-up quite quickly by members of the network. Furthermore, Wagner (2014) explained that the value and distribution of virtual currencies are typically controlled by centralized authority, which is usually the issuing corporation, and are used to solely facilitate online purchases. Cryptocurrencies are closer in form to physical currencies due to their usage as a medium of exchange for physical assets. Ironically Harvey (2015) posits that most of the modern world's money supply is in digital form and, as such, can be considered to be in the form of cryptocurrencies.

Another area of compelling arguments has been the issue of whether cryptocurrencies should be considered to be currencies or digital assets. Given the aforementioned definition, one could expect to view the token as a currency but Glaser et al. (2014) further convey that users of cryptocurrencies are not interested in an alternate transaction system but seek to participate in an alternative investment vehicle.

Drawbaugh and Temple-West (2014) noted that the U.S. Inland Revenue Service sees cryptocurrencies as a virtual currency and therefore it should be considered to be an asset. Such property, under U.S. financial law, is largely subject to capital asset taxes. Other early adopting jurisdictions, such as Norway, Sweden and Canada also recognize

cryptocurrencies as an asset. However, Germany which is also a very early adopter accepts that cryptocurrencies are a unit of account to be used for trading and taxation within the country but in the form of "private money" (Clinch, 2013). There has basically been no global consensus how best to define cryptocurrencies as an asset or currency. These matters have dealt within the parameters of every jurisdiction and their capabilities to regulate it.

Given the possibility of such a quick take-off, Gans and Halaburda (2013) investigate whether there is a need for regulation and oversight of these cryptocurrencies. The authors argue that most of these cryptocurrencies issued by companies are largely subsidies for buyers to participate in the network or platform such as Amazon coins and Kindle. Such a system is also cheaper for the company, as these currencies have to be spent on items on the platform such as Amazon rather than some outside good or service. For cryptocurrencies not tied to a particular platform for instance Bitcoin, Gans and Halaburda (2013) note that these currencies can impact on price stability, financial stability and payment stability. Therefore, there might be a case for further regulation.

If there is a relatively low level of interaction between these virtual currencies and traditional currencies, there might not be a need for any regulatory intervention. There are five potential risks associated with virtual currencies that are of interest to central banks. These are price stability, financial stability, payment system stability, lack of regulation and reputation (ECB, 2012). Virtual currencies could make the goal of price stability somewhat difficult if they affect the central bank's control of the money supply through open market operations. This reduced control over the money supply can also impact on financial stability through the central bank's ability to intervene in the foreign exchange rate market. In addition, speculation with respect to the virtual currency could occur due to the history of cyber-attacks and since there is no lender of last resort for these currencies. The value of virtual currency union depends largely on whether or not a second party is willing to accept the unit as a means of final payment, hence there is no guarantee of payment (FCB, 2012). Moreover, since there is no legal basis for virtual currencies, there is no clear definition of the rights and obligations of each party.

ECB (2012) notes that while the virtual currencies may be subject to price, financial, payment and lack of regulation risk, given that lack of interaction between virtual currencies and those issued by central banks. The paper, however, notes that these currencies do pose some degree of reputational risk for central banks, as most economic agents look to the central bank to ensure the smooth functioning of the payment and financial system. Therefore, if a major event does occur the general public might perceive that the central bank was not doing its job effectively.

While ECB (2012) suggests that the implications for central bank policy at present might be limited. Economic models' technological innovations within the banking system suggests that digital money can impact on the demand for money. Berensten (1998) notes that monetary policy depends on a stable velocity of money. However, as digital money becomes a both popular means of payment, it can impact on the income velocity of money and reduce the monetary base and more significantly reduce the precision of the central bank's control of monetary liabilities.

Given that cryptocurrencies reduce the effectiveness of monetary policy at the country level, Plassaras (2013) argues for greater international cooperation through the International Monetary Fund (IMF). The author notes that typically central banks hold reserves to counter speculative attacks against the currency. They can also raise interest rates or intervene in the currency market. If the central bank runs out of reserves, it can draw down on its quota's at the IMF. However, if wealthy Bitcoin investors launch a speculative attack on a currency there is relatively little that can be done at present as neither the central bank nor the IMF hold Bitcoin. Plassaras (2013) therefore argues that the Fund could either attempt to excise indirect control of the currency or it could offer the digital currency quasi-membership status. Such approaches will need to be further discussed as there are governance issues that would need to be addressed. Given the growth of Bitcoin, there is a clear need to be prepared for potential speculative attacks and incorporate this means of payment better into the financial system.

Crypto Currencies is a type of digital currency which relies on cryptography, usually alongside a proof-of-work scheme, in order to create and manage the currency. A decentralized network of peer-to-peer computer nodes working in sync creates and verifies transactions of transfer of said currency within the network (Ahamad, Nair and Varghese, 2013). Crypto Currencies can be transferred instantly and securely between any two parties, using the internet infrastructure and cryptographic security with no need for a trusted third party. Its value is not backed by any single government or organization (Ametrano, 2014). A cryptocurrency is a modern digital medium of exchange. It is a new decentralized, limited and peer–to–peer payment system. Most cryptocurrencies are created to introduce new units of currency, whose total amount is limited. All cryptocurrencies use cryptography to control the creation and transfer of money. All cryptocurrencies use public key cryptography; a pair of public and a private cryptographic key make Bitcoins safe (Wiatr, 2014).

Crypto technologies are technologies that are based on cryptography. Cryptography has a long tradition in human history. However, modern mathematical cryptography has been developed only over the last few decades. Public key cryptography, that will be mentioned below, was introduced for the first time in 1976 and first attempts to create a cryptocurrency were made in the beginning of 1980´s (Omohundro, 2014:19). Crypto-technology is a class of software systems that use cryptography. Generally, these software systems can implement a system to transfer virtual goods and at the same time they can implement complex agreements between parties.

There are various kinds of virtual goods such as songs, online documents and pieces of software. However, there are other kinds of virtual goods that might not be that obvious such as ownership of almost anything, an approval, notarization or verification of almost anything or a unit of currency (Eckersley, 2004:87). Cryptocurrency and other digital money such as bank deposits are typically files on computers that people consider having a certain value and is seen as money. The nature of money consists of building trusts among

the strangers who use money to trade. One must be confident that others are willing to accept their money in the future and that the money will keep a certain value so that it can be used for future trades (Camera, 2017). Money has three functions. According to Asmundson and Oner (2012) these functions are store of value that is saving, unit of account provide a common base for prices and medium of exchange that is trade.

With traditional money people attach a certain value to a paper banknote and the government and central banks make sure that the money remains valuable and that trust is remained. For private e-currency there is not an authority that fulfils this task of maintaining stability and thus it is one of the reasons that the value of private e-currencies is very volatile. Two important distinctions that should be made are the differences between sovereign and non-sovereign digital currency (Camera, 2017). With sovereign digital currency the digital form of cash is meant, which can be for example commercial bank deposits at the central bank, but also a Central Bank issued Digital Currency regime. Whereas no sovereign currency is private currency, such as Bitcoin. For this research non-sovereign private e-currency is compared with a sovereign version of e-currency, the Central Bank Issued Digital Currency regime.

3.5 Characteristics of cryptocurrencies

A cryptocurrency is a digital or virtual currency that uses cryptography for security. A cryptocurrency is difficult to counterfeit because of this security feature. A defining feature of a cryptocurrency and arguably its most endearing allure is its organic nature. It is not issued by any central authority rendering it theoretically immune to government interference or manipulation. It is designed from the ground up to take advantage of the internet and how it works. Instead of relying on traditional financial institutions that verify and guarantee your transactions, cryptocurrency transactions are verified by the user's computers logged into the currency's network. Since the currency is protected and encrypted, it becomes impossible to increase the money supply over a predefined algorithmic rate.

One cryptocurrency, in particular, has entered the public lexicon as the go-to digital asset: Bitcoin, often is regarded as father of cryptocurrencies and all other cryptocurrencies are referred as altcoins. Since 2009, the finance world has been watching the crackerjack rise of Bitcoin with a combination of fascination and, in many cases severe scepticism. Characteristics of Bitcoin make it fundamentally different from a fiat currency which is backed by the full faith and credit of its government. Fiat currency issuance is a highly centralized activity supervised by a nation's central bank. On the other hand, the value of a Bitcoin is wholly dependent on what investors are willing to pay for it at a point in time. It uses peer-to-peer blockchain network that is chronologically arranged chain of blocks where each block has a list of transactions information where all members are equal.

3.6 Bitcoin

Bitcoin is a communication peer-to-peer protocol that enables a payment system and use of virtual currency (Böhme, Edelman, Christin and Moore 2015). Bitcoin was introduced in 2008 by a group of anonymous developers or single developer named Satoshi Nakamoto (Nakamoto 2008). Although the concept of cryptocurrencies was described and suggested firstly in 1998, Bitcoin became the first "practical" proof of the theory (Kelly 2014).
Now that the terminology about cryptocurrencies is established, the most famous example of a cryptocurrency, namely Bitcoin is used to explain how an e-currency works. Bitcoin was introduced back in 2009 and since then the usage of Bitcoin has been growing rapidly. Bitcoin had 6.56 million users in 2016 and 11.05 million one year later in 2017 (Weber, 2017). Bitcoin works with a blockchain, a blockchain is a new technology that uses encryption. The blockchain is a ledger that is updated constantly and maintained by computers. Thus, eliminating the traditional role of a middleman, for example banks that are supervised by authorities.

An important feature of the blockchain is that it is public and everyone can see it as it acts as a public ledger, which is updated after every transaction. Everyone owns their own copy

of the ledger, although this might imply a lack of privacy, this is not entirely true as the transactions and accounts in the blockchain are anonymized by recoding it, a technical computerized process. The main advantage of the public ledger is that you do not have to trust a third party or middle man anymore. Every transaction becomes a block which is then checked by others' computer and approved, these verifiers are the so called miners (Dwyer, 2014).

After it is approved the transaction is added to the chain of blocks that is the blockchain and goes through. Every transaction is public and if someone tries to corrupt it, the mathematics behind it would flag it and prevent a consensus among all the ledgers and thus basically preventing fraudulent transactions. So the middlemen, banks for example are partly replaced by cryptographic verification (Swan, 2015). The existing blockchain technology used for private e-currencies could also be the basis for a central-bank issued cryptocurrency. Bitcoin's main function seems to be as a means of payment, transaction costs for Bitcoins are kept very low, making it easy and affordable to transfer sums of money with fast speeds all over the world (Sauer, 2016). Transactions are executed almost instantly and anytime. (Bitcoin, 2017). However, Bitcoin is still considered as a complement and not a substitute for traditional currency (Sauer, 2016). Nowadays Bitcoins are mainly used for speculative purposes rather than a mean of payment, resulting in a lot a volatility that is much higher than similar derivatives, such as currency exchange rates, as shown below in **Figure 2.1**. The Figure shows the volatility of Bitcoin (blue line) compared to the volatility of the USD/GBP exchange rate (red line). This volatility results in uncertainty about Bitcoin value, making it a risky investment and even riskier as a substitute
for traditional currency (Hay, 2017).

Figure 2: Comparing Bitcoin volatility with GBP volatility.

The supply side of bitcoins is based on the blockchain network that creates and transfers the bitcoins among its users, without an authority controlling it. Supply of Bitcoins is limited to 21 million. When this amount is reached no new Bitcoins can be issued. Issuance of Bitcoins takes place when transactions are verified by the so called "miners" (Dwyer, 2014). When the maximum supply is reached the only way to acquire Bitcoins would be by trading.

The Bitcoin supply was rapidly issued in the first years after introduction, reaching 10.5 million (50% of all available Bitcoins) already in 2013, merely 4 years after its introduction. What happens when this 21 million is reached, and money supply will be fixed at this 21 million, is unclear. On the Bitcoin (2017) websites they state: "The number of new Bitcoins created each year is automatically halved over time until bitcoin issuance halts completely with a total of 21 million bitcoins in existence. At this point, Bitcoin miners will probably be supported exclusively by numerous small transaction fees". This

suggests that Bitcoin trading and verifications can still take place because “miners” will verify transactions in exchange for transaction fees. Although there is no underlying theory supporting this and a back-up plan if this does not happen.

The popularity of Bitcoin mainly results from the anonymity it provides and the fast and cheap way of transferring all over the world. Bitcoin is sometimes associated with criminal activities, for example with ransomware hacks where the hackers ask for payments in bitcoins (Thomson Reuters, 2013). On the other hand, bitcoins are sometimes stolen by hackers as well. When bitcoins are stolen this is done by acquiring the password of a Bitcoin accountholder and transferring the funds to another account via untraceable ways. To some extend contradicting Sauer (2016) and despite some of the risks associated with Bitcoin,

3.7. Theoretical framework

3.7.1 Mises Regression Theorem

One of the most confusing aspects of bitcoin is how they get their value. Bitcoin has been cited as violating Ludwig Von Mises's regression theorem (LeRoux, 2014). The regression theorem demonstrates that all money, rather the money is commodity money like gold or government backed fiat currency, must ultimately derive its purchasing power from a historical tie to a commodity that was valued in a state of barter. Jeffrey Tucker (2014) goes into great detail with his article titled, ‘What Gave Bitcoin Its Value’ published by the Foundation for Economic Education and mentioned that the theory of the value of money as such can trace back the objective exchange value of money only to that point where it ceases to be the value of money and becomes merely the value of a commodity.

In this way one can continually go further and further back one must eventually arrive at a point where he can longer find any component in the objective exchange value of money

that arises from valuations based on the function of money as a common medium of exchange; where the value of money is nothing other than the value of an object that is useful in some other way than as money. Before it was usual to acquire goods in the market, not for personal consumption, but simply in order to exchange them again for the goods that one really wanted, each individual commodity was only accredited with that value given by the subjective valuations based on its direct utility. Bitcoin's value is subtle, but substantial. It's redeemability and the fact that it is a meta-currency that is inflation proof is what gives bitcoin value (Patterson, 201 4). To better put this into context, imagine the phenomenon that occurred to gold with paper. How much more convenient, portable, divisible, easier to handle, and easier to count, paper was compared to gold and why the market made people desire to have paper currency instead of gold coins or bars anymore. According to Graf (2013) the regression theorem is a temporal-sequential explanation of the initial emergence of indirect exchange value". The regression theorem was propounded by Mises (1953) as a praxeological statement that ties together with a comprehensive theory of the origination, formation and development of modern-day money. Prior to the theorem, Murphy (2013) in support with economist explained the valuation of money through marginal utility analysis and the quantity theory, creating a circularity in which the exchange value of money was explained by its marginal utility, derived from its own purchasing power.

According to Murphy (2013) Mises solved this circularity through the regression theorem by building upon works of Bohm-Bawerk and Menger before him with emphasis on the subjectivist approach to valuations. Mises acknowledged that the value of money is the result of the marginal utility of goods for which it can be exchanged; its expected purchasing power. Following this Mises identifies that people expect future purchasing power based upon current and previous observed purchasing powers. In his own words Mises noted that, "Objective exchange value... today is derived from yesterdays under the influence of subjective valuations of individuals frequenting the market" (Mises, 1953 p.121). The mises regression theorem shows that it is possible to regress to a point in time where the objective exchange value of money has no component based upon its function as

a medium of exchange, but that its value at this time is only based on its use in some other form that is for consumption or production.

It is at this point in time where people first emerged from a state of barter. Mises states that this is an observable "phenomenon of economic history" and not merely an abstraction. The mises theorem ties together at this moment in history with Menger's origin of money (Murphy, 2013). Menger argues that money formed organically, similar to language, as the natural result of traders overcoming inefficiencies in a barter economy; inefficiencies stemming from the difficulty satisfying the double co-incidence of wants. Traders would trade indirectly for other goods, even if they gain no use value for the goods received, so long as the acquired goods had a higher 'marketability' than the goods they forfeit. This process would continue until there would be an "Inevitable tendency for the less marketable of the series of goods used as media of exchange to be one by one rejected until at last only a single commodity remained, which was universally employed as a medium of exchange" (Mises, 1953 p.32). It attributes the prevailing of gold and silver as early media of exchange to their divisibility, identifiably and durability, all of which contributed to their high marketability.

Krugman (2013) has criticized Bitcoin for being an unreliable store of value. Thus Krugman (2013) denied the validity of bitcoin as money, although he concedes that bitcoin is likely a successful medium of exchange. As many scholars denotes that bitcoin can be at least a secondary medium of exchange it could be inferred that the mises regression theorem is either wrong, or misunderstood (Zhou, 2017).

Zhou (2017) noted that a new adaptation of the regression theorem is needed to encompass the technical, unforeseen nature of bitcoin. Zhou (2017) mentioned that, for the theorem to work, a medium of exchange must already have the attributes necessary for a medium of exchange, having a price and be accepted on the market. Both price and liquidity that is being accepted on a market are elements of the market. If the prospective medium of exchange possesses these elements then it points toward a demand for it a demand that

must exist before it becomes a medium of exchange that is then by definition a non-monetary demand. A medium of exchange might eventually cease to have non-monetary demand but continues to be sustainable. Even though Mises sees non-monetary demand as being necessary for the emergence of price and marketability, he still states that money only provides utility for obtaining other goods and services in exchange for it (Mises, 1953, p. 101).

This essentially means that even though non-monetary demand is necessary for the emergence of money, it is not necessary to sustain it. Rothbard (2014) further clarifies what Mises stated by saying that it is not necessary that the direct use of the money as a commodity continues, as long as the money has been established. Rothbard (2014) stated this by writing that even if gold were to lose its value as an aesthetically pleasing, easily controllable metal that doubles as a fantastic conductor, it would not necessarily mean that gold would lose its value as money. Rothbard (2014) however uses the premise that all monies must necessarily originate as commodity with direct uses, a claim that is difficult to accept.

3.7.2 Garch model

The cryptocurrency market has seen an unprecedented level of interest from investors in 2016. Bitcoin, the world's largest digital currency, has risen more than 1,500 percent since the start of 2017. However, the market is significantly more complex than the public lexicon might suggest. While there have been plenty of studies examining the future of Bitcoin and its volatility, according to Polasik et al. (2015), there have been few that explore the broader cryptocurrency market and how it is evolving. Bitcoin is currently trading at around $16,000; at the beginning of the year 2016, Bitcoin price was at $1,000 in 2017, raising warnings from some analysts and prominent financial figures that it’s a bubble. The currency is extraordinarily volatile despite its recent ever-peaking performance, rising by thousands of dollars in value on one day only to fall by even more the next day.

Katsiampa (2017) estimates the volatility of Bitcoin through a comparison of GARCH models and finds that the AR-CGARCH model gives the most optimal fit. He underlines that the market is high speculative. Bouoiyour and Selmi (2016) study daily Bitcoin prices using an optimal-GARCH model and show that the volatility has decreasing trend comparing pre- and post-2015 data. Even tough, they still observe significant asymmetries in the Bitcoin market where the prices are driven more by negative than positive shocks. Likewise, Dyhrberg (2016) investigates the asymmetric GARCH methodology to explore the hedging capabilities of Bitcoin and he finds that it can be used as a hedging tool against stocks in the Financial Times Stock Exchange Index and against the American dollar in the short term.

On the other hand, El Bahrawy and Alessandretti (2017) examine behaviour of entire market of 1469 cryptocurrencies between April 2013 and May 2017. They find that cryptocurrencies appear and disappear continuously and their market capitalization is increasing exponentially while several statistical properties of the market have been stable for years. Particularly, market share distribution and the turnover of crytocurrencies have remained quite stable. There is a wide agreement on that the cryptocurrencies will not only affect the trading practices of different countries and business organizations, but they will also affect the dynamics of international relations.

There are still a lot of people who are never accommodating the idea that cryptocurrencies will revolutionize how we do businesses. They cannot figure out how the whole blockchain technology and other annexes work. Furthermore, advancements in technology are introducing digital tools that companies can use to better interact with their customers. A rising shift from traditional platforms to digital platforms has also brought about an abundant supply in data from sources like social media, mobile devices, online retail platforms and so on. Due to technology advancements in the areas of gathering, storing, and sharing data, large sets of data are easily shared among companies in every sector and country for little to no costs. The widespread accessibility of data has also brought about

concerns over data privacy of individuals and their online transactions. Transactions carried out online leave digital trails, as a result, individuals are opting for more anonymous ways to use the internet and conduct online transactions. The Bitcoin cryptocurrency was introduced to address the issue of privacy concern.

3.8 Key features and uses of cryptocurrencies

According to Bryan (2015) money denominated in a particular currency includes money in a physical format with legal tender status and different types of electronic representations of money, such as central bank money or commercial bank money. Bryan (2015) defined electronic money, as terms used in payments and settlement systems as value stored electronically in a device such as a chip card or a hard drive in a personal computer, also commonly used around the world.

Some jurisdictions have developed specific legislation regulating e-money such as the E-Money Directive in the European Union (Bryan, 2014). E-money balances according to the legislation applicable in a particular jurisdiction that is e-money in a narrow sense are usually denominated in the same currency as central bank or commercial bank money, and can easily be exchanged at par value for them or redeemed in cash. Since the mid-year of 1990, the CPMI (2010) has studied the development of e-money and the various policy issues associated with it. These categories include cash, central or commercial bank money, and e-money in a narrow sense are traditionally perceived as "money" in a specific currency, giving rise to a currency's single.

Bryman (2014) noted that the definitions of e-money have widened the concept to include a variety of retail payment mechanisms, possibly extending to digital currency schemes. While cryptocurrencies may meet the broad conceptual definition of e-money, in most jurisdictions they typically do not satisfy the legal definition of e-money (Bryman, 2014). For example, in many jurisdictions, the value stored and transferred must be denominated in a sovereign currency to be considered e-money; however, in many cases cryptocurrencies are not denominated in or even tied to a sovereign currency, but rather are

denominated in their own units of value. In the case of the European Union, the legal definition of e-money includes the requirement that the balances issued should be a claim on the issuer, issued on receipt of funds. Given this, units of cryptocurrencies in some schemes will not be considered e-money in a legal sense as they are not issued in exchange for funds even though they can be subsequently bought and sold, and may not be issued by any individual or institution (Bryman, 2014).

Hundreds of digital currency schemes based on distributed ledgers currently exist, are in development or have been introduced and have subsequently disappeared (Meiklejon et al, 2016). These schemes share several key features, which distinguish them from traditional e-money schemes. First, in most cases, these cryptocurrencies are assets with their value determined by supply and demand, similar in concept to commodities such as gold (Meiklejon et al, 2016). However, in contrast to commodities, they have zero intrinsic value. Unlike traditional e-money, they are not a liability of any individual or institution, nor are they backed by any authority. As a result, their value relies only on the belief that they might be exchanged for other goods or services, or a certain amount of sovereign currency at a later point in time. The establishment or creation of new units that is the management of the total supply, is typically determined by a computer protocol. In those cases, no single entity has the discretion to manage the supply of units.

3.9 How cryptocurrencies work

According to Meiklejon et al (2016) bitcoin is a purely online virtual currency, unbacked by either physical commodities or sovereign obligation; instead, it relies on a combination of cryptographic protection and a peer-to peer protocol for witnessing settlements. Consequently, Bitcoin has the unintuitive property that while the ownership of money is implicitly anonymous, its flow is globally visible. Bitcoin initially was introduced by the (pseudonymous) Satoshi Nakamoto in 2008. From that time it has experienced a huge boom and generated millions of profit to those engaged in this business. Meiklejon et al (2016: 87) explain that as follows: Briefly, a bitcoin can be thought of as a chain of

transactions from one owner to the next, where owners are identified by a public key from here on out, an address that serves as a pseudonym; that is, users can use any number of addresses and their activity using one set of addresses is not inherently tied to their activity using another set, or to their real-world identity.

Meiklejon et al (2016) went on to say in each transaction, the previous owner signs using the secret signing key corresponding to his address a hash of the transaction in which he received the bitcoins and the address of the next owner. Meiklejon et al (2016) noted that transactions can have many input and output addresses. This signature that is transaction can then be added to the set of transactions that constitutes the bitcoin because each of these transactions references the previous transaction that is in sending bitcoins, the current owner must specify where they came from, the transactions form a chain. To verify the validity of a bitcoin, a user can check the validity of each of the signatures in this chain. To prevent double spending, it is necessary for each user in the system to be aware of all such transactions.

Double spending can then be identified when a user attempts to transfer a bitcoin after he has already done so (Meiklejon et al, 2016). To determine which transaction came first, transactions are grouped into blocks, which serve to timestamp the transactions they contain and vouch for their validity. Blocks are themselves formed into a chain, with each block referencing the previous one and thus further reinforcing the validity of all previous transactions. This process yields a block chain, which is then publicly available to every user within the system. This process describes how to transfer bitcoins and broadcast transactions to all users of the system. Bitcoin is decentralized and there are no central authority minting bitcoins, we must also consider how bitcoins are generated in the first place. In fact, this happens in the process of forming a block: each accepted block that is each block incorporated into the block chain is required to be such that, when all the data inside the block is hashed, the hash begins with a certain number of zeroes.

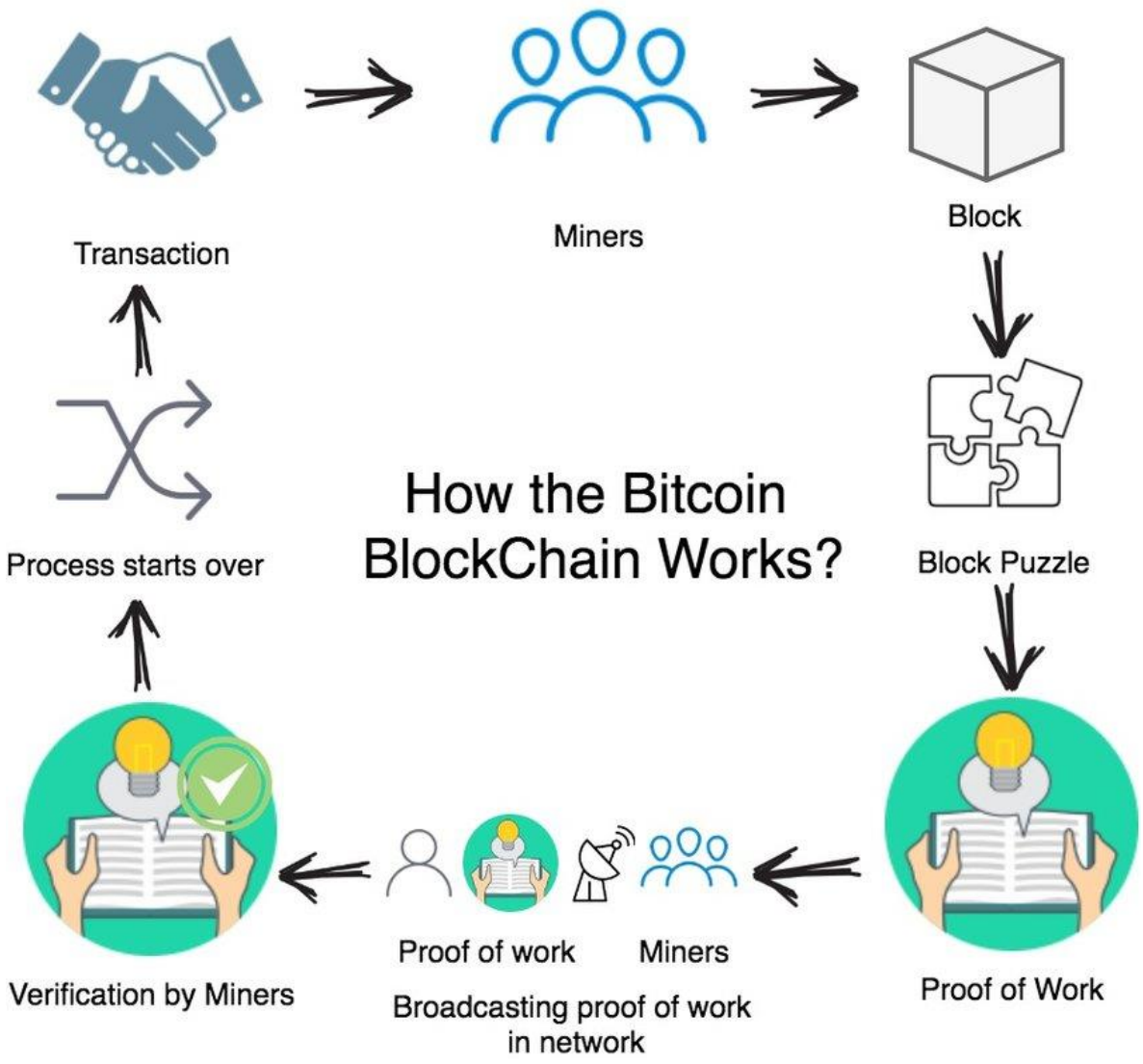


Fig3- How the Bitcoin BlockChain Works

4.1 Advantages of cryptocurrencies in banks

There are different and confronting opinions regarding the future of cryptocurrencies in general and bitcoins in particular (Bryman, 2014). Whilst, those with libertarian views of life are optimistic and embrace the cryptocurrency system, other authors, economists, and scholars from this field are not enthusiastic about the use of cryptocurency in the system of payments and financial transactions. Ivaschenko, (2016) noted that the optimistic view of

cryptocurrencies use is backed by the fact that they make it easier to transfer funds between two parties in a transaction; these transactions are facilitated through the use of public and private keys for security purposes.

These fund transfers are done with minimal processing fees, allowing users to avoid the steep fees charged by most banks. In addition, many countries have started to accept bitcoin as a valid currency. Especially, countries that aim to get rid of cash have a very friendly approach to cryptocurrencies. An argument that promoters of bitcoin use is Market Capitalization of bitcoin,
and powerful so banning it would be costly for any country (Bryman, 2014).On the other side the opponents of cryptocurrencies claim that cryptocurrencies are very volatile, can be used for money laundry or financing illegal activities. In this regard, Tymoigne (2015) for example, is not enthusiastic over cryptocurrency use, providing reasons why he believes bitcoins are not a viable electronic currency. He notes that bitcoins are illiquid and have shown high price volatility, and that the discounted cash value of a bitcoin is zero. He further observes the currency lacks a central issuer, and that there is no financial or economic basis for its creation. Ivaschenko (2016) provides the advantages and disadvantages of bitcoin as stated below.

4.2 Anonymous and Private

Chokun (2014) noted that cryptocurrencies in specific bitcoin transactions are completely anonymous and private. Chokun (2014) went on to say that, unlike in payments through bank, where the transactions can be tracked and identified, bitcoin transactions cannot be identified. According to Chokun (2014) a person can only know the addresses of the bitcoin wallet on which the payment has been sent and received. Chokun (2014) mentioned that; but to whom these addresses belong to, cannot be identified. It is like payment to a particular bank account can be tracked but to whom these accounts belong cannot be known but if a person uses same bitcoin address for every transaction for a long period of time, there is a possibility that the person can be tracked.

4.3 Cryptocurrencies are fast

According to Blatchford (2015) bitcoin transactions are very fast if compared to banking channels. Blatchford (2015) went on to say that a bitcoin transaction is as fast an e-mail and can be processed within 10 minutes. This was supported by Christin (2012) who went on to say that bitcoins can be instantly processed if they are "zero-confirmation" transactions, meaning that the merchant takes on the risk of accepting a transaction that has not yet been confirmed by the bitcoin blockchain. According to Condeisk (2015) the confirmed transactions are those which takes at least 10 minutes to process. Feuer (2015) noted that Credit Card or digital wallet services also provides instant approved transactions services but for this they usually charge a hefty fee, which is not in the case of Bitcoin. Bitcoin has very low transaction fees even for being super-fast in terms of processing.

4.4 Non-Inflationary

Grimbergen (2011) asserts that the reason why bitcoin is called the future of money is because they are non-inflationary. Marian (2013) noted that the central government can get fiat currencies printed as much as they want. Marian (2013) went on to say that when the economy is slowing down it is not able to pay off its national debt, the government orders to print more currency and inject it into the economy. Woodford (2005) noted that this causes the value of currency to decrease as more people have more currency. Also printing more notes creates inflation and increases the prices of commodity. It is because now more people are willing to pay for a particular commodity and the seller has to increase the price in order to make the sale. Thus, the person who had gained when government injected more currency can now buy more but those people who were not benefitted from have limited currency and now the prices of commodity has also increased.

On the other hand, this is not the case in Bitcoins. According to Woodford (2005) only 21 million bitcoins will ever be created and this is known to everyone. This means that after all

the Bitcoins have matured, a greater number of bitcoins cannot grow and thus inflation will not be a problem. Marian (2013) noted that in the year of 2013 almost 1.7 Million Bitcoins has been generated and the remaining will be generated over a period of time. Marian (2013) went on to say that bitcoins are generated through a process called “Mining”.

5. Disadvantages of cryptocurrencies in banks

5.1Lack of recourse

According to Khan (2014) if one loses his bitcoin wallet, he has lost all of his bitcoins in that wallet. Khan (2014) noted that he cannot regain it and they are simply lost forever until and unless he has backed up the wallet with a backup phrase code. This backup phrase code can be used to recover the lost bitcoin wallet balance. According to Khan (2014) in a case where a credit card or debit card stolen, only a call can be processed where one call the merchant to cancel the card and request for a new one but in case of bitcoins, as it is decentralized and no one has control over it, we do not have any person or organisation to call.

5.2Deflationary

Hildi (2013) discussed on how bitcoin being non-inflationary can be an advantage to the economy. But there is one possible negative factor attached to bitcoin because of being deflationary is that if it gets in the hands of speculator a huge recession will come in bitcoins. Acording to Hildi (2013) bitcoins are limited in number and if the major chunk is held by speculators and investors, they will hold it for a longer period of time and will not release it in the market. When the supply of bitcoin will be short and demand continues to increase, it will increase the price of Bitcoins and then the speculating investors may get benefited.

5.3 conclusion

Growing attention has been paid to cryptocurrencies in the academic literature, discussing whether they are supposed to disrupt the economy or are a speculative bubble which could crash and burn or favor money laundering and criminals. In support of the first view, it is often argued they meet a market need for a faster and more secure payment and transaction system, disintermediating monopolies, banks and credit cards. Critics, on the other hand, point out that the unstable value of cryptocurrencies make them more a purely speculative asset than a new type of money.

The reality is somewhere in between these two positions, with cryptocurrencies performing some useful functions and hence adding economic value, and yet being potentially highly unstable. The trend is towards a regulation of cryptocurrencies, and more generally of all crypto-assets, and to their increased trading on organized and regulated exchanges. This would go against the original libertarian rationale that originated the Bitcoin but is a necessary step to provide protection for market participants and reduce moral hazard and information asymmetries.

How will future research build on the articles in this special issue and on other recent studies of cryptocurrencies? It is of course always difficult to anticipate substantial future research contributions, especially in relation to such a recent and novel phenomenon like cryptocurrencies. But we would argue that there are a few major issues that deserve continued attention from scholars in finance, economics and related disciplines.

One is the need for a much closer examination of the 'market microstructure' of cryptoexchanges. Some recent research already draws attention to the functioning of cryptoexchanges. For example, Gandal et al. (2018) investigate price manipulations at the Mt. Gox Bitcoin exchange; a notable by-product of their research is the finding that suspicious trading on one exchange led to equal price changes on other exchanges, suggesting traders can effectively engage in arbitrage activities across exchanges. Similarly, signs of efficiency are detected in Akyildirim et al. (2019) who investigate pricing of Bitcoin futures on traditional exchanges—Chicago Mercantile Exchange (CME) and the Chicago Board Options Exchange (CBOE). Importantly, in their study information flows and price discovery go from futures to spot markets, in contrast to previous results for traditional assets; a likely explanation is the difference in the type of traders at cryptoexchanges (that determine the spot price) and both CME and CBOE.[Footnote13] Yet more has to be learnt about cryptoexchanges. Their open nature distinguishes them from conventional stock exchanges and dealer markets with transactors directly accessing the market rather than relying on brokers as intermediaries. Is this open nature helpful, providing greater liquidity and narrowing trading spreads? Or does it disadvantage some investors, limiting regulatory oversight and allowing a core of participants to manipulate market prices at the expense of other investors? Do the technical arrangements supporting cryptoexchanges, notably the use of distributed ledger or blockchain technology which eliminates the need for post-trade settlement, lead to more efficient trading outcomes in

terms of price, liquidity and speed of execution? Could these technologies also improve the efficiency of outcomes in conventional financial exchange?

The second issue, widely debated in the cryptocurrency literature, is whether cryptocurrencies have a fundamental own value. Dwyer (2015) conjectures the limitation of the quantity produced can create an equilibrium in which a digital currency has a positive value: this limitation is a form of commitment, replacing the implicit obligation of Central banks to exchange fiat money into gold. Hayes (2017) advocates the cost of production view on cryptocurrency pricing; yet, as we discussed earlier, from a market equilibrium perspective, being sunk cost (as in Dwyer 2015), it does not matter for the pricing of existing coins.[Footnote14] A concurrent work by Bolt and Van Oordt (2019) outlines three key elements of the cryptocurrency value: convertibility into fiat money or ability to buy goods and services, investors' expectations, and factors that determine acceptance of the cryptocurrency in the future, by both vendors and buyers. Simultaneously, Schilling and Uhlig (2019) offer a model where cryptocurrencies are a reliable medium of exchange and compete against fiat money: this role implies the current price of cryptocurrencies is the expectation of their future value (a martingale), yet interestingly, competition and substitutability between the two imply in their analysis cryptocurrencies should disappear in the long run equilibrium. The authors admit that their analysis abstracts away such distinctive features of cryptocurrencies as "censorship resistance, transparency, and speed of trading". Above we have provided a simplified argument explaining that cryptocurrencies may have a value by offering features, such as anonymity of transactions, not covered by traditional currencies. Many findings, also those included in this special issue, point towards the intangible nature of the cryptocurrency value. Knowing more about it, we would be better equipped to understand the price dynamics and, reciprocally, the price dynamics would improve our understanding of decisions made by investors. So far, we remain very much agnostic in this respect.

The third issue is the societal role of cryptocurrencies and their regulation. While many discussions of cryptocurrencies stress that they are free of regulation, and the desire to be unregulated was one of drivers behind their creation, there is considerable controversy both about the application of existing regulation to cryptocurrencies and other cryptoassets and also what if any new regulations may be needed to protect investors, prevent financial crime and ensure financial stability. Are crypto investments securities and therefore subject to securities law (in the US this has been determined by the so-called Howey test)? What about the regulation of cryptoexchanges and the problems of hacking with some prominent examples of theft and failure to enforce "know-your-customer" (KYC) and anti-money-laundering (ALM) regulations?

Globally, regulators are shifting towards a tougher stance. Some exchanges are seeking to engage with regulators and be fully compliant. Others prefer to operate outside of regulation. A simple argument is that one has to protect investors and users from financial and technological risks they face. However, as papers presented in this special issue demonstrate, cryptocurrencies differ from traditional assets, hence the validity of traditional arguments, such as systemic stability, consumer protection and promotion of competition, is not clear. As our literature review and papers in this special issue underscore, cryptocurrencies do not comove with other assets; they help diversification and do not pose

an immediate danger for systemic stability. There appears to be a significant and growing degree of competition between different cryptocurrencies and cryptoexchanges, and yet we have to understand whether and why such a competition is desirable for the society.

Similarly, we need to understand whether there is a need to protect consumers. In traditional asset markets and in banking such protection improves allocation of resources and promotes economic growth and welfare, which is not straightforwardly applicable to cryptocurrencies and existing other cryptoassets. An extra dimension that arises from the studies in our special issue is the sustainability and environmental impact of cryptocurrencies, and this is again different from other asset classes.

Last but not the least, yet another major issue is how cryptocurrency technologies may affect conventional fiat currency issued by central banks.[Footnote15] Emerging literature on the competition between cryptocurrencies and fiat money raises concerns that the emergence of privately issued cryptocurrencies could weaken the monetary policy tools employed by the central bank and result in welfare losses (Zhu and Hendry 2018; Schilling and Uhlig 2019). Fernández-Villaverde and Sanches (2019) find that when private currency competes with a central bank issued e-money the former should vanish in equilibrium, yet it remains unclear what happens if cryptocurrencies are not a perfect substitute to fiat money.[Footnote16] Cukierman (2019), building on the analysis by Roubini (2018), brings the discussion to a further level by discussing the potential also for cryptocurrency issue by the central bank being used to implement fully reserved or narrow banking and thus to promote financial stability.

We hope this special issue contributes to our understanding of cryptocurrencies and surrounding issues. We also reckon it helps generate knowledge and materials useful for practitioners and scholars, involved in studying and shaping the cryptocurrency market for the future. Very possibly this will evolve and become very different from what we observe today, but for sure already now cryptocurrencies embody an innovation capable of moving our financial markets and economies forward in terms of efficiency and growth. We just need to learn using this innovation properly.

4. CODE WITH FILE NAME

7.1 APP.JS

```
import React, { Suspense, Fragment } from "react";
import { Router, Switch, Route } from "react-router-dom";
import { MuiPickersUtilsProvider } from "@material-ui/pickers";
import MomentUtils from "@date-io/moment";
import { routes } from "src/routes";
import { createBrowserHistory } from "history";
import AuthContext from "src/context/Auth";
import PageLoading from "src/component/PageLoading";
import AuthGuard from "src/component/AuthGuard";
import { ThemeProvider } from "@material-ui/core";
import { createTheme } from "src/theme";
const history = createBrowserHistory();

function App() {
const theme = createTheme();
console.log(theme);
return (
<div className="App">
<ThemeProvider theme={theme}>
<MuiPickersUtilsProvider utils={MomentUtils}>
<AuthContext>
<Router history={history}>
<RenderRoutes data={routes} />
</Router>
</AuthContext>
</MuiPickersUtilsProvider>
</ThemeProvider>
</div>
);
}
```

```
export default App;

function RenderRoutes(props) {
return (
<Suspense fallback={<PageLoading />}>
<Switch>
{props.data.map((route, i) => {
const Component = route.component;
const Guard = route.guard ? AuthGuard : Fragment;
const Layout = route.layout || Fragment;
return (
<Route
exact={route.exact}
key={i}
path={route.path}
render={(props) => (
<Guard>
<Layout>
{route.routes ? (
<RenderRoutes data={route.routes} />
) : (
<Component {...props} />
)}
</Layout>
</Guard>
)}
/>
);
})}
</Switch>
</Suspense>
);
}
```

7.2 Index.JS

```
import React from "react";
import ReactDOM from "react-dom";
import App from "./App";
import * as serviceWorker from "./serviceWorker";
import "src/scss/main.css";

ReactDOM.render(<App />, document.getElementById("root"));
```

```
// If you want your app to work offline and load faster, you can change
// unregister() to register() below. Note this comes with some pitfalls.
// Learn more about service workers: https://bit.ly/CRA-PWA
serviceWorker.unregister();
```

7.3 Routing.JS

```
import React, { lazy } from "react";
import { Redirect } from "react-router-dom";
import DashboardLayout from "src/layouts/DashboardLayout";
// import HomeLayout from 'src/layouts/HomeLayout';
import LoginLayout from "src/layouts/LoginLayout";
export const routes = [
  {
    exact: true,
    path: "/",
    component: lazy(() => import("src/views/auth/Main")),
  },
  {
    exact: true,
    path: "/login",
    layout: LoginLayout,
    component: lazy(() => import("src/views/auth/LogIn")),
  },
  {
    exact: true,
    path: "/Term_Condition",
    layout: LoginLayout,
    component: lazy(() => import("src/views/auth/LogIn/Term_Condition")),
  },
  {
    exact: true,
    path: "/signup",
    layout: LoginLayout,
    component: lazy(() => import("src/views/auth/signup/signup")),
  },
  {
    exact: true,
    path: "/dashboard",
    // guard:true,
    layout: DashboardLayout,
    component: lazy(() => import("src/views/pages/Dashboard")),
  },
```

```
{
  exact: true,
  path: "/investment",
  // guard:true,
  layout: DashboardLayout,
  component: lazy(() => import("src/views/pages/Investment/index")),
},

{
  exact: true,
  path: "/myinvestment",
  // guard:true,
  layout: DashboardLayout,
  component: lazy(() => import("src/views/pages/MyInvestment/index")),
},
{
  exact: true,
  path: "/LifeInsurencePolicy",
  // guard:true,
  layout: DashboardLayout,
  component: lazy(() =>
    import("src/views/pages/MyInvestment/LifeInsurencePolicy")
  ),
},
{
  exact: true,
  path: "/withdraw",
  // guard:true,
  layout: DashboardLayout,
  component: lazy(() => import("src/views/pages/Transactions/Withdraw")),
},

{
  exact: true,
  path: "/trade",
  // guard:true,
  layout: DashboardLayout,
  component: lazy(() => import("src/views/pages/Trade/")),
},
{
  exact: true,
  path: "/transactions",
  // guard:true,
  layout: DashboardLayout,
  component: lazy(() => import("src/views/pages/Transactions/index")),
```

```
},
{
  exact: true,
  path: "/all_transactions",
  // guard:true,
  layout: DashboardLayout,
  component: lazy(() =>
    import("src/views/pages/Transactions/AllTransactions")
  ),
},
{
  exact: true,
  path: "/TransactionsDetail",
  // guard:true,
  layout: DashboardLayout,
  component: lazy(() =>
    import("src/views/pages/Transactions/TransactionDetail")
  ),
},

{
  exact: true,
  path: "/setting",
  // guard:true,
  layout: DashboardLayout,
  component: lazy(() => import("src/views/pages/Setting/index")),
},
{
  exact: true,
  path: "/wallet",
  // guard:true,
  layout: DashboardLayout,
  component: lazy(() => import("src/views/pages/Wallet/index")),
},
{
  exact: true,
  path: "/notifications",
  // guard:true,
  layout: DashboardLayout,
  component: lazy(() => import("src/views/pages/notifications/index")),
},
{
  exact: true,
  path: "/notification-detail",
  // guard:true,
```

```
  layout: DashboardLayout,
  component: lazy(() =>
    import("src/views/pages/notifications/NotificationDetails")
  ),
},
{
  exact: true,
  path: "/faq",
  // guard:true,

  component: lazy(() => import("src/views/pages/faq/index")),
},
{
  exact: true,
  path: "/Fauth",
  // guard:true,
  layout: DashboardLayout,
  component: lazy(() => import("src/views/pages/2FA/index")),
},
{
  exact: true,
  path: "/add-kyc",
  // guard:true,
  // layout: DashboardLayout,
  component: lazy(() => import("src/views/pages/KYC")),
},
{
  exact: true,
  path: "/otp",
  // guard:true,
  // layout: DashboardLayout,
  component: lazy(() => import("src/views/auth/OTP")),
},
{
  exact: true,
  path: "/kyc",
  // guard:true,
  layout: DashboardLayout,
  component: lazy(() => import("src/views/pages/KYC/KycList")),
},
{
  exact: true,
  path: "/profile",
  // guard:true,
  layout: DashboardLayout,
```

```
  component: lazy(() => import("src/views/pages/Profile/index")),
},
{
  exact: true,
  path: "/changepassword",
  // guard:true,
  layout: DashboardLayout,
  component: lazy(() => import("src/views/pages/changepassword/index")),
},

{
  exact: true,
  path: "/terms-and-condition",
  // guard:true,
  layout: DashboardLayout,
  component: lazy(() => import("src/views/pages/TermsAndCondition")),
},
{
  exact: true,
  path: "/privacy-policy",
  // guard:true,
  layout: DashboardLayout,
  component: lazy(() => import("src/views/pages/PrivacyPolicy")),
},
{
  exact: true,
  path: "/user-info",
  // guard:true,
  layout: DashboardLayout,
  component: lazy(() => import("src/views/pages/user-info/index")),
},
{
  exact: true,
  path: "/forget-password",
  // guard:true,
  component: lazy(() => import("src/views/auth/forget-password/index")),
},
{
  exact: true,
  path: "/ForgetWithMobile",
  // guard:true,
  component: lazy(() =>
    import("src/views/auth/forget-password/ForgetWithMobile")
  ),
},
```

```
  {
    exact: true,
    path: "/instrauctions",
    // guard:true,
    component:      lazy(()      =>      import("src/views/auth/forget-password-
link/index")),
  },
  {
    exact: true,
    path: "/reset-password",
    // guard:true,
    component: lazy(() => import("src/views/auth/reset-password/index")),
  },
  {
    exact: true,
    path: "/buy",
    component: lazy(() => import("src/views/pages/Trade/Buy/")),
  },
  {
    exact: true,
    path: "/sell",
    component: lazy(() => import("src/views/pages/Trade/Sell/")),
  },
  {
    exact: true,
    path: "/add-faq",
    // guard:true,
    layout: DashboardLayout,
    component: lazy(() => import("src/views/pages/FAQs/")),
  },

  {
    exact: true,
    path: "/404",
    component: lazy(() => import("src/views/errors/NotFound")),
  },
  {
    component: () => <Redirect to="/404" />,
  },
];
```

7.4 pakage.json

```
{
```

```
"name": "bitcoin-price-betting",
"version": "0.1.0",
"private": true,
"proxy": "http://182.72.203.245:1829",
"dependencies": {
  "@date-io/moment": "^1.3.13",
  "@material-ui/core": "^4.11.0",
  "@material-ui/icons": "^4.9.1",
  "@material-ui/lab": "^4.0.0-alpha.56",
  "@material-ui/pickers": "^3.2.10",
  "@material-ui/styles": "^4.10.0",
  "@testing-library/jest-dom": "^4.2.4",
  "@testing-library/react": "^9.5.0",
  "@testing-library/user-event": "^7.2.1",
  "aos": "^2.3.4",
  "apexcharts": "^3.23.1",
  "axios": "^0.20.0",
  "clsx": "^1.1.1",
  "formik": "^2.2.6",
  "lodash": "^4.17.20",
  "material-ui-password-field": "^2.1.2",
  "moment": "^2.29.1",
  "react": "^16.13.1",
  "react-apexcharts": "^1.3.7",
  "react-dom": "^16.13.1",
  "react-dropzone-uploader": "^2.11.0",
  "react-feather": "^2.0.9",
  "react-helmet": "^6.1.0",
  "react-icons": "^4.2.0",
  "react-number-format": "^4.5.5",
  "react-perfect-scrollbar": "^1.5.8",
  "react-phone-number-input": "^3.1.21",
  "react-router-dom": "^5.2.0",
  "react-scripts": "3.4.3",
  "react-slick": "^0.28.1",
  "slick-carousel": "^1.8.1",
  "yup": "^0.32.8"
},
"scripts": {
  "start": "react-scripts start",
```

```
    "build": "react-scripts build",
    "test": "react-scripts test",
    "eject": "react-scripts eject"
  },
  "eslintConfig": {
    "extends": "react-app"
  },
  "browserslist": {
    "production": [
      ">0.2%",
      "not dead",
      "not op_mini all"
    ],
    "development": [
      "last 1 chrome version",
      "last 1 firefox version",
      "last 1 safari version"
    ]
  }
}
```

7.5 Bankdetails.js

```
import { Typography, Grid, Box, IconButton } from '@material-ui/core';
        import React, { useState } from 'react';
        import ConfirmationDialog from 'src/component/ConfirmationDialog';
        import { FaPhoneAlt, FaRegTrashAlt } from 'react-icons/fa';

        export default function BankDetail({ data, index }) {
        const [confirmOpen, setConfirmOpen] = useState(false);

        const confirmationHandler = () => {
        setConfirmOpen(false);
        };
        return (
        <Box
        style={
        index % 2 === 0
        ? { backgroundColor: '#d5ecf5', borderRadius: 10, padding: 25 }
        : { backgroundColor: '#f5d5da', borderRadius: 10, padding: 25 }
        }
        >
```

```
{confirmOpen && (
<ConfirmationDialog
open={confirmOpen}
handleClose={() => setConfirmOpen(false)}
title={'title'}
desc={'desc'}
confirmationHandler={confirmationHandler}
/>
)}
<Box display="flex">
<Box>
<Typography variant="subtitle2">{data.name}</Typography>
<Typography variant="subtitle2" pt={2}>
{data.accountNumber}
</Typography>
<Typography variant="subtitle2" pt={2}>
<FaPhoneAlt />
   {data.phoneNumber}
</Typography>
</Box>
<Box style={{ width: '100%', textAlign: 'right' }}>
<IconButton
style={{ backgroundColor: 'white' }}
onClick={() => setConfirmOpen(true)}
>
<FaRegTrashAlt size={14} />
</IconButton>
</Box>
</Box>
<Grid container>
<Typography variant="subtitle2">
Swift Number : {data.SwiftNumber}
</Typography>
</Grid>
<Grid container>
<Typography variant="subtitle2">
IBAN Number : {data.IBANNumber}
</Typography>
</Grid>
</Box>
);

}
```

7.6 Nortification.js

```
import { Typography, Box, IconButton, Link } from "@material-ui/core";
import React, { useState } from "react";
import { FaRegTrashAlt, FaChevronRight } from "react-icons/fa";
import { Link as RouterLink } from "react-router-dom";
import ConfirmationDialog from "src/component/ConfirmationDialog";

export default function NotificationsList({ data, popUp }) {
const [open, setOpen] = useState(false);

const confirmationHandler = () => {
setOpen(false);
};
return (
<Box
className="notication-list"
style={
popUp
? {
borderBottom: "1px solid #ccc",
padding: "0px 5px 7px",
position: "relative",
color: "#000",
}
: {
borderBottom: "1px solid #ccc",
padding: "0px 10px 15px",
position: "relative",
color: "#000",
}
}
>
{open && (
<ConfirmationDialog
open={open}
handleClose={() => setOpen(false)}
title={"title"}
desc={"desc"}
confirmationHandler={confirmationHandler}
/>
)}
<Box display="flex">
<Box>
<IconButton
onClick={() => setOpen(true)}
```

```
style={{ backgroundColor: "#ccc", marginRight: "12px" }}
>
<FaRegTrashAlt size={14} />
</IconButton>
</Box>
<Link
to={{
pathname: "/notification-detail",
state: {
data: data,
},
}}
style={{ textDecoration: "none", width: "100%" }}
component={RouterLink}
>
<Box style={{ width: "calc(100% - 50px)" }}>
<Box className="rightPosition d-flex" style={{ marginTop: "10px" }}>
<Typography variant="subtitle2" pt={2}>
{data.date}
<FaChevronRight size={14} style={{ marginLeft: "15px" }} />
</Typography>
</Box>
<Box className="width120">
<Typography variant="subtitle2" className="extra-bold">
{data.title}
</Typography>
<Typography variant="subtitle2" pt={2} className="ellispsys">
{data.Message}
</Typography>
</Box>
</Box>
</Link>
</Box>
</Box>
);
}
```

7.7 align text/ package json

```
{
  "_from": "align-text@^0.1.3",
```

```
  "_id": "align-text@0.1.4",
  "_inBundle": false,
  "_integrity": "sha1-DNkKVhCT810KmSVsIrcGlDP60Rc=",
  "_location": "/align-text",
  "_phantomChildren": {},
  "_requested": {
    "type": "range",
    "registry": true,
    "raw": "align-text@^0.1.3",
    "name": "align-text",
    "escapedName": "align-text",
    "rawSpec": "^0.1.3",
    "saveSpec": null,
    "fetchSpec": "^0.1.3"
  },
  "_requiredBy": [
    "/center-align",
    "/right-align"
  ],
  "_resolved": "https://registry.npmjs.org/align-text/-/align-text-0.1.4.tgz",
  "_shasum": "0cd90a561093f35d0a99256c22b7069433fad117",
  "_spec": "align-text@^0.1.3",
  "_where": "C:\\Users\\DELL\\Task\\node_modules\\center-align",
  "author": {
    "name": "Jon Schlinkert",
    "url": "https://github.com/jonschlinkert"
  },
  "bugs": {
    "url": "https://github.com/jonschlinkert/align-text/issues"
  },
  "bundleDependencies": false,
  "dependencies": {
    "kind-of": "^3.0.2",
```

```
  "longest": "^1.0.1",
  "repeat-string": "^1.5.2"
},
"deprecated": false,
"description": "Align the text in a string.",
"devDependencies": {
  "mocha": "*",
  "should": "*",
  "word-wrap": "^1.0.3"
},
"engines": {
  "node": ">=0.10.0"
},
"files": [
  "index.js"
],
"homepage": "https://github.com/jonschlinkert/align-text",
"keywords": [
  "align",
  "align-center",
  "alignment",
  "center",
  "center-align",
  "indent",
  "pad",
  "padding",
  "right",
  "right-align",
  "text",
  "typography"
],
"license": "MIT",
"main": "index.js",
"name": "align-text",
```

```
  "repository": {
    "type": "git",
    "url": "git://github.com/jonschlinkert/align-text.git"
  },
  "scripts": {
    "test": "mocha"
  },
  "version": "0.1.4"
}
```

7.7 align text/ index json

```
/*!
 * align-text <https://github.com/jonschlinkert/align-text>
 *
 * Copyright (c) 2015, Jon Schlinkert.
 * Licensed under the MIT License.
 */

'use strict';

var typeOf = require('kind-of');
var repeat = require('repeat-string');
var longest = require('longest');

module.exports = function alignText(val, fn) {
  var lines, type = typeOf(val);

  if (type === 'array') {
    lines = val;
  } else if (type === 'string') {
    lines = val.split(/(?:\r\n|\n)/);
  } else {
    throw new TypeError('align-text expects a string or array.');
  }

  var fnType = typeOf(fn);
  var len = lines.length;
  var max = longest(lines);
  var res = [], i = 0;
```

```
  while (len--) {
    var line = String(lines[i++]);
    var diff;

    if (fnType === 'function') {
      diff = fn(line.length, max.length, line, lines, i);
    } else if (fnType === 'number') {
      diff = fn;
    } else {
      diff = max.length - line.length;
    }

    if (typeOf(diff) === 'number') {
      res.push(repeat(' ', diff) + line);
    } else if (typeOf(diff) === 'object') {
      var result = repeat(diff.character || ' ', diff.indent || 0);
      res.push((diff.prefix || '') + result + line);
    }
  }

  if (type === 'array') return res;
  return res.join('\n');
};
```

7.8 ansi style/ index.d.ts

```
import { Typography, Box, IconButton, Link } from "@material-ui/core";
import React, { useState } from "react";
import { FaRegTrashAlt, FaChevronRight } from "react-icons/fa";
import { Link as RouterLink } from "react-router-dom";
import ConfirmationDialog from "src/component/ConfirmationDialog";

export default function NotificationsList({ data, popUp }) {
  const [open, setOpen] = useState(false);

  const confirmationHandler = () => {
    setOpen(false);
  };
  return (
    <Box
      className="notication-list"
```

```
 style={
  popUp
   ? {
      borderBottom: "1px solid #ccc",
      padding: "0px 5px 7px",
      position: "relative",
      color: "#000",
     }
   : {
      borderBottom: "1px solid #ccc",
      padding: "0px 10px 15px",
      position: "relative",
      color: "#000",
     }
 }
>
 {open && (
  <ConfirmationDialog
   open={open}
   handleClose={() => setOpen(false)}
   title={"title"}
   desc={"desc"}
   confirmationHandler={confirmationHandler}
  />
 )}
 <Box display="flex">
  <Box>
   <IconButton
    onClick={() => setOpen(true)}
    style={{ backgroundColor: "#ccc", marginRight: "12px" }}
   >
    <FaRegTrashAlt size={14} />
   </IconButton>
  </Box>
  <Link
   to={{
    pathname: "/notification-detail",
    state: {
     data: data,
    },
   }}
   style={{ textDecoration: "none", width: "100%" }}
   component={RouterLink}
  >
   <Box style={{ width: "calc(100% - 50px)" }}>
```

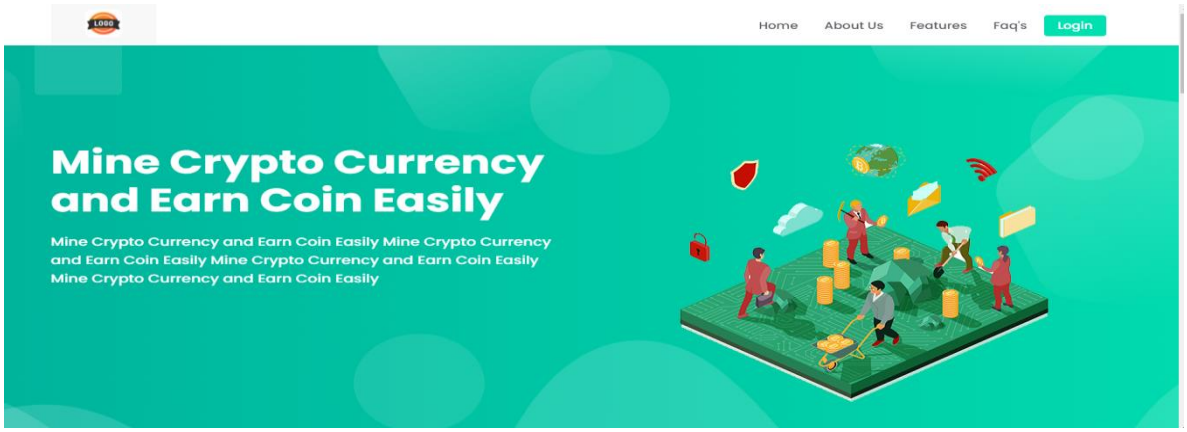
```
            <Box className="rightPosition d-flex" style={{ marginTop: "10px" }}>
              <Typography variant="subtitle2" pt={2}>
                {data.date}
                <FaChevronRight size={14} style={{ marginLeft: "15px" }} />
              </Typography>
            </Box>
            <Box className="width120">
              <Typography variant="subtitle2" className="extra-bold">
                {data.title}
              </Typography>
              <Typography variant="subtitle2" pt={2} className="ellispsys">
                {data.Message}
              </Typography>
            </Box>
          </Box>
        </Link>

    </Box>
  );
}
```

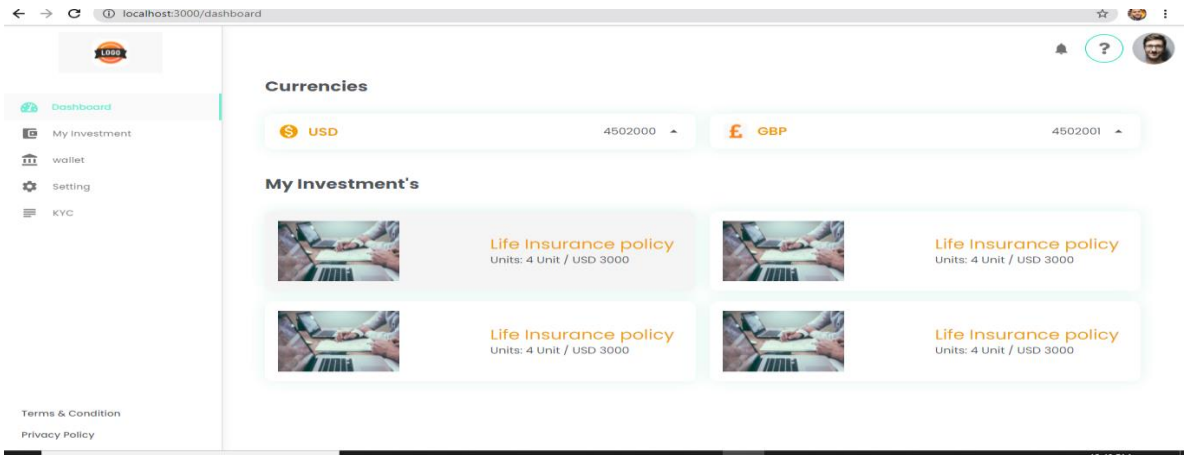
CHAPTER -4

SCREENSHOT OF PROJECT

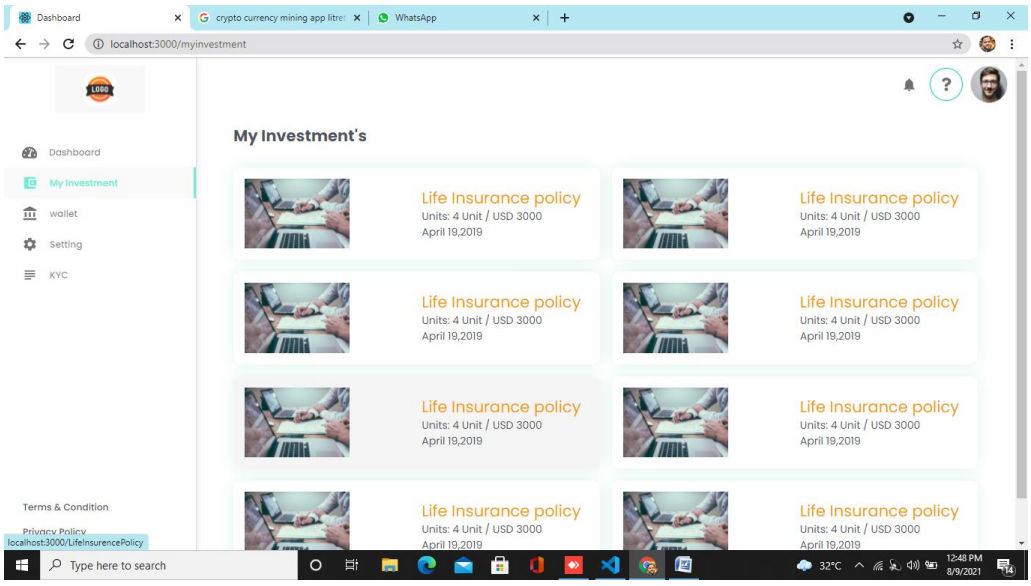
8.1 Home Page



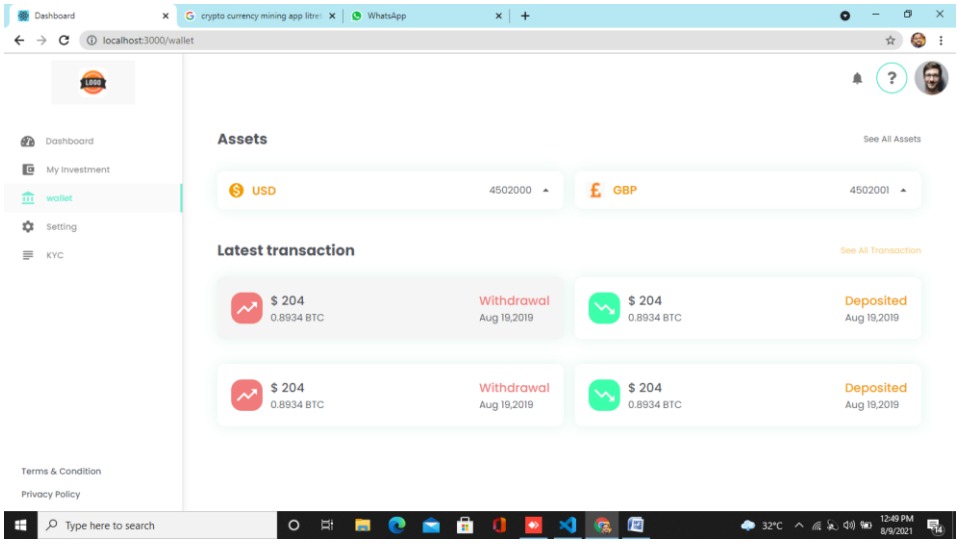
8.2 Dashboad Page



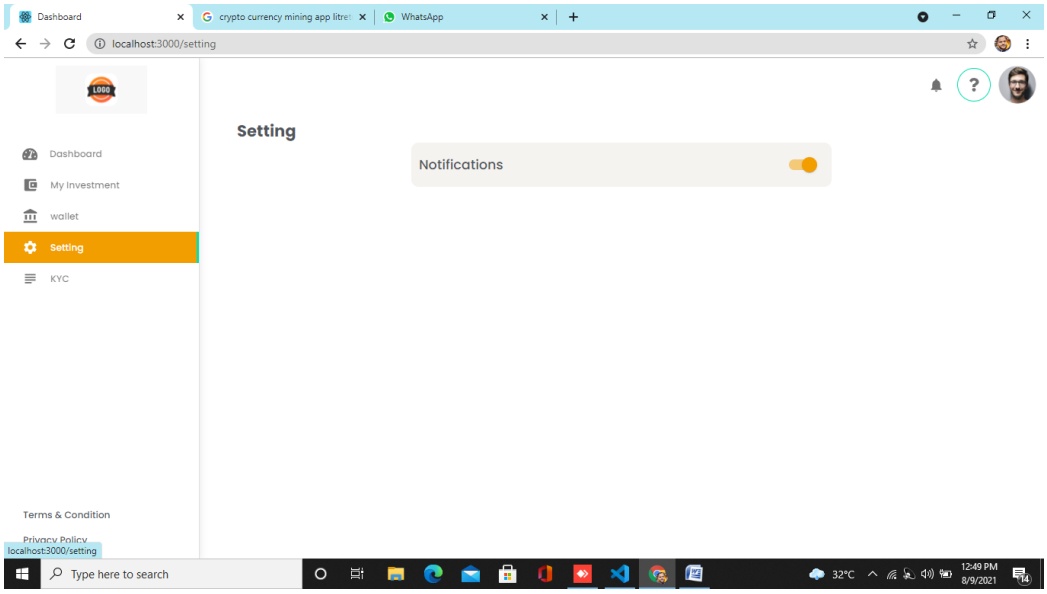
8.3 My Investment Page



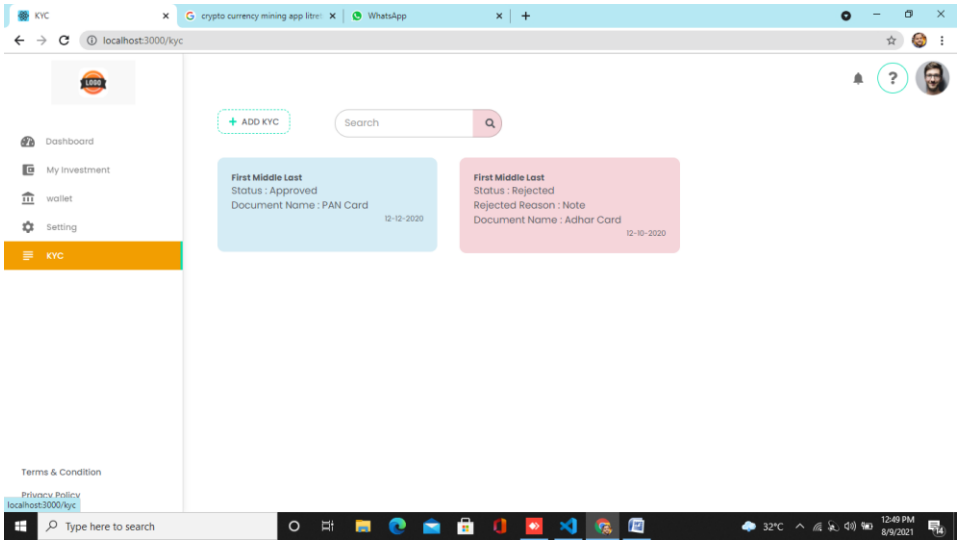
8.4 Wallet Page



8.5 Setting Page



8.6 KYC Page



Chapter-5

TESTING

Testing is the process of evaluating a system or its component(s) with the intent to find whether it satisfies the specified requirements or not. In simple words, testing is executing a system in order to identify any gaps, errors, or missing requirements in contrary to the actual requirements.

According to ANSI/IEEE 1059 standard, Testing can be defined as - A process of analyzing a software item to detect the differences between existing and required conditions (that is defects/errors/bugs) and to evaluate the features of the software item.

An early start to testing reduces the cost and time to rework and produce error-free software that is delivered to the client. However in Software Development Life Cycle (SDLC), testing can be started from the Requirements Gathering phase and continued till the deployment of the software.

It also depends on the development model that is being used. For example, in the Waterfall model, formal testing is conducted in the testing phase; but in the incremental model, testing is performed at the end of every increment/iteration and the whole application is tested at the end.

Testing is done in different forms at every phase of SDLC −

- During the requirement gathering phase, the analysis and verification of requirements are also considered as testing.
- Reviewing the design in the design phase with the intent to improve the design is also considered as testing.
- Testing performed by a developer on completion of the code is also categorized as testing.
- Testing must include UI testing, functional testing, regression testing, integration testing, system testing and system integration testing.
- Automation testing can also be enforced on using tools like HP Unified Functional Testing (UFT) and Selenium.
- A tester needs to be cautious during UI testing as most of the web pages on the Salesforce platform are Visual Force pages. The dynamic nature of visual force pages need to be paid special attention as all the elements of a webpage may not be loaded at one go.
- Testers need to create functional flows including positive and negative flows to cover the entire functionality of an application.
- Workflows using various user roles must be constructed and tested.
- Test cases need to be documented using a test management tool like HP ALM.

Test Data needs to be prepared for validating the reports functionality.

9.1 Test Automation

Automated functional testing of SalesForce is a challenging one as most of the web pages are dynamic in nature on the SalesForce platform. Hence, SalesForce demands automation testers to build robust automation framework to sustain in the future. Also, there can be frequent updates to the applications as they are on cloud applications.

Test Automation on Salesforce can be achieved using any of the following tools:

- Selenium web driver
- HP Unified Functional Testing (UFT)
- Test Frameworks, such as Cucumber

- Provar

9.2 Security Testing

Security testing on the Salesforce platform is usually done by SalesForce development team. Before placing a request for a security test, it is best to review the 'Application and Network Vulnerability Assessment Summaries' provided by Salesforce.

After reviewing the summary, if a security test is still required, then a Security Assessment Test can be scheduled with the Salesforce team.

CHAPTER-6
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