Corruption Meet Your *Crypto*nite - Blockchains and Distributed Public Ledgers

You may have noticed in the title that the word kryptonite is intentionally spelled as "cryptonite" in a nod to cryptographically secured asset and currency system that lies at the heart of blockchains and distributed ledger systems. From the Cambridge English dictionary, "*kryptonite is something that hurts or damages a person or thing that usually seems strong*." In many developing economies, corruption is that very strong thing, which has an unusually powerful pull in virtually every area of the economy; in particular the public sector. In fact, the level of corruption in any country is usually directly proportional to the level of poverty within the population. And that corruption eventually affects the lives of mostly those living in those countries, and indeed indirectly even those in developed economies. This is a tragedy given the level of ingenuity humans are capable of. In fact, we all have our one life gifted to us by our creator, but in large portions of the world, many pass that existence in sub-par living conditions, without realizing their potential due to the corruption ridden economies they happen to be born in.

However, that corruption is tough to combat because it becomes a cycle that is difficult to break. Due to the already existent poverty; usually coming from a history of colonial rule and poor leadership following it; the pay grade for middle class and public sector jobs are usually not set up to be sustainable. This exerts an existential need for more income from those job positions, that results in corruption. The good civil servant that resists that temptation ends up penalized with a life of travail and suffering, and become rare with each generation. Consequently, the public sector becomes locked into a cycle of increasing corruption, and progressive poverty. Any attempt at a sudden halt to this cycle via brute force methods usually meets with failure; and is bound to; as the need for survival would trump the threat imposed by those brute force approaches.

Corruption Mitigating Features of Distributed Public Ledger Systems

Many erroneously associate blockchain technology and cryptocurrencies with unethical transactions, tax evasion, and money laundering because some of their earliest uses have been co-opted by some utilizing its pseudo-anonymous nature for such purposes. The technology could provide cover for such activities because it allows transfer of value outside the currency system that is operated by government authorities and regulated institutions. In addition, some cryptocurrencies that have developed since bitcoins, the earliest and most popular cryptocurrency, have taken the pseudo-anonymous nature of blockchains and further encrypted the transactions making it difficult to impossible to trace funds moving in and out of the system. But those are use cases in the same way the development of unmanned aerial vehicles could potentially facilitate package delivery, drone racing in sports, drones used in war and combat, and drones used for aerial traffic surveillance, or mapping and land surveys; all with different purpose, and focus, at the same time.

In fact, the very nature of blockchains is actually more suited to transparency, and can be deployed towards that end; in the following ways.

1. A blockchain is a public ledger whose accounts, transactions, and balances are fully accessible to anyone for view and analysis.

2. The transactions of anything recorded on a blockchains are immutable such that they are pretty much impossible to reverse, rewrite, forge, or change anything written on it, since data etched on the chains are cryptographically hashed in it. Any change to any aspect of a past block immediately breaks all subsequent blocks and as such cannot be accommodated. In fact, counter to popular belief, the bitcoin network itself has not been hacked in nearly a decade. This can be compared to the track record of the banking system that has come to live with an acceptable level of fraudulent transactions. The hacking that people hear of in the crypto world is not usually of the blockchain itself but of individuals who practice bad key and password strategies.

3. Due to the fact that the blockchain is usually maintained by multiple entities, and all synchronize to have the same copy of the state of the ledger, there is no easy attack point, as an attacker would need to compromise all copies at exactly the same time to be successful. This is virtually impossible since most of those copies are maintained by different unconnected entities.

4. Another aspect of blockchains that proffer anti-corruptive characteristics is that of smart, code-enforced contracts. If two people reach an agreement that they write into a blockchain as a smart code, the blockchain is able to enforce the terms of that agreement. It becomes impossible for either party to return after the fact, to corruptively alter the terms unilaterally, or use corruptive methods or intimidation to exact any advantages beyond what was agreed and proper. The drive here would be towards more Ricardian contracts, where the means for enforcement of the contract is encoded within the contract terms and conditions itself.

5. Less cash equals less corruption. Blockchains can hold assets, transfer them, and even implement conditionals and contracts for their transmittal, increased use of blockchain technology is giving less need to paper cash transactions; which is an easier fuel for corruption. In future, blockchain assets can be linked via biometrics to the owner of the assets such that there is no need to carry any cash assets or even identification linking the owner to the asset. While a purely cash-less society might still be in the future, reduction in cash handling can result in less corrupt government officials and law enforcement in development countries.

We will not demonstrate how those properties come together to provide a potential corruption busting capabilities, using a few use cases.

Use Case One: Sale of Mineral Resources

Mining and selling of mineral resources is one area that is rife with corruption, conflict, and sometimes even violence due to its lack of transparency. One such area that is exploring the use of blockchains to usher in transparency is that of diamonds from recording its mining, to each sale, to its insurance to the final buyer. This has been facilitated by several actors that came together and working with the United Nations acceded to follow the Kimberley Process that required a declaration of each stone. In a recent Forbes article, a description of how blockchain technology is facilitating that process beyond what is currently feasible via paper based certification of stones is described.

Another example is oil production and sales. If every country that purchased oil utilizes a blockchain transaction feature that required every oil vessel to record its loading and shipment on the blockchain, then every citizen can easily see how much oil their government has sold and what the revenues are thereof. This would reduce the likelihood of events where revenues could not be accounted for, while officials inexplicably show up with suitcases of money in foreign countries or record large bank accounts in Swiss banks.

Use Case Two: Charitable Donations

The question of how much of a claimed charitable donation or contribution actually reaches its intended recipient is a prevalent one; even in developed countries where the donors could use it to defray their tax obligations. There are various auditing organization that attempts to compute metrices such as the percentage of a charitable organization's intake that actually gets disseminated successfully into charitable works compared to how much is spent on organization or remunerations. Enter the blockchain where every aspect of a charity's intake and distribution could be transparent. And anyone would be able to see on the public ledger numerical information and specifics such as how many

children actually received vaccines from a vaccination program entrusted with a lot of resources, or how many families received meal packets during an environmental event. In fact, it would probably be derelict if donors to a charitable cause, governments that accept such donations to offset taxes, and non-governmental organization do not require the level of transparency that blockchain brings as conditions for accepting claims of charity, in the very near future.

Use Case Three: Agricultural Subsidy Distribution to Farmers

Provision of agricultural subsidies in the form of fertilizers, seeds, and equipment is a government program in virtually all countries – in developed and developing economies alike. However, this program is an easily corrupted one as a good portion of the subside could become diverted and (1) sold, (2) directly misappropriated, or (3) directed to recipients that favor the officials in return in the form of bribes.

Cellulant, of which Bolaji a co-author is CEO, some years ago set out to solve this problem. The company built a grassroot network of farmers and infrastructure and helped the government of several countries including Liberia, Nigeria, Kenya, Tanzania to distribute agricultural subsidies in a manner that infinitely enhanced the percentage of that resource that reached the intended recipients. Much of the success was brought upon by extremely innovative organizational means. With the development of blockchain, Bolaji saw an opportunity to add an additional level of transparency to this distribution service. With blockchains, anyone could easily follow in details, or in aggregate, the amount of subsidy issued, up to the individual farmers receiving it, including such details and region, type of crop, and even the agricultural yield resulting from those input. The success of those endeavors has seen interest from other countries including in Afganistan, list. Greater details of the success.

The above are few examples out of a myriad such possibilities that the above listed blockchain properties provide that could mitigate corruption and inefficiencies to a great extent.

Finally, the way in which blockchain provides anti-corruptive transparency is not via a sudden halt or brute force method that typically meets with failure. Usually, deployment of blockchain to usher in transparency and provide publicly verifiable accountability is typically a gradual adoptive one. For instance, even if the oil industry agrees to begin recording every shipment of oil from a developing country on a blockchain, it would take some phased in period for such recording to approach the 100% mark. It would also take some time for citizens to see the data accumulate and begin to use the data to hold their officials accountable.

However, everyone has a role to play in this next phase of seriously combating corruption, its ravaging effect in several regions of the world. Governments have a role to play in acceding to the transparency that blockchains will bring to the public sector. Non-governmental organizations such as the United Nations have a major role to play as well. Donations and developmental projects should begin to require

a standard of transparency that can be facilitated best by blockchain technologies. Finally, citizens also do have a role to play, and must call for the use of technology such as blockchains to be deployed to situations where the opaque nature of the activities and transactions lead to corruption. And just as is seen in the use of blockchains for financial transactions, the adoption would also likely increase, with a trend towards greater transparency and accountability, and progressively reduced corruption.

References

1. The Kimberley Process, 2000, https://www.kimberleyprocess.com/en/about, Retrieved 2017-09-13.

2. Pamela Amber, Forbes Magazine, Sep 10 2017, "Diamonds Are The Latest Industry to Benefit from Blockchain Technology", Retrieved 2017-09-13.