

Transactional systems and Cryptocurrency: A Review of Literature

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Abstract

This study is aimed at reviewing literatures relation to general transactional systems and also cryptocurrency related literatures. The study information was collected through empirical literatures, published documents and monetary related database. The settled that transactional system has witnessed series of shift from barter system to the present fiat and fractional reserve system. The advancement of technology and the digital economy has contributed to significant decline in cash usage and the digital transaction is fast gathering momentum. The cryptocurrency system is among the recent evolution in a transactional system where the currency operates as a decentralized system on blockchain technology and distributed ledger with high security, simplicity, traceability, transparency, and accountability of all transactions on the block. Those formidable features are now threatening the future of the current fiat and fractional reserve system because the crypto is geared towards eliminating the role of banks in transactions.

Keywords – Transactional system, fiat money, fractional reserve, cryptocurrency and blockchain.

1. Introduction

The world today is faced with critical issues to improve the livelihood of individual households together with enhanced economic activities of nations. The consequences of consistent financial instability and financial crises in all parts of the globe have captured the attention of many stakeholders on the sustainability or otherwise of the current monetary system. It has been established that economic stability and meaningful living condition can only be achieved through a well-structured and stable monetary system that could be capable of regulating and coordinating the routine transactions within and outside the country.

The monetary system has witnessed series of shift from one type of operation to another. From barter system to gold standard to Bretton Wood to the present fiat money and fractional reserve requirement have all being used to facilitate trades and investments, each with its uniqueness and challenges. Since abandoning the gold standard and with the introduction of fiat money and fractional reserve requirement, the world has witnessed a cyclical recession about every 10-year cycle. Experts attributed the cyclical recessions to the imbalances in money supply and real economic activities (Werner, 2018 & Carson, 2020). Whenever a crisis (recession) hit, the economy would contract to correct the imbalances and in the due process causing many people to become poorer and even drive the poor into poverty when the costs of living increase with the value of money getting smaller.

The imbalances in the economy are largely due to the over-creation of the money supply with no real asset backing leading to huge bubbles formation. The excess money

supply is a result of credit creation practices by private banks through the fractional reserve requirement. The requirement permits banks to create more money out of new loans through money multiplier effects. In times of recession, the value of money diminishes as it has no asset backing but just a government promise and guarantee of value (fiat money). This problem is compounded with money creation by private banks since the created money is majorly invested in pre-existing assets which will not lead to real economic growth and development. A recent development in the field of financial technology, blockchain, big data, and the digital economy has seen the rise of innovation to address the shortcomings of the present economic system. The innovations are mainly to bring down costs and speed of doing business and also to expand the business outside the norms by connecting sellers or providers of funds directly to buyers or borrowers.

The digital transformation has brought about cashless and online business conducts thereby opening new means of a transaction with the sole aim of easing the bureaucracy and simplifying the transaction conducts. Amongst the most common virtual currencies is a cryptocurrency, which utilises blockchain technology in its operation. A cryptocurrency is known as an electronic cash system, working on a peer-to-peer basis to enable the transfer of funds between users without a financial transitional or central source. These types of currencies are categorised as virtual currencies since at present they are unregulated and are not backed by any government. The currency has gained the trust and confidence of the users due to its system efficiency and also simplicity as there is no middle party to impose significant transactional costs and bureaucracy within the system.

Cryptocurrency potentially offers a new way of doing economic transactions with certainty and confidence. This study assesses the operation of the cryptocurrency system and the future of the current fractional reserve system to provide a better understanding of the potentials and limitations of the two systems. The remaining section of the paper covers a description of transactional systems which include fiat and fractional reserve system, the features of the system together with the credit creation process. The sections also cover the cryptocurrency transactional system, the challenges of the major systems and the future of cryptocurrency in relation to the operation of the current fiat and fractional reserve system thereafter conclusion and recommendations.

2. Literature Review

2.1 Review of the Present Transactional System in Nigeria

The modern (present) transactional system relies on two main features that are fiat money and fractional reserve banking. Each of these features is discussed next to highlight its meaning, requirement, efficiency, and also challenges associated with it. For ease of discussion, the present transactional system (with fractional reserve banking and fiat money features) is termed as a fractional reserve system.

2.1.1 Fiat Money

This is a government-backed coin or paper money, which is not tied to any real asset (gold or silver) but rather a mere promise of value. The use of fiat money can be traced back to the Kublai Khan era in the 16th Century where he printed a state-backed currency, which was used and considered as the medium of exchange. Before the fiat money evolution, the well-known transactional medium is gold.

The gold standard has been very effective in its role as a medium of exchange as it has an intrinsic value that can be stored without value loss. Its effectiveness is enhanced, as the system requires no central bank and government interference in the

monetary arena. The gold as an external transactional tool makes the money supply to be exogenous, as the total stock of gold cannot be increased at will. Under the gold standard, neither the government nor the banks can arbitrarily increase the money supply in the economy. The collapse of Bretton Wood Agreement in 1971 (the Agreement set the exchange value for all currencies in terms of gold) was marked as the end of gold-backed currency and countries in the world adopted the fiat money system where each nation produces its fiat currency which is not based on any real asset but rather on state promise and guarantee of value.

Monetary economics argues that the fiat money plays a significant role, as a medium of exchange especially as it is believed to have solved the double coincidence of wants problem. The fiat money is said to have enhanced welfare through efficient resource allocations by injecting money into the economy after due consideration of the necessary economic motivations (Pedro, & Sun 2019). In theory, the supply of fiat money is infinity, as its production does not depend on the availability of an external factor, for example, gold or other precious metals. The unrestrained fiat money production is said to have caused major disorders the world is experiencing today such as high rate of inflation, poverty, housing unaffordability, high costs of living, unemployment, and widening gap between the rich and the poor. Since the removal of the Bretton Wood Agreement, the world has witnessed an increasingly widening gap between money supply and the growth of the economy as measured in terms of Gross Domestic Products (GDP) in Nigeria.

The major consequences of the widening gap (expansionary monetary system) are the rise in the price of goods and services as a result of too much money in circulation. Since the introduction of the fiat money in 1971, the world has also seen a cyclical recession happening about every 10-year cycle to correct the imbalances (the real economy and money supply) in the economy. The fiat monetary system is so systemic that as soon as the imbalances are corrected, the whole cycle of bubbles creation is starting all over again.

2.1.2 Federal Reserve Banking

Fractional reserve banking (FRB) is a system in which banks will only hold a fraction of bank deposits in cash (while lending out the remaining) to expand the economy by making more money available for lending. In practice, banks typically treat the total bank deposits as required reserves learning that the deposits will just remain without them moving anywhere. The practice is analogous to the practice of the Goldsmith system in the 16th Century when it allowed Goldsmith to keep merchants' precious transactional assets (gold). Goldsmith gave the merchant a receipt indicating that the gold was with him and since he was a trusted person, the merchant offers those receipts to other parties in an exchange of goods and services and the third party use the receipt to claim the gold in the vault of Goldsmith. The gold remained in the vault for some time without owners withdrawing them. Goldsmith took advantage of the gold non-movement by offering loans to interested customers in the forms of issued receipts.

Goldsmith ended up doubling his income of the principal amount together with the interest. Effectively, this is the same approach taken by the private banks in the modern days when they create more money out of customers' deposits by extending loans to third parties while the deposits remain with them for a long time. Every time a new loan is approved, new (electronic) money is being created without necessarily using the deposit amounts. Since most of today's transactions are handled online and money are not being withdrawn in huge numbers at once, the necessity to use the deposit is indeed very minimal. Besides, cheques and drafts are also an acceptable means of exchange. This is the very reason why many critics of the system are accusing banks of creating money out of thin air

(Werner, (2014).

The Bank of England in its 2016 report estimated that only less than 5% of the money in circulation was printed by the central bank with the remaining more than 95% were created out of bank deposits by the private banks. The direct consequence of this practice is huge money supply is in the economy and without the assets backing, the value of money decreases with the increase in the money supply. The effects on inflation and cost of living are discussed in the coming sections.

2.2 Challenges of Major Transactional System

To date, the world has witnessed many introductions and reforms of the transactional system and their mediums of exchange. Each transactional system has its unique challenges. The barter system is faced with the challenge of indivisibility and inconsistency in demand. This has caused inconvenience to users and the gold standard was introduced to solve the problems. The gold standard and Bretton Wood systems, which are categorized as a real asset-backed transactional system was successful in solving the major problem of the barter system and brought economic stability to the world and less hardship is faced by households (Palley, 2015). The economic stability was achieved when money supplies moved together with real economic activities and thereby preserving the value and the purchasing power of the currency. However, the situation could not be sustained with the persistent increase in the population coupled with the increase in nations' expenditure. Limited availability of gold and other precious metals means that the economy cannot be expanded as wished and countries started to look for other solutions to meet their respective demands and peculiarities.

The search brought about an expansionary monetary system known as fiat and fractional reserve banking system (fiat fractional reserve system). Under this system, a country can increase its money supply when it deems fit without any asset consideration as a backing to such production and this makes the money expansion so easy and consistent. The fiat fractional reserve system is successful in expanding money but is criticised for creating economic imbalances and consequently causing higher costs of living and inflation to most economies (Rozeff, 2010). The system is seen as the major cause of the overwhelming increase in the money supply of many countries and such increase in supply was not supported by the proportional increase in the real economic activities that will contribute to the real growth of a country and improved living condition of its citizen (Tashtamirov, 2013).

The cryptocurrency transactional system has made a great effort in the eradication of money creation by a private bank, which will naturally solve the oversupply of money and inflation. It has also been able to curtail the interest rate manipulation which is believed to have played a significant role in contributing to the economic and financial crises witnessed under the fractional reserve system as pointed out by (Turner, 2012). The system also has the capacity of building a high level of trust among parties that partake in the transaction as transparency and traceability is cardinal in its operation. However, the great challenge of the system is that they are not regulated and controlled by any state and this may pave the way for illegal transactions, which will be detrimental to the general wellbeing of nations. Nevertheless, proponents of decentralised system, value the freedom and speed at which the transactions take place, not to mention the significant transaction costs saving.

Considering the problems and issues with each transactional system, the study has come up with the assessment table of the most common challenges facing the three major transactional systems as identified by Positive Money United Kingdom, Monetary Movement for Justice and some scholars like Friedman (1970), Tobin (1987), Kay (2009),

Kotlikoff (2010) Huber and Robertson (2000) in their book *Creating New Money* and Werner (2014) as presented in table 1 which addresses only the key components. It can be seen from the analysis in Table 3 that the most stable system is the asset-backed system, which has scaled through almost all the challenges except for the growing need and expansion. The expansion cannot be achieved under the asset-backed system due to the limited production of the precious asset that the money creation is based upon. The present system of the fractional reserve has encompassed almost all those challenges of fiat money, money creation, inflation, and interest rate manipulation. On the other hand, the cryptocurrency system has squarely addressed the asset-backed system challenges and it also curtails the major challenges under the fractional reserve system, but it is being faced with the challenges of an unregulated transaction as it is not under the control of any state.

Table 3: Transactional systems major challenges

Challenges	Transactional and monetary systems		
	Asset backed	Fractional Reserve	Cryptocurrency
Fiat Money	No	Yes	Yes
Credit creation	Less	High	Less
Inflation	Less	High	Less
Interest rate manipulation	Less	High	Less
Unregulated transaction	High	High	Less
Growth need & expansion	Not visible	Visible	Visible

Authors' Compilation (2024).

3. Cryptocurrency

Technological advancement in computing and finance has seen the emergence of innovation that improves business dealings such as financial technology (fintech), blockchain, and cryptocurrency. The latter is a virtual currency transactional system invented in 2008 by a group or an individual with a pseudonym of Satoshi Nakamoto to serve as a medium of exchange. The currency is currently operated on the blockchain technology with a peer-to-peer network, which gives all transactions the required authenticity and trust by the participants. The operation of this transactional system uses a general ledger to capture all the decentralised transactions and the operation results in a high rate of traceability, transparency, and immutability. The ledger contains all transactions that have ever been conducted and are shared and agreed upon by the entire network of an individual node, making it impossible to falsify past transactions. The technology also allows crypto wallets to calculate the spendable balance to validate new transactions and thus avoiding double-spending and ensuring spending by the actual owners. The whole transactions are secured with cryptography, a method to protect information and communication through the use of codes that can only be read and processed by whom the information is intended.

Practically, cryptocurrencies have no intrinsic value because the prices of the currencies are based on speculation. This is evidenced in the consistent rise in its value especially the Bitcoin which witnessed a spectacular price increase from essentially a value of zero for one coin in 2009 to \$9,624.39 in 2019 and with a market capitalization of \$111,667,324,912 out of the total cryptocurrencies capitalization of \$253,281,617,093 as published in December 2019 by coin market capitalization (<https://coinmarketcap.com/>). The users of such currencies are optimistic that its value will forever increase as the present price of the currency is determined solely by expectations about its future price. This makes it reacts highly elastically to the changes in the expectations of market participants and is reflected in extreme price volatility (Berentsen & Schar, 2018).

Table 2: Some major cryptocurrencies, features and capitalisation

Currency	Features	Market capitalisation as at December 2019 in USD
Bitcoin	The most widespread cryptocurrency so far	\$111,667,324,912
Ripple	It was developed for peer-based debt transfer	\$21,503,755,339
Ethereum	A currency that supports smart contracts	\$21,692,737,457
Swiftcoin	Proprietary alternative to Bitcoin but with blockchain ledger that is not public	\$8,443,833
Petro	The first oil-backed cryptocurrency	\$1,872,677

Source: coinmarketcap.com

Cryptocurrencies have been acclaimed for their unparalleled achievements in their portability, divisibility, and transparency. They also reduce transaction costs significantly with the elimination of middle parties for any transfers. Since the total amount of cryptocurrencies is predetermined, they are also inflation resistant as they preserve the purchasing power of the currencies. Cryptocurrencies are also subjected to many criticisms among others are the nature of the cryptocurrency transactions. The semi-anonymous setting encourages illegal activities such as money laundering, tax evasion, and possibly terrorist financing. Whistleblowers and activists living under repression value highly the benefits of privacy or anonymity associated with cryptocurrencies.

In summary, the cryptocurrencies are fast gaining popularity, confidence, and trust of the investors alike. Despite it is not recognised by any government as a legal tender, the benefits brought about by the cryptocurrencies have caused serious discussion over the possibility of them being the future transactional system. The next section discusses the issue further.

4. Future of Cryptocurrency in the Digital Economy

Technological advancement and widespread Internet availability have caused many changes in the transactional system when cashless transactions are becoming the new norm. The revolution of financial technology is also increasingly putting banks aside when borrowers (users) are directly connected to the funders or lenders. The technology has made the costs of borrowing to be cheaper than what it used to be with the removal of intermediary roles (such as bank's functions). For example, the introduction of wallet and cryptocurrency has eliminated the middle parties' role and consequently reducing the cost and speed of the transactions significantly.

Cryptocurrency has an intrinsic or store of value in the same way that gold has. Its value does not depreciate much over time. The creation of more cryptocurrency units (via mining) would not result in loss of value as the cryptocurrency has intrinsic value and the total unit of cryptocurrency creation is already pre-determined (Madeira, 2020). These features make cryptocurrency suitable and attractive as a medium of exchange. However, to qualify as money, features such as durability, portability, divisibility, uniformity, limited supply, and general acceptance as a payment method must be met. Whilst the first five characteristics could easily be met by cryptocurrency, the last attribute is still a challenge as society at large barely understand about cryptocurrency.

At present, only limited merchants and companies would accept cryptocurrency in settlement although experts are optimistic about its potential (Madeira, 2020). The major obstacle for cryptocurrency to become mainstream money is due to its present complicated system that is socially inept (according to Trenchev as cited by (Madeira, 2020). Currently, cryptocurrency is still considered as a niche product that would easily satisfy certain demographic groups' needs, while it is an expensive engagement for some others

particularly to small traders. Furthermore, network congestion and fee preferential market (higher fee transactions are given preferential treatment) are among the top challenges that need to be improved upon. A second layer network is being created to cater to micro-transactions to avoid congestion and improves efficiency.

The presence of multiple cryptocurrencies has paved a way for a global payment system to be established. Facebook Inc. announced its plan to revolutionise the money transfer system with the Libra project. Aside from the plan to introduce a more stable and less speculative Libra token, the transfer system will also be based upon an authorised blockchain network of Libra Association that would verify transactions and token ownership. Permission use of the blockchain is effectively making the Libra Association as a “de facto central bank”.

Responses from the governments were overwhelming and many central banks responded to the Libra plan as it is impinging on the central banks’ sovereignty. France, Germany, and the European Union Central Bank (EUCB) expressed their concerns over the risks posed to the European financial sector that could block Libra authorisation in Europe Guarascio (2019) while claiming that the EUCB has its long-term plan of alternative public cryptocurrency. The Libra announcement has sparked and contributed to the speed of responses by countries on cryptocurrency, which was previously left unaided for more development to gather pace.

Development around the world has also seen the impacts of e-commerce and the digital economy getting more pronounced with less reliance on cash as a method of payment and some pilot projects are already underway to introduce government-backed virtual currencies. Sweden, Bahamas, and China (to mention a few examples) are already piloting their respective central bank digital currencies (CBDC) *albeit* at varying levels of testing progress, reaffirming the state’s role in the payment market. Sweden, e-krona, is being evaluated as potential digital money to replace cash whose usage has rapidly declined in Sweden with just 1% of its transactions are done in cash (value of outstanding cash as a percentage to GDP). While the Bahamas initiated Sand Dollar as a digital fiat currency to curb violent crimes and reduce security and insurance costs associated with keeping physical cash; whereas China’s plan to introduce its sovereign digital money to control the total volume of money supply and to be able to monitor its citizen real spending apart from controlling illegal and vice activities.

Generally, many countries are planning to introduce some forms of sovereign digital money for the public to use although digital money has long existed between central banks and financial institutions. The decision to introduce sovereign digital money is mainly due to the rapid decline in cash usage and the considerable success of e-commerce platforms such as Amazon, Alibaba, Tencent, etc, and also the need to reduce reliance on foreign payment infrastructure as the case of Sweden (Söderberg, 2019).

The presence of sovereign digital money facilitates electronic money transfers and increases the efficiency of online payments, e-commerce, and digital trade by reducing transaction costs. Banks can also lower their cost structures, as digital money does not require physical storage and security costs associated with the storage. Though the development is interesting, the sovereign digital money would still not solve the present flaws in the fiat fractional reserve system as long as banks can create money multipliers that increase the amount of money supply in circulation. The economy would still arguably be susceptible to cyclical recessions, as the money supply would still not match the real economic activities.

The long-term strategy of these countries is to launch their equivalent of state-cryptocurrency as part of their grandeur plan to link domestic payments and transfers across

a seamless digital payment infrastructure. The Libra development serves as a wake-up call for central banks throughout the world reminding them of risks to their public monetary sovereignty if alternative public cryptocurrency is not made available. Traditional banks could be at the risk of disruption when individuals and businesses engage more in cryptocurrency leading to less need to deposit and extended loans. This disruption would help to curb the banks' ability to create money out of thin air as mentioned by (Werner, (2014).

The European Central Bank is working on a long-term plan to launch a public digital currency that would be similar to the Libra project and could accelerate the development of centralised cryptocurrency further. The future of cryptocurrency remains exciting as nations discover the limitations of the present transactional system and are addressing the challenges as technology and development advances.

5. Conclusion and Recommendation

The study concludes based on the review from literatures that digital transformation has caused a tremendous shift from physical cash transactions to the cashless and digital transaction with an increasingly lesser role played by the middle parties in most transactions. The shift has reduced transactional costs and transaction difficulty as the system is now being improved with the emergence of cryptocurrency as an alternate system. The cryptocurrency transactional system is gaining a lot of attention from investors and the business community because of its simplicity and less bureaucracy in its operation. However, the alternate currency is characterised with a lack of proper governance and the regulatory mechanism by a specific central authority and this is tantamount to abuse by the actors through money laundering, terrorist financing, and tax evasion as the case may be.

With technological development happening so swiftly, it is imperative that the alternative transactional system preserves the value of the currency, curbs inflation, and protects from loss of purchasing power. The alternate system should capture the global shift in technology that suits the industrial revolution and digital economic transformation to reduce transaction bureaucracy, improve transparency, security, control, and simplicity of transactions.

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