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COMPUTING TECHNOLOGY OF CRYPTOCURRENCY AND THE FUTURE OF COLLECTION DEVELOPMENT IN NIGERIA LIBRARIES

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Abstract
The paper x-rays the concept of computing technology of cryptocurrency and the prospects of it in collection development in Nigeria libraries. To understand how cryptocurrencies work, the meaning of some basic terminologies attached to it were clarified. Types, values and functions of cryptocurrencies were also highlighted. Also reviewed is the emerging economy of cryptocurrencies in various nations and features that would help drive cryptocurrency usage in library acquisition transactions in collection development. In conclusion methodical planning from the part of the government, libraries and collection development librarians deem fit to avail the opportunities brought by computing technology of cryptocurrency.

Keywords: Cryptocurrency, Collection Development, Nigeria

Introduction
On Monday 25th October, 2021 the president of Nigeria, Muhammad Buhari lunched the Central Bank of Nigeria Digital Currency (CBNDC) known as electronic Naira (e-Naira) issued by Central Bank of Nigeria (CBN) as a legal tender, which make Nigeria join the rest of the world in crypto-monetary system. This was adjudged by many financial and economic analysts as a right step in the right direction.

Life is gradually been redefined by digital age we found ourselves, therefore to keep with life certainly there is no choice than to go for it as it is redefined. Virtually everything about life is technologically been remodeled. Whether by evolutionary or revolutionary means, the world will certainly continue to experience novelty, discoveries and inventions that shape life. Indeed, in a world where digital technologies such like robotics, artificial intelligence and digital machines

increasingly assert relevance, it is not surprising that 'money' the very orbit around which the global economy revolves is also now going fully digital (Okeke, 2021), thus the emergence of new world of monetary system, the new world of financial inclusion, the world of cryptocurrencies, where the term 'legal tender' has taken a whole new different meaning – all digital, unregulated, and uncensored. Cryptocurrency is another emerging opportunity in monetary system that is redefining the life of transaction and overall financial inclusion. Cryptocurrency, through its mathematically complex encoding and decoding protocol, has made it possible for huge amount of virtual currencies to be transferred over decentralized public networks, unintercepted and uncorrupted, a problem that for decades, computer science had thought was impossible, in fact even beyond human imagination. This situation is gradually redefining world mode of transaction and of course would redefine the mode of collection development in the library particularly with regard to library resources acquisition through purchasing method.

Collection development is the process of planning and building a useful and balanced collection of library materials over a period of years, based on an ongoing assessment of the information needs of the library's clienteles, analysis of usage statistics, and demographic projections, normally constrained by budgetary limitations (Reitz, 2004). Collection development includes the formulation of selection criteria, planning for resources acquisition and sharing and replacement of lost and damaged items, as well as routine selection and deselection decisions (Tunde, 2018). Collectively, collection development involves resources selection, acquisition and weeding (i.e. deselection of damage, obsolete, or excess copies) of materials from the stock to create space for new ones arriving.

The method used in the library to acquire library materials otherwise known as 'acquisition methods' are many. Examples of these are; purchasing method, donation/gift, bequeath, legal-deposit, and internal-production. Purchasing method where money budgeted for the library used to buy materials for the library is one of the acquisition methods manned by collection development unit of every library. One major transaction that takes place in Nigeria libraries is purchasing of library materials (journals, books, dailies, etc, soft and hard copies). Nigeria is the most populous black nation located in west-Africa sub-region with a population of over two hundred million people, and quite a lot of libraries in states, local government areas and institutions across the country. Obviously in Nigerian libraries, money either cash or cheque is what is majorly used to acquire library materials. In many occasions annually but some cases daily like purchasing of daily newspapers and magazines. It is on this ground that the writer found it necessary for librarians, especially acquisition librarians to start preparing their minds and grounds for library transaction using cryptocurrencies as the world economy is gradually driving towards that. Doing so, the need to beam light on the term 'Cryptocurrency' as it relates to library transaction (resources acquisition) is paramount, of which this paper presents below.

What is Cryptocurrency?

Cryptocurrency is a virtual currency that is developed through mathematical encoding and decoding of computer protocol which has made it possible for huge amount of virtual currencies to be transferred over decentralized public networks, unintercepted and uncorrupted. In simple terms, cryptocurrency is computer-generated money that can be used to pay for transactions just like conventional money. It is also considered an exchange commodity, like gold, silver or olden days cowries. It is therefore an investment instrument, just like stocks and shares that are traded in

capital markets. Today, investors buy and store cryptocurrency with hope that it will increase in value over time and give them a good return on their investment. According to Sampson (2017) the term 'cryptocurrency' is derived from the key security feature of these; 'cryptography' and 'currency'. Cryptography is a mathematical coding and decoding mechanism invented during World War II as warring parties tried to secure their communication and avert interception of their messages by enemies. With the emergence of the digital age, computer and software experts have built on this technology, using a combination of complex mathematical theories and software codes to mine digital coins while also securing transactions on them. In this system, through a two-way authentication process, senders and receivers of cryptocurrencies are able to encrypt and decrypt transaction messages across a secure, public network, and also control the creation of additional units of currencies in a simple way.

Several nations, especially in North America and Europe, are reviewing their financial policies and regulation to accommodate virtual currency. Thus, efforts are being made by policy makers in these nations to clearly understand the nature and functions of cryptocurrencies with the aim of leveraging its benefits. In this regard many definitions were attached to the term cryptocurrency (virtual money) by deferent bodies. For instance, the United States'

Internal Revenue Service (I.R.S) (2017) defined it as 'a digital representation of value that functions as a medium of exchange, a unit of account, and/or a store of value [that] does not have legal tender status in any jurisdiction.' Similarly, the European Banking Authority (EBA) (2015) describes it as 'a digital representation of value that is neither issued by a central bank or a public authority, nor necessarily attached to a fiat currency, but is accepted by natural or legal persons as a means of payment and can be transferred, stored or traded electronically'. These bodies are already working out modalities for generating tax revenues from cryptocurrency transactions.

To understand how cryptocurrencies work, it is necessary to know the meaning of some of the basic terminologies attach to it.

i. ***Blockchain*** is a public ledger that keeps track of all cryptocurrency transactions made. This is a global online database that one with an internet connection can use but belongs to no one. Blockchain is a continuously growing list of records called 'blocks' which are linked and secured using cryptography.
ii. **Addresses** are string of symbols (sequence of letters and numbers generated randomly) that are used to send cryptocurrencies.
iii. ***Mining and Miners*** **-** Mining is a record keeping service of blockchain while miners are keepers of blockchain.
iv. **Wallet and wallet ID** - A wallet is an electronic purse where inflows are stored and from where outflows are sent while wallet ID is person's password (string of random letters and numbers) that acts as username used to log into the wallet.
v. **Public key and private key** – Public and private keys are both sequences of letters and numbers through which funds are received in the transaction of cryptocurrency, but while public key is the account address through which funds are received in the transaction of cryptocurrency and of which is disclosed to the payers expecting inflow from, private key on the other hand is the holder's signature that acts as proof of ownership which is kept secret. Private key is used by the account holder to authenticate inputs and outputs in the transaction of cryptocurrency (Sampson, 2017).

Types of cryptocurrencies

Indeed, today more than nine thousand different cryptocurrencies are in circulation around the world, with Bitcoin, Etherum, Ripple, Lota and Litecoin being the most popular. Among these, Bitcoin is the oldest and most widely known with $57.2 billion in circulation as at June 2017. Bitcoin was developed in 2009 by the anonymous Satoshi Nakamoto, whose identity is yet known in the cryptocurrency industry. It is estimated that about 10 and 15 million people around the world currently hold material amount of Bitcoin (Wikipedia, 2019). The market capitalization of Bitcoin is now about $66.6 billion, at a unit price of $54116 and there is speculation by industry analysts that Bitcoin's price would rise above $11,000 by 2022 (Economic digest, 2019).

Next to Bitcoin in popularity is Ether, which is said to be run on the Ethereum blockchain. Initiated in July 2015 by a 21-year-old Russian-Canadian and ex-Bitcoin programmer, Vitalik Buterin, this cryptocurrency currently has total value of about $28.1 billion in circulation. Its market capitalization is $30.3 billion, while unit price is above $300 (Wikipedia, 2019). Ether has gained much traction in recent months following its endorsement by major US brands, including Deloitte, Microsoft, JPMorgan, Accenture, and Intel. It is estimated that around 2 million people currently hold material amount of Ether across the world (Sampson, 2017).

Furthermore, other fast emerging cryptocurrencies in circulation includes; Ripple; founded in 2012 and with market capitalization of around $6.3 billion, Litecoin; released in 2011 by Charlie Lee, a former Goggle employee, with total market value of around $2.4 billion and unit value of about $46.00, and Lota; founded in 2015 by David Sonstebo, with $2.8 billion worth currency in circulation, $2.4 billion in market value, and unit price of about $1.00 (Wikipedia, 2019). Others to mention but few are novacoin, peercoin, namecoin, and so on, are some of the cryptocurrencies that are fast emerging.

Several nations, especially in Asia and Europe have reviewed their financial policies and regulation to accommodate virtual currency. Also, in Africa, several cryptocurrency exchanges and merchants are springing up. Some emerging African players in this space include Geopay and Ekasi-Blucks from South Africa; Bithub-Africa from Keyan; NairaEx from Nigeria; BitMari from Zimbabwe; PayPlux from Gana; and the rest. Belfrics-Global, a Malaysian bitcoin trading platform recently announced plans to open exchanges across Africa to derive financial inclusion and swifter penetration of virtual money across the continent (Economic digest, 2019).

Values and Functions of Cryptocurrencies

Cryptocurrency has brought enormous value to the economy. It brought forum for free market trade and switching barriers between investments and investors. Cryptocurrency ultimately ensure collaboration and competiveness in the market as it promotes fast and excellent service delivery. Cryptocurrencies have no real value as you have in commodity monies such as gold, or as you have in paper or fiat money such as the Nigerian naira or US dollar. Rather, the value of a cryptocurrency is derived from the perception of the value that investors, users and speculators place on it. Also, cryptocurrencies have no physical existence. They exist only as records of transactions and not as physical currencies, like we have naira, dollars, euro, or pound sterling (Economic digest, 2019). Thus, a person who possess Bitcoin do not necessarily have any physical Bitcoin in one place or account. When you purchase a Bitcoin, what you actually get is not a tangible item, but record of transaction indicating the value of what you purchased, and the same applies when you receive

inflows of cryptocurrency. ln an article published in Forbes.com titled (2015) 'The Value of Cryptocurrency Today and What the Future Might Hold', Chalmer (2015) posits that the value of Bitcoins can be determined in different ways, and that, one of such ways is their scientific value that has been able to solve the riddle commonly referred to as the Two Generals' Problem (or the Byzantine General' Problem) in computing which demonstrates the complex challenge of coordinating an action by communicating over an unreliable, untrusted link. Cryptocurrency, through its mathematically complex encoding and decoding protocol has made it possible. Also, beyond scientific value, Leandro, Antonio and Antonio (2013) asserts that cryptocurrencies such as Bitcoin have technological value in that they are censorship resistant and cannot be shut down. The authors also said that they have social value because they use decentralized public ledger, which removes the need for a trusted third party before transactions can be affected. In addition to these, analysts have made the case that the many benefits derivable from cryptocurrencies, include; speed of new coin mining and transaction, secure storage, independence from sovereign authorities and inflationary pressures, low transaction costs, and their innovative infrastructure and features, all these add to their market value.

The Nations and Emerging Economy of Cryptocurrencies

Quite a lot of nations are taking steps towards imbedding the technology of cryptocurrency. The advanced economies of Europe and America where the virtual currency technology evolved have demonstrated significant acceptance of the new money, even though skepticisms persist.

Beyond Europe and America, other part of the world are also keying to the technology of cryptocurrency. In Asia, countries like China and Japan have embraced cryptocurrencies even more than in Europe and America. It is anticipated that China may well be the place where more than half of all global cryptocurrency transactions would take place very soon (Wikipedia, 2019). The authors who stated that some of the factors that may drive cryptocurrency popularity in China would include the need to break away from the highly government controlled socialist system, the zero-transaction fee, the very high return on investment and swift technological transfer among the citizenries. Japan closely follows China in swift usage of cryptocurrency. It is reported that Japan actually displaced the United States in the middle of January 2017, to take the second spot after China, in volume of Bitcoins transactions (Sampson, 2017). In Africa, South Africa has taken the lead in the adoption of cryptocurrencies with hundreds of merchants already accepting cryptos in that jurisdiction. The Reserve Bank of South Africa has expressed willingness to explore opportunities in cryptocurrencies, including the possibility of issuing its own virtual money. If a report published in bitcoinafrica.io (2019) is anything to go by, Mauritius could also be considered as gearing up to play actively in the cryptocurrency (Wikipedia, 2020). This country is partnering with a US startup, ConsenSys, to create a blockchain technology hub called the Ethereum Island. Mauritius plans to create an ecosystem of blockchain innovators and entrepreneurs; establish itself as a key player in blockchain technology, and pursue its vision of becoming a financial gateway to African and Asian markets (Wikipedia, 2021).

Egypt is another nation championing the usage of cryptocurrency. The first local Bitcoin exchange 'Bitcoin Egypt was launched in this Egypt. According to the report published on Bitcoinafrica.io this would enable trade on Bitcoin and other cryptocurrencies using the Egyptian pound, thereby connecting the local economy to the global digital currency market.

In other parts of Africa, quite a number of cryptocurrency exchanges and merchants are springing up. In Kenya, Ghana, Nigeria and many others, efforts are on top gear accommodating the technology of cryptocurrency. This could be deduced from the effort put in place by these nations in developing their own type of cryptocurrencies as brought up in types of cryptocurrencies section above. Just of recent, Central Bank of Nigeria (CBN) – the apex bank of Nigeria, motioned that the pilot stage of the digital currency is expected to kickstart by October, 2021 though financial technology specialists said the date may not be feasible even as they warn the apex bank to be cautious, think of methodical planning and consult widely (Akwaja, 2021). Against this speculation, president Muhammad Buhari on Monday 25th October, 2021 unveiled the Central Bank of Nigeria Digital Currency (CBNDC) known as electronic Naira (e-Naira) issued by Central Bank of Nigeria (CBN) as a legal tender (Daily Trust, 2021). This development by CBN justify the need to x-ray the future of cryptocurrency usage in collection development in Nigeria libraries

The Future of Cryptocurrency Usage in Collection Development in Nigeria Libraries

The usage of cryptocurrencies in collection development particularly with regard to acquisition of materials through purchasing method either in Nigeria libraries or elsewhere will come to stand. The growing penetration of ICT infrastructure and mobile telephony could help drive cryptocurrency adoption in library acquisition transactions. So far however, since the lunch of eNaira, much enthusiasm has been seen by librarians in Nigeria where transactions using computing technology of cryptocurrency is a welcome idea. This was the view of many librarians in the idea shared with during 2021' Librarians Registration Council of Nigeria (LRCN) conference. But several librarians especially those working in government owned libraries are still highly skeptical and cautious, owing to perceived risks from an unregulated and complex blockchain technology market, as well as apprehension that virtual currency, with its highly decentralized structures, could be used to carry out illicit transactions.

However, cryptocurrencies are gradually evolving into popular medium of exchange in many parts of the world. One of the biggest attractions for cryptocurrency usage and is expected to pool librarians especially collection development librarians soon is the convenient transaction cost especially with agencies abroad. Unlike conventional banking transactions that always attract charges, virtual currency transactions could be free of charges. And even when fees are involved, how much to pay could be determined (Chalmers, 2015). Another major advantage of cryptocurrency usage is that it is fast and safer compared to cash or cheque transactions practices by most libraries in Nigeria. Cryptocurrency transfers are faster than regular international wire transfers. Zero-confirmation transactions are instant, while transactions that require confirmation take an average of 10 minutes to complete, way faster than the time lapse for international wire transfers (Sampson, 2017). Beside this, cryptocurrencies are not subject to the control of government of any nation or regulatory banks as they are completely decentralized. So, the issues of bureaucratic impediments foreseen in conventional banking transactions are totally absent, making it faster. Okeke (2021) stressed that the most amazing advantage in cryptocurrency transactions is that no third party in the business that has control over accounts of two parties making business; the buyer and seller. What it means is that, unlike in conventional bank transactions, individual account cannot be frozen by any one owing to inactivity, dormancy (of collection development account as a result of

no money to make frequent transactions) misuse or overuse, etc, without releasing the private and public keys necessary to do so. This makes the account owners wealth in all sense and a key to facilitating transactions in the libraries.

Moreover, cryptocurrency users can have as many wallets as they want. In fact, unlike in conventional bank account holding where multiple accounts owned by single customer may generate suspicion, having many wallets at the same time is a norm in cryptocurrency business, since this enhances transaction security. Similarly, libraries can hold as many wallets as possible at the same time to enhance purchasing transactions in collection development. Relatedly, in the transaction of cryptocurrencies there also no chargebacks once a transaction is completed, because it cannot be reversed without the consent of the recipient. This is quite different from what is obtainable in credit cards used in collection development when card holders could fraudulently request for chargebacks after a legitimate transaction has been completed which sometimes a case in library transactions. This means that, moneies that would go for chargebacks would be save for more collection of materials. Relatively, the security of users' payment information in cryptocurrency transaction is guaranteed. Likewise, the security of payment information in collection development using cryptocurrency is guaranteed and cannot be intercepted or stolen. Unlike credit card transaction where information could be intercepted and stolen during online transaction, cryptocurrency transaction is secured from such identity and users' information theft. This is due to the very secure encryption and decryption technology, and the mathematically complex public and private keys combinations on which virtual currency transactions run. In this technology of cryptocurrency, identity theft is almost impossible since users ID are confidential, this makes it fit in collection development. Confidentiality is needed in collection development to save money budgeted for collection development. Lutus (2020) stressed that users are not required by cryptocurrency transactions to disclose their confidential information before making transaction which is impossible with the use of conventional ATM and credit cards. When users make a purchase with ATM card or credit card, users' personal information such as name, physical address, etc, is attached to every transaction. But with cryptocurrency transaction, the user is completely anonymous. While the blockchain that carries the different addresses or account ID are transparent and publicly available, it is however impossible to identify owners of addresses, funds and transactions of cryptocurrency; inflows and outflows are publicly seen, but no one can tell the owners of them.

It is also interesting to note that the limitation of purchasing-order in the value chain in conventional fiat money transactions by banks and regulatory bodies does not hold with cryptocurrencies because the technology is decentralized and own/control by no single body. More so, unlike traditional fiat money, cryptocurrencies are not subject to inflationary pressure occasioned by monetary regulators' policies. For instance, government authorities could decide to print more currencies of their will to increase their purchasing power or to meet their financial obligations, thereby resulting into inevitable inflation and high cost of materials, including library materials. But with cryptocurrencies, this is totally ruled out because of its decentralized nature that absolutely takes it out of government control. Overwhelmingly, all these benefits and with increasing acceptance of virtual currencies in the global corporate community is an indication that indeed cryptocurrencies could go complete mainstream and be popularly accepted as legitimate means of exchange, and could also have a future in collection development in not just Nigeria libraries but libraries elsewhere.

Conclusion

Virtual currencies are gradually becoming a veritable frontier through which users are allowed to conduct a range of financial transactions remotely using mobile devices. This overwhelming success of computing technology would revolutionalised the financial services industry and pool wide range of advantages that enables users to overcome many of the constraints that exclude them from the financial system. Cryptocurrencies per say, would offers a major opportunity for financial inclusion of libraries in Nigeria, and open doors for collaborations and seeking aid with partners across the world. What is now required is methodical planning from the part of the government, libraries and collection development librarians to avail the opportunities brought, and more to be brought by computing technology of cryptocurrency.

Recommendations

The paper recommends the following:

1. Methodical planning from the part of the government, libraries and collection development librarians for adoption and easy usage of cryptocurrency in collection development in libraries should be done.
2. Training of librarians, particularly those working in collection development units to acquaint with cryptocurrency usage.
3. Personal efforts should be made by librarians, particularly those working in collection development units to know more about cryptocurrencies to avail the opportunities brought, and more to be brought by computing technology of cryptocurrency.

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