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EXPLORING THE BLOCKCHAIN REVOLUTION: AN IN-DEPTH OVERVIEW

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Abstract:
Blockchain technology, initially introduced in 2001 by Satoshi Nakamoto through Bitcoin, has revolutionized online transactions by offering characteristics like transaction freedom, ease of use, transparency, and global connectivity. Over the past nine years, cryptocurrencies, such as Bitcoin, have witnessed rapid development and user adoption. However, the potential of blockchain technology extends far beyond cryptocurrencies. It can drive innovation and find applications in various domains, transcending the boundaries of online transactions.
The realm of blockchain use cases has evolved significantly, with some remaining theoretical and others being implemented in different sectors of the economy. The possibilities are vast, and the world is yet to witness the full potential of this emerging technology.
This paper explores the impact of blockchain technology on government-related services, focusing on the potential benefits and applications in a global context. The rise of global cities driven by technology and the growing influence of blockchain in various economies, including developing nations, highlight the need to harness this technology's power for government services and beyond.

Keywords: Blockchain technology, cryptocurrency, online transactions, government services, innovation.

Introduction

Distributed ledger has been known for a while until Satoshi Nakamoto created the first blockchain using cryptocurrency in 2001. He made the first bitcoin transaction on a blockchain platform. Subsequently, Bitcoin gain popularity in online transaction due to it characteristics such as freedom of transactions, ease of usage, transparency and global connectivity. Cryptocurrencies like Bitcoin have witness rapid development and user adoption over the past nine years. However, blockchain technologies which powers cryptocurrencies can be leveraged to drive innovation and increase adoption in new domains beyond cryptocurrency(Hughes, Park, Kietzmann, & ArcherBrown, 2019). Several use cases of blockchain has evolve over time, and the world is yet to see the peak of this emerging technology. Some of these use cases of blockchain are still theoretical with real world applicability while other have been deployed for implementation in several part of the economy.
The emergence of internet has creates an increase in the rise of global cities driven by technology (Abubakar, Benna, & Benna, 2019). The hype in blockchain cut across the global economy, even the developing country have started witnessing the impact of blockchain, mostly in the financial sectors of the economy for financial related services. However potential benefit to government related services needs to be explored.
The Nigeria's annual international summit on Information and Communications Technology (eNigeria), provides a platform for brainstorming on emerging technologies, local innovation and relevant ICT issues for the socio-economic development of Nigeria. The recent eNigeria in 2018 had a special panel section

which showcases blockchain technology as one of the emerging technology whose adoption would boast sustainable ICT development in Nigeria. The conference also addresses certain challenges and limitation of blockchain technology in relation to Nigeria; creating a necessity for Information and Communications Technology stakeholders in Nigeria to examine the technology and it viability in a developing country like Nigeria. Blockchain, like most new technology is yet to be completely explored, though the futuristic analysis of blockchain shows it footprint on almost any existing technology and processes.

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Blockchain integration work seamlessly with other emerging technologies such as IoT(Barenji et al., 2019) artificial intelligence (Chandrasekaran et al., 2019) big data analysis (Dlodlo & Kalezhi, 2015) and cloud computing (Yu, Yang, & Sinnott, 2019; Zhu, Wu, Gai, & Choo, 2019); creating a unique boundless future projection.

In recent years, ICT has become one of the most vibrant industries in Nigeria; with a good internet penetration and sizable number of ICT expert, deploying blockchain technology is attainable; in the presence of proper regulation. Though, regulating a new and evolving technology like blockchain, is a challenge for regulatory body to resolve. It is in the light of this that this work examines the concept of blockchain within the government landscape whilst emphasising the various associated issues affecting the adoption of blockchain technology in Nigeria. This paper give an overview of blockchain technology, its importance, challenges, limitations and possible solutions that could be embraced towards adopting blockchain in Nigeria; with a focus on the adoption of blockchain in government establishment and governance.

Background

Blockchain is basically a distributed database that stores an irreversible, time-stamped history of record of transaction of every process between users on its network. Blockchain Technology is presently disrupting financial services industry(Notheisen, Hawlitschek, & Weinhardt, 2017). It already altering the provision of financial services in emerging markets in selected Africa region(Abubakar, Benna, & Benna, 2019). High regulatory uncertainties; hostility from Financial Services (FS) incumbents; poor data protection; disruptive technology; terrorism financing; money laundering; cyber crimes and identity theft or fraud as some of the challenges in fintech sector within the Nigeria ICT ecosysytem (Ojo & Nwaokike, 2018). However, blockchain has the potential to solve some of these challenges (Skinner, 2016).

The traditional financial service technology solutions is usually characterised by higher banking risks and lower bank penetration; creating a necessity for blockchain adoption. Blockchain in fintech has the potential to create a technology leap in organisation processes(Niforos, 2017)and boost financial inclusion and growth(Nir Kshetri, 2017). Blockchain technology is also flourishing in the private investment fund industry(Friedlmaier, Tumasjan, & Welpe, 2017). The associated innovation benefits of blockchain technology in private investment fund strategies promises a lasting change for the industry (Chen, 2018). For instance, a recent research shows that the use of blockchain technology by private fund advisers led to significant benefits for their clients (Kaal, 2017).

Integrating blockchain technology into business strategy could enhance industrial growth in Nigeria. A recent research measured the impact of blockchain technology in enhancing customer loyalty programs in Nigeria airline industry. It was discovered that the magnitude and scope of effective implementation of blockchain technology has direct positive effect on the achievement of the goals and objective of the customer loyalty program (Ebarefimia, 2017). Blockchain usage is also playing an important role in other

sectors of the economy. Even agricultural sector (Dlodlo & Kalezhi, 2015) now stand the chance of embracing blockchain for fund management, product management and supply chain.

Nigeria IoT market has leap in the past three years, ranging from development of smart device to installation of smart solutions. The integration of blockchain technology into (Gubbi, Buyya, Marusic, & Palaniswami, 2013) would make it possible to track and lock the time dependent history of a state, status and change in activity of any internet enable device or sensor, on a blockchain network. This innovation increase IoT security and data transparency in IoT application market. An example is the development of a tiered vehicular forensics framework based on permission Blockchain to generate comprehensive evidence for resolving disputes and appropriating blame in automobile investigation. Blockchain makes it easy to prove the state of a smart vehicle on the blockchain network when an accident occurs. An evaluation of this framework against existing vehicular forensics approaches shows a significant advantage (Ugwu, Okpala, Oham, & Nwakanma, 2018). Indicating veracity of blockchain application in IoT application market (Dlodlo & Kalezhi, 2015). Nigeria was ranked high in corruption by Transparency International and this has been seen as one of Nigeria's biggest challenge (Mike, 2019). Integrating Blockchain technology to services and processes in Nigeria, has the possibility of reducing corruption and enabling better transparency with accountability in Africa's extractives sector (Washbourne, 2018). Conducting a free and fair election process is a daunting task in Nigeria.

A study by Dogo et al, evaluate the feasibility of using blockchain technology to substitute the current manual or semi digitized voting approach in Nigeria; this work employs the qualitative Strengths, Weaknesses, Opportunities and Threats(SWOT) and Political, Economic, Social and Technological(PEST) analysis approach to propose a strategic direction in adopting block chain Enabled E-voting (BEEV) system in Nigeria(Dogo, Nwulu, Olaniyi, Aigbavboa, & Nkonyana, 2018); indicating the possibility of adopting Blockchain Enabled E-voting (BEEV) system in Nigeria.

Though, in the early developmental stages, integration of blockchain technology in higher education processes are now being explored(Briggs, 2018); result reveals that blockchain holds promising potential for use in higher education processes(N. Kshetri & Voas, 2018). Some of these application are budding hypothesis while other areas have already started witnessing practical implementations(Dugan, 2017). Blockchain technology also has the potential in transforming global cities and regions; through the rise of borderless transactions and processes(Abubakar et al., 2019). There is need for an increase call for a collaborative and inclusive process of stakeholders' engagement in blockchain emerging area, and the demands on the government especially the regulators as an important stakeholder to enact relevant legislation. There is also the need to fund blockchain research and leverage on it applications for exhaustive understanding and strategic adoption through critical insights for decision-making in the ICT ecosystem.

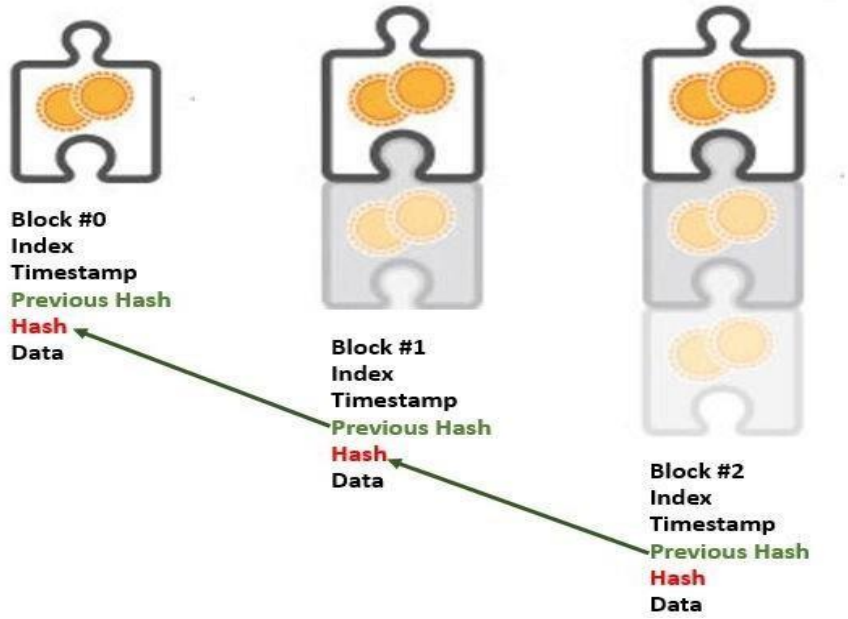
Overview of Blockchain Technology

Blockchain is a distributed ledger that keep a temper proof history of all activities on a network of connected systems. Transactions in a blockchain are grouped in blocks while being cryptographically chained in an approach that is immutable; thus generates a mathematically irrefutable history. Blockchain is driven by the presence of a peer-topeer networks; Merkle trees, asymmetric key encryption, hash values to list a few; making it possible to store data in several locations and still continually reconcile such data through a shared database.

Blockchain generates identical blocks of information across the network; these information cannot be controlled by a single entity thus, eliminating a single point of failure. It also has a secure validation mechanisms for every transactions on the blockchain; utilising sophisticated encryption technology. Transactions are recorded as temporal and sequential order of occurrence. Previous data on blockchain are immutable yet accessible to users for validation purposes. Updating transactions on blockchain

requires the identity verification of the parties involved in the transaction; the updated transactions is also verified by other users. The connection between identities, transactions, and the ledger create transparency; establishing trust on a blockchain network. Thus, making it possible to trace an entity or a transactions path from source to sink with remarkable security and transparency(Ahishakiye, Wario, & Niyonzima, 2018).

Figure 1: Representation of blocks in a blockchain, showing how the previous block is linked to the next block through the stored hash value



Blockchain technology addresses technical challenges of cyber related problems. Issues such as network breakdown of a centralised server system due to power failure, or cyber-attack on a centralise server would be reduce to minimal in a distributed network of connected nodes as shown in Figure 2. For instance, a single server breakdown, means other connected servers are still accessible; and a single attack on a connected node can only affect the localise performance of such node, not the entire network

Concept of Blockchain Technology

Gatteschi et al. revealed the following as some of the core concepts behind the blockchain technology (Gatteschi, Lamberti, Demartini, Pranteda, & Santamaría, 2018).

Transactions

This represent each activity that requires the transfer or a change in the state of entities within the network or from one participant to another. This is represented as a transaction as shown in Figure 3; a transaction from account A to account B. Blockchain keeps track of the transaction history from its origin to destination.

Blocks

Blockchain groups transactions in the form of blocks. Each block stores all transactions, time stamps and associated information such as it unique hash with a reference linking the preceding block through the previous hash as shown in Figure 1; thus forming a chain of linked blocks.

Nodes

The linked blocks is replicated and stored in several locations networked together over a network of nodes. Each node has a local copy of the entire blockchain activity history.

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Majority Consensus

In the absence of a centralised storage and control; there could be a missing central authority. Thus, decisions on the network could be achieved through a majority consensus. Once a consensus is agreed upon, each node updates the local copy of the blockchain across the network of nodes.

Mining

This is usually useful for cryptocurrency BT transactions. Nodes within the network could be used for storage alone or be part of the maintenance of the Blockchain within the network through a "mining" process. The mining processes ensures that nodes validates previous transactions and authenticate new transactions through complex computational intensive mathematical approach prior to adding a new block to the chain.

Wallet

Cryptocurrency is transferred through electronic wallets; each wallet is associated with a single or multiple unique addresses. Wallet stores credentials of every transactions, since Cryptocurrency cannot be stored on a physical memory. This could enable the transfer and trading of cryptocurrency from one person to another through a BT network.

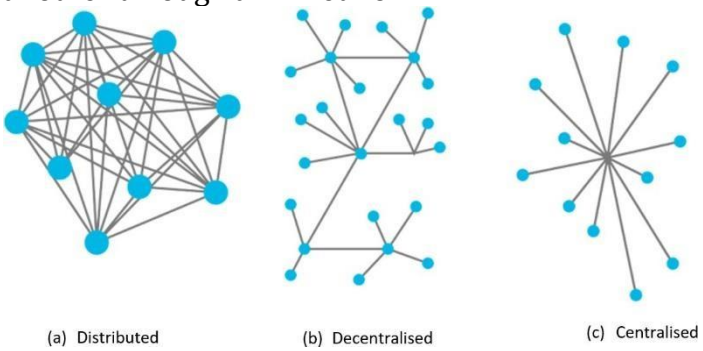

Figure 2: Illustration of nodes in a network showing the difference between a centralised, decentralised and distributed nodes. A decentralised, distributed network is fundamental to blockchain technology.

Accessibility

Blockchain could be public, profiled on a network that is accessible and visible to everyone with the right credentials; an example is a public online Bitcoins trading and transactions. Blockchain could also be private with permission controlled by an organisation, an example of this is the use of blockchain within a government institute for the effective management of assets within such institution. Private blockchain requires strict permission prior to accessing the ledger or initiating any transactions on the blockchain. However, there could also be a middle way between the two extreme.

Blockchain could also be a hybrid of both public and private; between the low-trust offered by public blockchains and the single highly-trusted entity model of private block chains. An example of a hybrid blockchain would be effective in citizen services and e-government applications. This way the governmental organisation has the permission to control the network while the network information is accessible and visible to citizen with the right credentials issued by the government institution.

Blockchain Technology and Governance

Information Communication Technology (ICT) is one of the most vibrant industries in Nigeria; ensuring the best use of ICT increases economic growth and global competitiveness. Currently, ICT is the backbone of eGovenance in Nigeria; the hallmark and enabler of social services to the citizens, organisation, government ministry, departments and agency interactions(Oghogho, 2013). However, E-government goes beyond a website or internet presence of a government entity; indeed e-governance is the

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restructuring of the administrative processes that reinforce fast, transparent and efficient service delivery to the citizen of the country.

Blockchain technology have the potentials to save costs, improve service quality, reduce response time; ease access to services; increase effectiveness and responsiveness of public administration(Nwachukwu & Pepple, 2015). Blockchain technology could create an e-government that would be more competitive while eliminating bureaucracy through the restructuring of administrative processes. Blockchain digital revolution comes with several possibilities with broad economic and social implications. It could push for the emergence of digital transparency and integrity in the society; and also lead to extensive changes in business transactions and governmental functions. Blockchain applications could be broadly classified into three categories:

Intra-Government Application

These are application within the government procedures and processes. It involved transactions within units, departments and subsidiaries of the same government institution; thus linking all the sections of an organisation irrespective of geographical location. For instance, Figure 3 shows an intra agency private consensus blockchain network; initiating a payment process from an agency central office to a subsidiary office. The head of accounting notifies the agreed key stakeholders in the organisation on the network for payment transfer; they all view and approves the payment through the network; the approved amount is transferred to the subsidiary account and a copy of the transaction is updated across the network. The process creates an

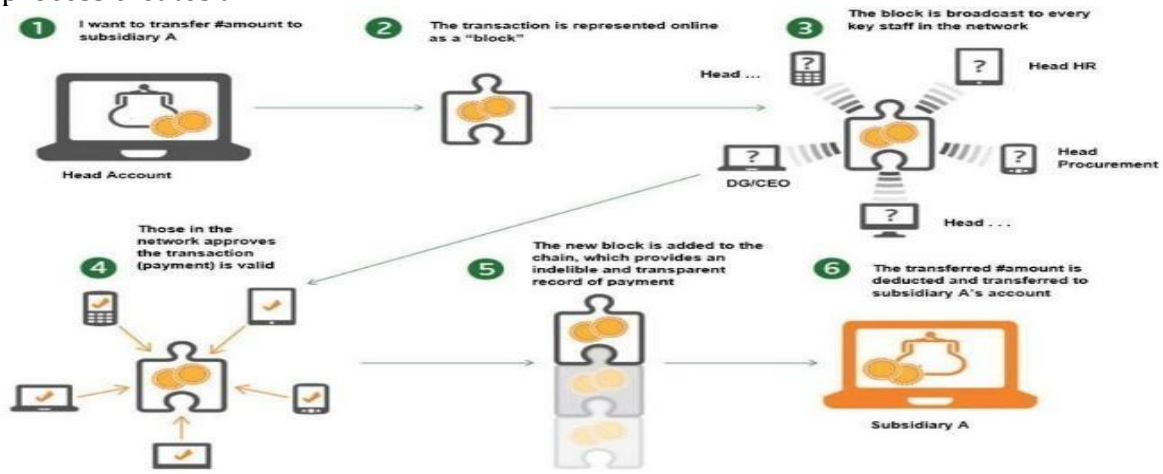

Figure 3: A sample blockchain execution flow of a government organisation initiating a transparent transfer of money from the organisation central account to a a subsidiary account of the same organisation.

Unchangeable history of the payment information for both the subsidiary and the central office. This way, blockchain create a transparent structure for document approval and payment process within government institutions.

Inter-Government Application

These are applicable to processes and procedures that requires the collaboration of two or more government institution. The block is share between the institutions, managed, track and traces by all agreed participants in the network. These type of blockchain applications could be deployed in government to government, government to businesses and government to people application processes.

Public and Private Sector Application

Most popular public blockchain application is the Bitcoin and related online cryptocurrency transactions (Skinner, 2016). Blockchain could be useful for private sectors in several activities; this could also be inter or intra organisations, as the case maybe.

Application of BlockChain Technology

Riding on the three core features of blockchain technology - immutability, transparency and autonomy; blockchain becomes an essential tool for good governance, business and management. The areas of application keeps budding and the peak of this emerging technology is yet to unfold. Blockchain areas of applications include and not limited to: Cryptocurrencies, Smart Contracts, Supply Chain Management, The Sharing Economy, Crowd Funding, Governance, Forecasting, Auditing, Identity Management, File Storage, Internet of Things (IoT), Data Management,

Research, Insurance, Elections & Voting System, Protection of Intellectual Property, Land Title Registration, Stock Trading and Anti-Money Laundering (AML). A detailed explanation of these applications is beyond the scope of this article, however, the next section gives a brief explanation of some possible areas of adoption of blockchain by government institution for sustainable national development.

Corruption

Corruption is a challenge yet to be completely eradicated by Nigeria and Africa as a whole(Mike, 2019). Africa continent loses an average of 148 billion dollars, which is 25 percent of Africa's average GDP every year to corruption(Songwe, 2018). Blockchain could be deploy to combat corruption at every strand of the economy. For instance, budget-related corruption could be eradicated through blockchain technology. Nigeria ranked 90th out of 115 countries globally, and 23rd out of 38 African countries on transparent budgeting in 2017 by Open Budget Index (OBI) survey (Echewofun, 2018). Blockchain technology could be utilise in the development of budget-tracking mechanisms. An application that is built on blockchain technology would keep an update of all transactions making it available to all participants within a network. This could reduce corruption and pilfering of funds; all transaction data such as transaction cost, account details, receivers and time will be transparent for public scrutiny. Thus, making it difficult to embezzle public funds.

Financial Industry

Government financial services, banks and other financial institutions, including credit bureaus are often faced with lack of synchronised database to access identity confirmation, availability of collateral, creditworthiness of individuals and small business owners; stiffening accessibility to funds. An effective ledger system like blockchain technology could save information about the financial states of their clients, customers and beneficiaries; including data about financial status, current loans, interest obligations, collaterals, repayment history and income levels. However, individual authorisation is required for data accessibility to protect data privacy. Blockchain has the potential to create fast, transparent and seamless global financial transaction; promoting an ease of business transactions across borders.

Smart Contract

Government institutions are seeking to improve the management of identities, assets, data, and contracts; this could be achieved through the adoption of blockchain technology. Smart contracts resolves the trust issues that arises with intermediaries between parties to an agreement. It enables parties with trust related issues to agree on the distribution of assets, temporal ownerships and potential assets transactions, ensuring transparency in businesses.

The set of conditions, mutually agreed upon by all parties involved in the contract, is set and defined in a blockchain network. Whenever the mandatory conditions are met, certain actions are executed and all members of the network get to the same result by executing this action. Smart contract is useful in several

government and nongovernmental industry, such as insurance, properties and titles verification; making it easy to transact business without the fear of been swindled by a third party.

Identity Management

Identity authentication and authorization is of great concern to Nigeria government. There are several identity database stored in different locations in the country such as Bank Verification Number(BVN), Voters Registration Information (VRI) and National Identification Number (NIN) to least a few. The harmonisation and unification of this data for interoperability, verification and synchronisation, is still a challenge. Blockchain technology offers a solution to Nigeria unique identity and cyber digital identity issues; where identity can be uniquely created, authenticated and updated in an irrefutable, immutable, and secure manner. Effective identity management would boost numerous sectors of the economy such as government digital promotions and development, cybersecurity, digital inclusion, healthcare, national security, banking and ecommerce.

Cryptocurrencies

Blockchain has the potential to improve business transactions and related activities. Initially propagated by Bitcoin and other cryptocurrency applications; countries are now seeking novel way of absorbing the technology. Relatively small business or subset of businesses transacts directly in Bitcoin while some payment processing solutions uses the Bitcoin distributed ledger to transfer payments in conventional currencies.

Nigeria financial regulator, The Central Bank of Nigeria (CBN), advised Nigerians to be cautious of investments in cryptocurrencies. Emphasising that virtual currencies are not an acceptable legal tender in Nigeria. Yet, Nigeria came second in the world's peer-to-peer (P2P) Bitcoin transactions in 2017 outpacing major European countries, the United Kingdom and the United States of America(LocalBitcoins, 2018). These data reveals the involvement of Nigerians in bitcoins transactions. Thus, the adoption of Cryptocurrencies could be useful in Nigeria, provided the government can find innovative ways to leverage its usage with effective regulation.

Election Process

Blockchain technology can be adopted in elections processes to gain the trust of participants and stakeholders in the process. A distributed and immutable record of all electoral votes in an election process will not be altered without leaving traces of tampering; thus, encouraging transparency in election process. To achieve a seamless electoral process powered by blockchain, votes would be cast using mobile phones and stationary digital devices, connected to the blockchain network, in pollen areas. Votes casted would be would be permanently recorded. A pilot phase of a blockchain voting system was deployed and tested in Sierra Leone(Chohan, 2018); each ballot cast in Sierra Leone's was logged into a blockchain network for verification(Rubtcova & Pavenkov, 2018).

Challenges of Blockchain Application

Despite the hype surrounding any new technology, it would have certain pitfalls which can inhibit its full utilisation. There are several limitations when embarking on blockchain adoption and implementation; while some are global, there are also specific issues associated with a developing country like Nigeria.

Conceptual Issues

There is a misconception of blockchain technology applications as being synonymous to cryptocurrencies; Bitcoins to be specific. Nigerians are sceptical of cryptocurrencies, given the high incidence of online scams associated with cryptocurrencies and its related online application processes. This create a phobia for blockchain in the minds of policy makers, private sector stakeholder and potential consumers of blockchain related technology.

Education and Awareness

There exist a low level awareness and education towards understanding blockchain technology development, applications and usage within the Nigeria tech-communities, academic and business sectors. Blockchain could be complex with a developing environment that is not completely user friendly; thus, there are few professionals with the requisite knowledge and experience to develop blockchain solutions. Also, most government policy makers and private sector stakeholders are not aware of the benefit blockchain might bring to their organisation.

Cost

Similar to most new technologies, the cost of blockchain solutions is still relatively high in Nigeria. There is a high cost of investment associated with blockchain technology especially in the government institutions. Besides, blockchain has not been proven to be cost effective because, the ratio of investment to return on investment on blockchain is yet to be determined. In Nigeria, the true cost of migrating to blockchain solutions or integration of existing solution with blockchain platform is still a challenge for many organisation and businesses.

Governance

Blockchain is relatively new in Nigeria, there is no policy or law guiding the usage of Blockchain in Nigeria. This bring about regulatory and legal questions such as: When there is fraud who protects assets, transactions and participants? Who regulates the blockchain activities? Where do you go to complain? What governs my stored data in the Blockchain network? These questions and a host of others, can only be answered when the government create regulatory frameworks and documentation for blockchain technology.

Technical Challenges

Blockchain technology also has some technical challenges in the development, deployment and maintenance of its application. Some of the technical challenges cited in Swan(Swan, 2015) and identified by Yli-huumo et al includes(J, D, S, S, & K, 2016).

- *Task Complexity:* an increase in frequency of transactions in Blockchain demands an improvement in the throughput of the blockchain network.
- *Latency:* To create sufficient security for a Bitcoin *transaction* block, it takes currently roughly ten minutes to complete one transaction. To achieve efficiency in security, more time must be spent on a block, because it has to outweigh the cost of double spending attacks.
- *Size and Bandwidth:* For blockchain to control more transactions, the size and bandwidth issues must be solved.
- *System Security:* Though blockchain is more secured than traditional centralised systems, yet more research on the future security of blockchain is necessary.
- *Wasted Resources*: The issue with wasted resources needs to be solved for more efficient mining in blockchain network.
- *Ergonomics:* The Bitcoin Application Programming Interface (API) for developing services is difficult to use. There is a need to develop a more developer-friendly API for blockchain.
- *Versioning, hard forks, and multiple chains:* A small chain that consists of a small number of nodes has a higher possibility of a 51 percent attack. Another issue emerges when chains are split for administrative or versioning purposes
- *Infrastructure:* There are infrastructure challenges that could limit blockchain processes and efficacy. For instance, very few Nigerians have internet access; less than half of those with internet accessibility barely have good quality uninterrupted internet service. Increase in quality internet penetrations is required for blockchain application to be successfully deployed and maximised by the Nigerian economy.

- *Others*: There are other concerns with regards to: data portability, architecture and design risk, ill-defined requirements, integration risks key, Information Technology compliance risk, security, third party risk, user collusion, user safety and vendor risk. It becomes importance for government and stakeholders to examine all associated business, legal, and technical risk prior to deploying a blockchain solution.

Solution to Blockchain Adoption

Though, blockchain technology might not be fully adopted or implemented in Nigeria anytime soon, nevertheless, it is essential for government and private sector to be enlightened, informed, educated and prepared for the emerging technology disruption in the ICT ecosystem. Some possible solutions to the aforementioned challenges could be:

- The development of legal regime through legislations, policies and regulations to enhance blockchain solutions adoption.
- The establishment of massive blockchain awareness programs. The 21st century digital revolution is powered by information and appropriate education. Blockchain and associated applications would not be optimised within the ICT ecosystem until the right knowledge is acquired and effectively utilised.
- The establishment of a country wide blockchain usage and transactions advocacy.
- Integrate blockchain to higher education institute programme; reviewing and enhancing existing related courses such as ICT, to reflect veracities of blockchain technology.
- Strategic training for government policy makers, law makers, the judiciary, regulators and key stakeholders in the private sector on blockchain in relationship to their domain.
- Initiate and support training, workshops, seminars, forum, summit and conferences under public-private sector collaborations on blockchain and associated technologies.
- Invest in research and development (R\&D) for innovation in blockchain and development of new solutions on identified case studies.

Role of ICT Regulator in Blockchain Adoption

The success story recorded in ICT ecosystem is partly due to the effective regulatory instrument established by relevant regulators for the sector. The role of ICT regulators is to develop information technology through regulatory standards, guidelines and policies. ICT regulators are the prime agency for e-government implementation, internet governance and general information technology development in the country. Although the adoption of blockchain is in its early stages, ICT regulators may have a role to play in several areas. These include the oversight of government institutions seeking to deploy blockchain technology; it also requires the exploration of whether regulations are necessary to govern blockchain's use in the private sector.

Meanwhile, the regulatory framework around blockchain has not fully matured thereby raising the likelihood of compliance risk materialization. This clearly shows that ICT regulators have important role to play in setting the path for a beneficial on-boarding of blockchain indeveloping nations through research and updated regulatory instruments that could control and protect the use of blockchain technology. Blockchain can definitely play a part in driving both business and economic growth. However the technology cannot achieve this alone, government has a greater role to play by quickly adapting to changes in technology and providing the right regulations to guide its usage in the country.

Conclusion

Blockchain is an emerging technology with the ability to track and trace a transaction or product path from source to sink with exceptional security and transparency. Though, Blockchain was initially used in cryptocurrency transactions such as bitcoins, however, with the rise of blockchain based applications, the potential benefits of this ground-breaking technology is unparalleled. It can be observe from this paper that blockchain application can be applied across various industries within Nigeria, increasing efficiency

and transparency. However, blockchain is a disruptive technology, hence, it is essential that effective planning and research is carry out prior to applying blockchain to government verticals. Governments of emerging economies also need to stimulate entrepreneurial awareness of emerging technology through training and promotion to facilitate investment readiness. Similar to every emerging technology, the adoption of blockchain to its full potential is dependent on the extent that government and relevant stakeholders take the lead in supporting and unveiling market-creating innovation on blockchain platforms.

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