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Contribution by Kenya

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development: prospects and challenges”

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REPUBLIC OF KENYA

KENYA'S POSITION PAPER ON THEME 1:

“HARNESSING BLOCKCHAIN FOR SUSTAINABLE DEVELOPMENT: PROSPECTS AND CHALLENGES”

SUBMITTED TO THE UNITED NATIONS COMMISSION ON SCIENCE AND TECHNOLOGY DEVELOPMENT (CSTD)- GENEVA

1. Preamble

Blockchain is an open, distributed ledger that records transactions between parties efficiently and in a verifiable and permanent manner. The present state of blockchain is often compared to that of the Internet in the mid-1990s, still in its infancy, when its value and potentials were not understood. In Kenya, the Blockchain Association of Kenya was established as a non-profit organization and registered in October 2017 under the Societies Act Cap 12 Laws of Kenya to promote the adoption of blockchain and cryptocurrency technology in Kenya and East Africa by building a network of competent homegrown human capital.

As the technology evolves, the demand for connectivity increases. Constant investments in infrastructure are therefore necessary to narrow the digital divide and improve social inclusion. Although Kenya's internet penetration of 85 percent is higher than that of Africa (35.2%), more needs to be done to improve rural access to broadband as well as internet-enabled devices. As a customer, the government will consider methods in which effective relevant solutions can be co-designed through public private partnerships. Such solutions will be 'use-case' specific and solve a pressing requirement of the government. While directly regulating the technology, the government is already considering innovative approaches, such as regulatory sandboxes that can test methods by which the needs of both the public and private sectors can be balanced.

The two critical questions that need to be considered about blockchain are:

- i. What kind of changes will blockchain applications bring in the next two decades that, according to some experts, could be even more disruptive than those produced by the Internet so far?
- ii. How will blockchain technology affect our societies and firms, as well as most aspects of our work and daily life?

According to Spyros and Klitos (2019)¹, the possibilities are endless. Disruptive breakthroughs are inevitable without being able to predict the outright successes and the unavoidable failures. Mankind needs to anticipate that the extent of disruptive changes initiated by blockchain will probably be the equivalent of where the Internet is today in relation to where it was in 1995. In this regard, the utilization of crypto-currencies is gaining momentum.

Crypto-currencies are digital currencies that have the following features:

- i. **Decentralized:** Cryptocurrencies do not have a central point of control. They are ran and owned by the community.
- ii. **Peer to peer:** Cryptos are easy to transfer from one person to another in any part of the world.
- iii. **Fast transactions:** Unlike bank transfers which may take days, cryptos take a few seconds or minutes utmost. The transaction speed varies among different cryptocurrencies.
- iv. **Cheap:** Believe it or not, but you can now send your millions of dollars to any part of the world at a cost of only a few cents.

These features, not mentioning blockchain, are some of the reasons why cryptocurrencies have gained a lot of traction over the past few years. Banks, including Central Banks around the world, are also getting wary of cryptos since they are difficult to regulate

Kenya is looking favorably at blockchain, with companies using it to disrupt key industries like agriculture. In February, 2018 the government set up a task force to study the benefits and challenges of blockchain in the hope of using it to create foolproof land registries and tackle corruption.

Globally, investors in blockchain like Joel Monegro² believe that investing in ventures that help re-design capitalism by distributing capital over blockchain networks is the best way to go. They believe that moving capital over the internet is key to creating more perfect markets where open data, wealth and power are distributed more equitably.

1 Spyros Makridakis and Klitos Christodoulou (2019), future internet, block chain project; University of Nicosia

² <https://www.placeholder.vc/monegro>

2. Challenges

- i. Information transmitted through the traditional Internet layer is likely to be copied or altered, making it impossible to guarantee its trustworthiness without depending on the approval of an intermediary, such as a financial institution to verify account balances prior to transferring money, or an expert to attest that a video has not been modified.
- ii. There is inadequate capacity to exploit the emerging blockchain technologies by following successful companies that have applied the architecture of a distributed ledger system which consists of many different technological components.
- iii. Lack of capacity to manage the Fourth Industrial Revolution will result in massive transformations in the labour force, economy and productivity of our society. It will fuse the physical, digital and biological worlds, thereby affecting all sectors, geographies and economies
- iv. Of all the emerging technologies, none exhibits the potential to be as disruptive and transformative as distributed ledgers with a focus on Blockchain and AI technologies.
- v. There is inadequate government investment in supporting an ecosystem through effective regulations that balance citizen protection and private sector innovation within blockchain and AI.

3. Prospects

Inevitably, these advantages will be exploited in ways not obvious at present, to disrupt current business practices and create the new giants that are likely to dominate the world.

- i. In more detail, such systems utilize different types of data structures (e.g., a reversed linked list, direct acyclic graphs), distributed computing mechanisms (e.g., consensus protocols), cryptographic techniques (e.g., hashing functions, symmetric-key cryptography, and digital signatures) blended with game theoretical concepts (e.g., concepts that are based on financial incentivization structures; used mostly in public, permission-less and open-participation protocols e.g., the Bitcoin Blockchain). Clients transact over a distributed peer-to-peer network by exchanging messages using message-passing techniques. In such a system, the identity of each client is recorded with a pair of public/private keys that are mathematically linked with each other (based on asymmetric-key cryptography). In reality, only the public key (referred to as the address) of a client is revealed to other clients of the network.
- ii. New information can be added to the blockchain ledger only when the majority of network participants give their approval, after receiving satisfactory proof that the information, transmitted cryptographically, is truthful. The authentication of information is done in short intervals of time and the updated information is stored, or more precisely appended to, the blockchain ledger, and made available to all participating network peers.
- iii. Information can only be appended to previous data and once entered, cannot be altered or lost, providing an incorruptible historical record that becomes permanent in the system. In addition, transparency is ensured while all changes are reflected on the ledger and can be audited by any party that is participating in the network.

- iv. The blockchain ledger (database) is not maintained by any single person, company, or government, but by all participating network computers distributed around the world. This means that two parties can interact (e.g., move funds) without the need for any central intermediary to authenticate transactions or verify that the records are truthful.
- v. Additionally, but not always, blockchain can result in substantial cost savings and greater speed when transferring money or other assets, as transactions are possible throughout and do not require an intermediary working during “regular” business hours, or requiring a commission to verify the truthfulness of the record

4. Promotion of Blockchain in Kenya

The government of Kenya possesses a strong history with respect to the involvement in and prioritization of digital agendas³. Kenya’s willingness to embrace innovation in partnership with the private sector has earned her the moniker of ‘Africa’s Silicon Savannah’. This innovative, forward-leaning approach to national development is reflected in Kenya’s Big Four Agenda, which will be supported and enhanced by leveraging emerging technologies. The Big Four Agenda focuses on food and nutrition security, affordable housing, enhancing manufacturing and universal health coverage.

The use of Blockchain and AI technologies could be transformative across several key sectors in Kenya, including healthcare, agriculture, education and government services. The improved efficiency, transparency and accountability of Blockchain can considerably benefit government services in which several emerging markets struggle with inefficient legacy infrastructures and an inability to provide citizens with fast, accountable and transparent service delivery.

Creating a Blockchain-based land registry in Kenya would considerably improve the citizens’ ability to prove land ownership and provide access to credit.

In the education sector, AI exhibits the potential to improve learning outcomes by supporting the delivery of personalized virtual lessons. A good example here is M-Shule, an SMS-based learning platform in Kenya, which uses AI to track and analyze student performance and to deliver lessons that satisfy their needs and increase their competency. The platform reduces the fear of failure that is inherent in several learning environments, allowing students to advance at their own pace and to ultimately improve their learning outcomes.

In Kenya, Bitcoin could have the same network effects as M-PESA has had if a successful mobile payment platform around it were developed. We’re seeing some of that happening in the developer-friendly Android ecosystem. But for the time being, it might have to come from more open platforms for feature phones like the one provided by Kipochi (Bitcoin wallet). M-PESA has been able to use its network of customers to obtain clout with local banks and signing deals with the likes of Western Union to send money to places all over the world. Now, Western Union isn’t scrambling to get bitcoin customers signed up, but the M-PESA example is a sign that all it takes is user adoption for big financial companies to get on board with digital platforms.

³ Vitange Ndemo (2019) Emerging Digital Technologies for Kenya; Exploration and analysis

Finally, through a supportive ecosystem (National Digital Infrastructure) and effective regulations on citizen protection and private sector innovation, the Government of Kenya will have to implement protections necessary to ensure economic development and successful implementation of government Agenda.

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