KICTANet
KENYA ICT ACTION NETWORK

KICTANet
BLOCKCHAIN
POLICY

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ACKNOWLEDGEMENTS

EXECUTIVE SUMMARY

The introduction of a policy brief for Blockchain in Kenya is intended to spur discussions that will provide solutions aimed at leveraging Kenya's dynamic ecosystem in the adoption and use of Blockchain technology.

This brief covers an introduction into Blockchain technology and makes a simplified definition of this technology. Concerns that have been raised are tackled starting with the misunderstanding between Bitcoins and the underlying technology that is the Blockchain. The creation of viable use cases and an enabling ecosystem for the adoption of the technology are addressed.

The key actors in the adoption of the technology are identified as the tech community, the business community and government agencies. The general roles they will play in the adoption of the technology are discussed.

Further, a number of opportunities and challenges that have already manifested in the use of the technology are explained. And as we enter an era of unparalleled change in the world necessitated by technology, this brief makes the following recommendations:

1. There is need to demystify the technology for different stakeholders and in particular distinguish between cryptocurrencies and Blockchain since such misconceptions ruin the narrative.
2. There is a need to localise the Blockchain narrative by creating use cases that will create viable solutions.
3. An enabling environment must be fostered for the adoption of the technology.
4. The government should include Blockchain under its priority ICT policies.

INTRODUCTION

The world is virtually unrecognisable from what it was 25 years ago due to the rapid changes mostly occasioned by technological advancements. The Internet has changed the way people communicate, shop, learn, listen to music and store information. It is now possible to exchange information instantaneously with almost anyone, anywhere, anytime!

If the evolution of networked innovation is examined, the 1970s and 1980s saw the development of the Internet, which can be described as the "first wave" in the development of innovations in the internet. In this context term wave is used to refer to a period of significant growth in networked innovation. In the early 90's, there was promotion of the creation of intuitive navigation and cross-connection of information, making possible the "second wave" of the World Wide Web (www). With decreasing bandwidth costs and increasing ubiquity of smartphones and smart devices, we trace the "third wave" to the launch of mobile broadband services, which brings us to Blockchain with Satoshi Nakamoto's October 2008 paper launching the "fourth wave".

Blockchain technology has recently had a phenomenal impact and is catapulting the latest wave of disruption and technological advancement via the Internet. Blockchain technology has entered the top strategic priorities of the CEOs of the fortune 10001.Venture investment in the field grew to $ 1 Billion in 2015, representing 7% of all FinTech (Financial Technology) venture capital funding, with some forecasting investment in Blockchain to grow to $10 billion in 20162 in distributed ledger technology.

BLOCKCHAIN DEFINED

"The Blockchain is an incorruptible digital ledger of economic transactions that can be programmed to record not just financial transactions but virtually everything of value."

At its core, the Blockchain is a technology that permanently records transactions in a way that cannot be later erased but can only be sequentially updated, in essence keeping a never-ending historical trail.

The following diagram illustrates a Blockchain transaction. The diagram shows how a block is created upon the initiation of a transaction. The block is linked to previous blocks by including a security hash thus creating a chain. Mining is the process which checks the validity of the blocks in the chain. A successful transaction occurs when the block is validated as an honest part of the chain.
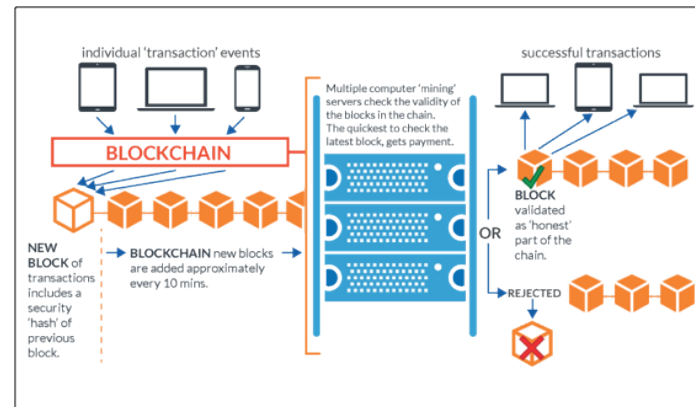
Tapscott, D., & Tapscott, A. (2016). Blockchain revolution: How the technology behind bitcoin is changing money, business, and the world. Mougayar, W. (2016). The Business Blockchain: Promise, Practice, and Application of the Next Internet Technology. John Wiley & Sons.

Image 1-A Blockchain Transaction

"True Blockchains have at least four elements listed as follows. The first is the ledger which contains permanent records of transactions. Second is a token or crypto-currency that rewards miners also known as stakers for securing the ledger. The third element is the Network Protocol used to transmit the tokens and finally an open source software used to govern the above."

The Blockchain is a type of a distributed ledger. A distributed ledger is a database held and updated independently by each participant in a large network. Through this technology what is being witnessed is one of those possible explosions of creative potential that is set to catalyse exceptional levels of innovation.

"A distributed ledger is essentially an asset database that can be shared across a network of multiple sites, geographies or institutions. All participants within a network can have their own identical copy of the ledger. Any changes to the ledger are reflected in all copies in minutes, or in some cases, seconds. The assets can be financial, legal, physical or electronic. The security and accuracy of the assets stored in the ledger are maintained cryptographically through the use of 'keys' and signatures to control who can do what within the shared ledger. Entries can also be updated by one, some or all of the participants, according to rules agreed by the network."

As such, Blockchain represents a technology innovation that enables transparent interactions of parties on a more trusted and secure network, which distributes access to data. It is a novel, resilient and ubiquitous approach to data, transaction analytics and networks. It holds the potential to address inefficiencies, reduce cost, unlock capital, improve trust in societal fabric, and open new business models. It also could accelerate the growth of the informal economy and the benefit from an enlightened, informed and ethical application by its users. Further, the fact that data is spread across a network of connected computers, rather than held by a single central entity might make cyber-attack less likely. Also there is the possibility to automate contracts.

The Open University -Open Blockchain, http://Blockchain.open.ac.uk/
John Karanja-Research lead and funder Bithub Africa. Coin Desk(2017)
What is a Distributed Ledger?https://www.coindesk.com/information/what-is-a-distributed-ledger/Government Office for Science (2016) Distributed Ledger Technology: beyond block chain- A report by the UK Government Chief Scientific Adviser https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/492972/gs-16-1-distributed-ledger-technology.pdfibid

CONCERNS IN REGARDS TO BLOCKCHAIN TECHNOLOGY

MISUNDERSTANDING IN REGARDS TO BITCOIN AND THE BLOCKCHAIN TECHNOLOGY
There is a great misconception that the Blockchain technology is all about Bitcoins. The Bitcoin is the most popular cryptocurrency traded worldwide and has been adopted in several transactions as an alternative to fiat currency. Bitcoin cryptocurrency was the first use case of Blockchain technology that was introduced in the financial sector. The underlying technology behind the Bitcoin cryptocurrency is the Blockchain. The Bitcoin therefore happens to be the initial interaction that majority of people have had with Blockchain technology. In Kenya companies like Bitpesa offer Bitcoin trading and money transfer services.

However, in December 2015, Kenya's financial services regulator the Central Bank of Kenya (CBK) cautioned against use of virtual currencies such as Bitcoin. This was informed by fears ranging from money laundering and financing of terrorism, to the fact that there is no underlying or backing of assets, and the value of virtual currencies is speculative. For those who had had no previous knowledge of the technology, a negative attitude was automatically formed.

As a result, a reputational bias on Blockchain technology was formed in the financial sector. There is need therefore to foster a clear understanding of the distinction between cryptocurrencies, and their underlying technology, the Blockchain. Once this is done the financial sector regulator will be able to explore how the Blockchain technology can be utilized. There are several central banks, which have explored Blockchain to create digital currencies for example UK, Russia, Switzerland, and Canada. The government of Senegal is one of the first countries in the world to issue a Blockchain-based national digital currency. All these can be explored to provide information which can then be used by Kenya's Financial sector Regulator to forge a way forward.

The Blockchain technology has several use cases and the first step in removing barriers to adoption will be to create a mental separation between the Bitcoin and the Blockchain. This will allow for the exploration of several use cases. A clear example of the adoption of the technology was in 2016 when IBM announced an intended partnership with the Kenya government through the Ministry of ICT. The partnership would aim at exploring the application of the Blockchain technology in the management of health, education and real estate, with the view of instituting transparency in government operations.

Central Bank of Kenya, 2015. Caution to the public on virtual currencies such as Bitcoin.
https://www.centralbank.go.ke/images/docs/media/Public_Notice_on_virtual_currencies_such_as_Bitcoin.pdf
Joseph Young (2016) Senegal Introduces Cryptocurrency Based on its National Currency –
Cointelegraph https://cointelegraph.com/news/senegal-introduces-cryptocurrency-based-on-its-national-currency

CREATING AN ENABLING ECOSYSTEM FOR THE ADOPTION OF BLOCKCHAIN TECHNOLOGY

It should be understood that the question is not whether or not the technology will be adopted but when will that happen. The invention of Blockchain has been likened to the Internet: it is revolutionary and disruptive and will definitely play a major role in every facet of society in the near future.

There is currently no regulation in Kenya on the Blockchain technology. There have been suggestions that industry players should move on with innovating around the technology and the government will catch up. Given that there is no regulatory intervention in regards to this technology, industry players will need to set their own metrics that market participants will be required or be encouraged to meet. It would however be prudent to consider regulatory approaches that have allowed technology to thrive to the extent in which we see it today. A clear example is that during the dot-com era it is the "Performance-based " regulation that was adopted in the USA that gave birth to the creation of such companies as GOOGLE, Facebook, LinkedIn, and YAHOO. Accordingly, due to the concertino effect there is now APPLE, Skype, Amazon and several other platforms.

Eric Wainaina (2016) IBM, Kenya Government to explore BlockChain in Management of Public Records
http://www.techweez.com/2016/12/16/ibm-kenya-government-explore-Blockchain-management-public-records/
Government Office for Science (2016) Distributed Ledger Technology: beyond block chain-

A report by the UK Government Chief Scientific Adviser https://www.gov.uk/government/uploads/
system/uploads/attachment_data/file/492972/gs-16-1-distributed-ledger-technology.pdf
Ibid Building on the Blockchain (2016)Nasdaq's Vision for Innovation http://business.nasdaq.com/Docs/
Blockchain%20Report%20March%202016_tcm5044-26461.pdf
ibid

KEY ACTORS

Various actors are key in the evolution and successful adoption of Blockchain technology. They include:

THE TECH COMMUNITY

The technical community will have to take the lead in promoting the adoption of the technology. It goes without saying that the Blockchain discussion will come to a dead end if no use cases are developed and adopted. The onus is thus on the tech community to engage in developing viable use cases.

In order to suit various technical use cases Blockchain ledgers can be designed differently. The technology can produce both 'permissioned' and 'unpermissioned' ledgers, which give various levels of control of the Blockchain databases. Such can be used to inform specified use cases. 'Unpermissioned' ledgers are those that are open to everyone to contribute data to the ledger and cannot be owned like the Bitcoin ledger; while 'permissioned' ledgers may have one or many owners and only they can add records and verify the contents of the ledger, which would be most suitable for government departments.

There exists a broad spectrum of distributed ledger models, with different degrees of centralisation and different types of access control that suit different business needs.

BUSINESS COMMUNITY

The Blockchain technology considered a tool and the business community will play a role in adopting the technology for various use cases. The technology has already been adopted to create smart contracts, which can be adopted by businesses to increase the speed and security of transactions. In the financial sector, a good place to begin would be through utilising the technology to meet regulatory requirements like Know Your Customer (KYC) and Anti-Money Laundering (AML) requirements. There is fear that technology, which has perfected immutability, may still not offer a perfect solution if the information input in the first place is incorrect. The business community will have the benefit of ensuring almost perfect records that will allow transactions to be carried out at a speed and scale that has never been achieved before. The main challenge however is that there must be stringent guidelines and a check and balance system to ensure the integrity of initial records.

GOVERNMENT AGENCIES

In as much as technology comes first and regulations follow there will be need for collaboration with government to provide an enabling environment for the adoption of the technology. Developing the relevant skill sets for the adoption of the technology may require incentives like training, research hubs, subsidies on Blockchain hardware and availability of energy to run the various Blockchain platforms.

A major issue to be addressed would be to define the interaction between the various Blockchain products with the regulators especially in use cases that the government can adopt. From a regulatory point of view, there are always fears about ledgers that are open and where the regulator has little control or oversight over what actions may be carried out in a platform. However it has been proven that the technology can be customized to fit the various regulatory requirements. Dubai hopes to be the first Blockchain powered government by the year 2020 and has already begun testing several use cases.

Nikhil Lohade(2017, April 24) Dubai Aims to be a City Built on Blockchain, Wall Street Journal.
https://www.wsj.com/articles/dubai-aims-to-be-a-city-built-on-Blockchain-1493086080

OPPORTUNITY AND CHALLENGE

The opportunity for regulators is that the tampering with government records will be an issue of the past and may reduce the time taken during transactions. For example if one was certain of the ownership of lands records, and if there was no need to go through several government agencies to confirm this, then land transactions could be completed in minutes.

Another opportunity is that there may be revenue generation by governments especially for taxes on profits generated during the trading of cryptocurrencies. In the USA the Internal Revenue Service (IRS) treats virtual currencies as property for taxation purposes, thereby putting earnings from the technology under the tax net.

The challenges regulators might face when building new regulatory frameworks for crypto-currencies and other Blockchain-based applications will be in ensuring that the most genuine records are entered in the first instance. And only undisputed records should be uploaded otherwise injustices will be created in making immutable fraudulent records. Stakeholders should sit and address the common development of best practices for the technology so that emergent technologies can gain foothold into existing systems while minimizing risk.

There is also the challenge of criminal activity that has occurred in the virtual currency space, with the most common being the ponzi schemes related to the mining of virtual currencies. Unsuspecting individuals are lured into "investing" in the mining of virtual currencies, and in turn introduce more members to the mining community. There needs to be a great amount of consumer awareness to tackle this challenge. The other challenge is whereby criminals choose to get paid through virtual currencies where they rely on the anonymity of the platforms to store their proceeds of crime. Strict adherence to know your client (KYC) principles by cryptocurrency exchanges would enable law enforcement agencies to catch these criminals.

IRS Virtual Currency Guidance (2014) Virtual Currency Treated as Property for U.S Federal Tax Purposes of tax
https://www.irs.gov/uac/newsroom/irs-virtual-currency-guidance

Madore P.H, The Anatomy of a Bitcoin Pyramid Scheme-The BTC Scholar Story, Cryptocoin news
https://www.cryptocoinsnews.com/the-anatomy-of-a-bitcoin-pyramid-scheme-the-btcsolar-story/

RECOMMENDATIONS

1. Blockchain technology will need demystification. There is a need to correctly frame the definition of Blockchain in a way that various stakeholders understand its utility value. The technology offers the opportunity to disrupt several traditional services by leveraging on the efficiency and trust created by the system. Target audiences should not feel threatened by the technology. In an example of a land registry all a country's land records can be stored in a Blockchain and land transactions that usually take months have the potential to be carried out in under a day. In such a one may imagine that one will no longer need to have a lands registry. For such a use case the the, the Minister for ICT Joe Mucheru suggested this framing: "the register is controlled across all nodes and that the ministry does not lose control on managing the land records".

2. There is a need to localise the Blockchain narrative by creating use cases that will create viable solutions. An example has been given where Africa is known for corruption, money laundering, and starvation. Africa needs to start building applications on African problems. The continent should not be left behind, as the current trends seem to suggest.

3. An enabling environment must be fostered for the adoption of Blockchain technology. This calls for formulation of broad based policy principles applied among trusted peers and to avoid using regulation for specific technologies.

4. The government can make Blockchain a priority area under the ICT Policies, where courses on this topic could be introduced at University, and provision of research grants and scholarships be made possible, thereby investing in research and development. If included in ICT policy, it would inspire confidence in private industries.. In the proposed government engagements, the aim should be to support and enforce a predictable, minimalist, consistent and simple legal environment for the adoption of the technology.

CONCLUSION

Innovations such as Uber or Airbnb would never have been imagined a few years back. Facebook's success or You Tubes market dominance would not have been envisaged. Today, it can only be imagined what the "killer app" for Blockchain will be. The near term future is much clearer and certainly much more exciting.

It is worthwhile to note that survey responses to the 2016 ICT year in review conducted by the Kenya ICT Action Network (KICTANet), 61% of respondents felt that the ICT policies and initiatives had not impacted the counties. This brief posits that in forging ahead in a more networked universe, there is need to adopt new technologies such as Blockchain. Such will firmly position Kenya as a hub of innovation in Africa.

Blockchain technology is already being tested in Kenya for a number of use cases including education, identity, supply chain (ease of doing business and shaping the cross border trade) under the IBM African lab in Kenya. However more needs to be done in order to promote the adoption of the technology that promises to be the next frontier in ICT development.

The Kenya ICT Action Network -https://www.kictanet.or.ke/