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Implementing Blockchain in Public Sectors in MENA Countries: Opportunities and Challenges

Musaab Mohammad Alhaddad

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Author: Director, IT Solutions, Technoware for IT and Telecom

Abstract

Governments all around the world are expanding their study and use of Blockchain technology Blockchains have the potential to improve many aspects of the public sector. This research discusses opportunities and challenges in using blockchain in the public sectors of MENA countries. Their public sectors may use it to safeguard sensitive documents and streamline interactions with residents and solve record-keeping challenges and improve the capabilities of the present public systems. Instability and corruption have weakened public and market trust in MENA countries. Moreover, public data in the region is housed in a disjointed bureau and division. The process of acquiring and transferring assets, whether physical goods or financial instruments, often entails multiple transactions and a long paper trail. We argued that as blockchain needs a minimal digital trace, integrity, and immutability, it is particularly fit for the public sectors in the MENA region. A blockchain would keep detailed records of the exchanged assets as well as every step of the transaction. All important information about each person or corporation would be maintained in a separate ledger inside an encrypted blockchain. However, the lack of expertise and experience among the government employees, and the lack of real use cases around

the world are the main barriers to implementing blockchain technology in the public sector of MENA countries.

Keyword: *Blockchain, MENA, Public sector, record management.*

Introduction

Countries in the MENA region benefit from a favorable geographic position at the intersection of European, African, and Asian territories with a youthful and growing educated population (Assaad and Roudi-Fahimi, 2007; Hattab, 2011); and significant potential in industries such as renewable energy, industrialization, leisure sector, and entrepreneurship (Fräss-Ehrfeld, 2009; Seznec and Kirk, 2010; Naudé, 2017). The public sector has historically played a significant role in several spheres of daily and economic aspects in the MENA region, spending a larger proportion of GDP.

The economies of MENA are undertaking significant public administration changes to ensure the efficient, effective, and equitable implementation of greater services to residents and businesses. This acknowledges the reality that sound public governance may result in inclusive growth (Deighton-Smith, Erbacci and Kauffmann, 2016), which benefits earnings, employment, and living standard. Emara and Jhonsa, (2014) argued that reasons for the governments of multiple MENA states' failure to provide their populations with a good system of government that enables robust economic development and constructive upward mobility fall into one of three main categories: the execution of misplaced economic policies that gave government officials an excessive level of authority over resource allocation during the Cold War; the application of misdirected economic policies that gave government officials an excessive level of authority over resource allocation during the Cold War; and the application of misdirected economic policies that gave government (Emara and Jhonsa, 2014) (Vafin *et al.*, 2012; Vafin, Morozov and G. M. Galeeva, 2012; Galeeva, Ivanov and Vafin, 2016).

Trust in administration and state entities is critical for policy change to be implemented effectively (Chanley, Rudolph and Rahn, 2000). In MENA economies, instability and corruption have eroded public and market faith in government (Brixi, Lust and Woolcock, 2015) (Vafin, 2017a; Aidar Vafin, 2018). Corruption erodes

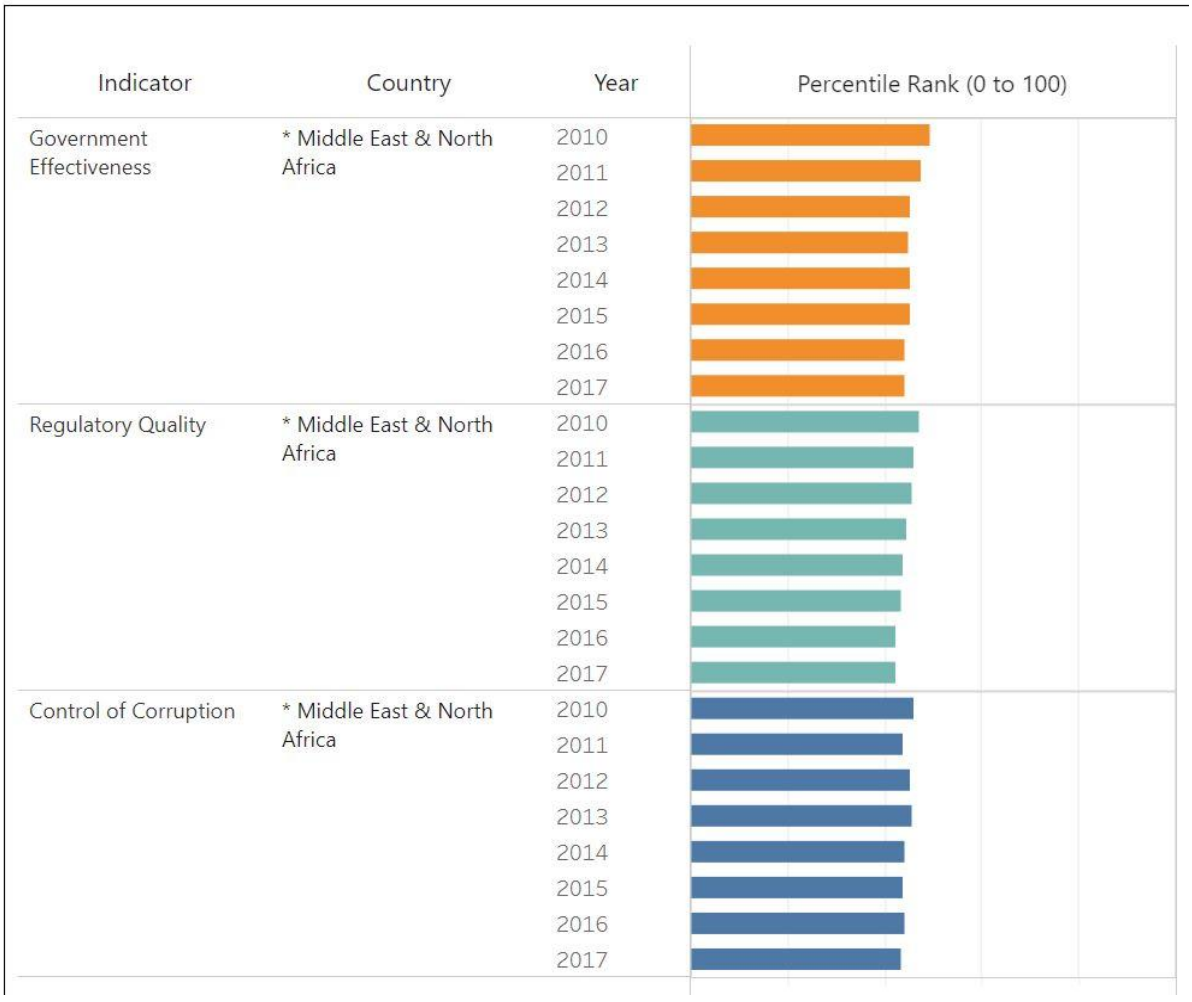
public administrations' performance and exacerbates inequalities in access to public administrations. It jeopardizes government and non-governmental productive capacity by establishing incentives to allocate funds to inefficient activities, discouraging innovation, skewing procurement and expenditure decisions, undermining the civil service's skills and professionalism, and minimizing available resources to support economic productivity (Coetzee, 2014). Figure 1 demonstrates the different statistics for government effectiveness in the MENA region. It shows the indicators have low scores. Recognizing these negative consequences, several MENA economies have elevated anti-corruption and public service effectiveness efforts to the top of their political agendas.

All government sector modernization programs include a cross-cutting aspect of digital technology use. Better information and data administration, as well as new avenues of communication, enable the public sector to work more effectively and to better identify and address unresolved issues of public concern (Vafin, Morozov and G. M. Galeeva, 2012). The effective use of technology in the MENA region has the potential to significantly increase transparency, public involvement, and involvement. To accomplish these goals, the region's economies must adopt a systematic strategy to the adoption of emerging techniques in the public service and gradually establish institutional capacity to execute digital government policies.

Inadequate institutional capabilities are another critical issue for the region. According to a 2015 OECD analysis of five MENA nations, the majority of the region's economies lack standard ICT project administration methods (Salahuddin and Alam, 2016; Williams, 2016). Despite the difficulties inherent in integrating digital national initiatives into public sector transformations, countries around the region are beginning to examine methods to enhance their use of technology for public sector modernization. Contemporary public governance and management encounter ethical difficulties including corruption and embezzlement that transcend national borders, posing threats to peace and economic prosperity.

Governments around the world are quickly extending their research and usage of Blockchain technology (Batubara, Ubacht and Janssen, 2018). Almost every sector of

the public service might profit in some manner from Blockchains. In the future, central authorities may lose relevance in the framework of Blockchain technology, or their function may evolve away from being at the heart of every transaction and toward offering a framework and administration for decentralized services (Hou, 2017). A variety of Blockchain technology application developed that governments are actively studying and, in some instances, adopting (Ølnes, Ubacht and Janssen, 2017).



Source: World bank governance indicators-2018 (Kaufmann, Kraay and Mastruzzi, 2011)

Public records management with blockchain in MENA countries

The public documents keeping has established as the basis for society's institutional institutions of governance, education, and so on for ages. Government recordkeeping

is a foundation of governance, providing proof of officials' acts and decisions (McKemmish et al., 2005). Public documents are accessible to the public, which guarantees that the state is responsible to the people it governs. Confidence in governance starts with confidence in public records (Basu and Waymire, 2006). Land records are incredibly useful as a record of land usage and ownership across time (McKemmish, 2017). Land records may last hundreds of years or in perpetuity in terms of legal, environmental, and commercial worth (Gilliland, 2014).

Without trustworthy recording methods, the usefulness of documents as evidence is dubious, if not nonexistent. Faith in public records is critical for the functioning of the judicial system, and hence trust in the mechanisms that generate and govern public information and records is critical (Barata, Cain and Thurston, 2000). Generally, records submitted as evidence must be validated. This authentication method enables the court to have confidence in the accuracy of the data included within the record. This enables the courts to substitute the verification of a public official's authority for the authentication of the record provided to it (Werbach, 2018) (Apte and Petrovsky, 2016).

Not just government services rely on public records to operate smoothly and effectively. Numerous private company operations depend on data gathered or created by the government to function. Establishing and verifying one's identification is one such step; establishing and verifying one's residency is another (Gollins et al., 2014). Starting bank accounts or requesting for loans, going to colleges, traveling overseas, seeking for medical insurance or obtaining medical treatment – all of these may need evidence of identification or residency, which is often in the form of a signed document of an official record (or perhaps another government-issued document, such as a driver's license). Thus, since both governmental and commercial entities depend on public records to perform critical activities MENA countries, public records are critical. Confidence in these files is also crucial, and government personnel at all levels of power and in every department are responsible for maintaining that trust (Newton, 2001). There would be no faith in government without confidence in government records.

Government agencies, institutions, and offices in some MENA countries are subject to significant differences as a result of forgeries and duplicate certifications (Fawzy, 2002; Sayan, 2009). All certificates such as birth, residence, caste, marital status, and death may be officially certified and kept on a blockchain network, making the documents unchangeable (Faizan and Ishrat, 2018). It will serve as a roadmap for Regulatory Transparency, Trusted Timestamping, and Auditability in the administration of public documents in that region (Ahmad et al., 2018; Wang et al., 2018).

Governments and industries in some countries of the world are deploying Blockchain-based solutions to address particular record-keeping difficulties and to expand the capabilities of the current system. Governments worldwide vary in their degree of Blockchain maturity; for example, Estonia takes the lead with Blockchain-based digital IDs and licenses (Rivera et al., 2017; Fridgen et al., 2018). Dubai also aspires to establish itself the first city to be entirely operated by Blockchain technology in the near future (Gao et al., 2018; Lyons, 2018). The United States Department of Homeland Security is experimenting with Blockchain technology to create digital documents and fight counterfeiting.

Estonia is implementing a keyless signature infrastructure (KSI) to secure all public-sector data (Shukla, 2016). KSI generates hash values, which are unique representations of enormous quantities of data in the form of substantially smaller numeric numbers (Ramadhani, Choi and Kim, 2018). Although hash values may be utilized to identify records, they cannot be utilized to reconstruct the data contained inside the file. Hash values are spread over a secure system of government servers through a blockchain. Each time an underlying file is modified, a different hash value is added to the chain, so this data is no longer modifiable. Each record's history is entirely visible, allowing for detection and prevention of unwanted alteration from inside or outside the system. KSI can enable governments personnel in MENA countries to monitor changes to numerous databases—who modifies a record, what modifications are made, and when they occur (Emmadi and Narumanchi, 2017). For instance, all Estonian individuals' electronic health records are maintained with KSI

technology, and the nation intends to make KSI accessible to all government departments and private sector businesses.

Ownership of digital assets.

Typically, the process of acquiring and exchanging assets, whether physical assets or financial instruments, involves several transactions and a lengthy paper trail in MENA region (Creane et al., 2004; Neaime, 2005). Government agencies might significantly reduce both by digitizing and storing the data about asset owners on blockchain registries. The risks are quite high in case of real estate transactions within the countries in the Middle East and North Africa region (Ben Naceur, Cherif and Kandil, 2014). Nonetheless, property registration and transfer remain onerous undertakings. MENA's land register bodies should investigate methods to automate the procedure. It can test smartphone application that would facilitate transactions between sellers and purchasers, and also their real estate brokers and banks. A blockchain would maintain complete records of the properties being sold, as well as each stage of the transaction. Communications between all parties involved in the transaction would remain more transparent. Paper documentation (Saidi, Yared and Others, 2003), which is generally hundreds of pages in length, would become obsolete. When fully deployed in the MENA countries, the software is projected to shorten the time required to close a deal from few months to a few days.

Additionally, by using blockchain to monitor property ownership, insiders can be held accountable; it would be far more difficult for unauthorized government personnel to corrupt information (Kshetri and Voas, 2018). This might result in more safe property ownership in regions of the Middle East and North Africa region currently with a poor rule of law and a high rate of power abuse (Hassan, Najdi and Reza, 2013).

There is a significant danger associated with assigning authoritativeness to particular blockchains (Yli-Huumo et al., 2016; Kube, 2018). Due to the fact that blockchains are primarily composed of volunteer participants, such participants may decide to quit participating at any time (Yli-Huumo et al., 2016). Alternatively, they may determine

that a particular block or group of blocks is significant enough to initiate a new chain starting at that point. This is referred to as a fork, and it has happened several times throughout Bitcoin's existence. It is unknown how a split might affect the long-term dependence on blockchains as record-keeping systems (Memon *et al.*, 2018). Due to the lack of a long-term commitment to any blockchain network, fragmentation of a block chain technology could present a significant challenge: users would need to recognize which of the numerous distinct forks of any given blockchain is authoritative when trying to verify the authenticity of a record in one of the models. While these eventualities are improbable, the significant level of fluctuation in the main blockchains throws the sustainability paradigm into question.

Blockchain-based record keeping and administration will eliminate duplication and fraud in the issue of different sorts of papers and identification cards (Dai, Wang and Vasarhelyi, 2017), thereby putting an end to such operations that exist in the MENA countries. While connecting records management with Blockchain will not eradicate all fraudulent actions occurring in record keeping, it has been shown that it would significantly reduce forgeries in record keeping.

Making connected public services though blockchain in the MENA region

Governments typically have a wealth of information about citizens and organizations as a result of the data they accumulate. However, because this information in the MENA countries is stored in bureau and division silos, it is frequently not utilized to its full potential.

In most cases, service agencies in MENA countries do not have direct entry to data about how a client has dealt with other government agencies. And gathering such data can be a time-consuming process requiring considerable time and effort. Civil servants involved in planning rehabilitation services for convicted prisoners spend a large portion of their workdays attempting to gather information about these people from distinct government agencies (Vafin, 2017b; A. Vafin, 2018).

Technically, there is no justification for preserving data separately. Governments, with some effort, could establish central archives or infrastructure components for information sharing across agencies. A critical major hurdle, however, is security—much like their private sector counterparts, public agencies in MENA countries cannot under any circumstances make sensitive data widely accessible. What is required is an environment that facilitates data sharing across systems but also allows individuals and organizations to reclaim possession of their data and manage the flow of private details.

Blockchain technology, which is still in its infancy, may enable such a case. Each individual or company would have all relevant information about them recorded in a dedicated ledger inside an encrypted blockchain (for example, basic personal details or records of past encounters with government agencies) (Kuo, Kim and Ohno-Machado, 2017). Individuals or businesses can gain access to these ledgers via the Internet. Then, utilizing public- and private-key cryptography, end users could grant government departments the control to read and modify specific elements of their private ledger. They can use public access to share information about a specific service encounter with departments selectively. Alternatively, they could provide private keys to departments in exchange for a single "write" access to information (Cheng et al., 2017).

Conclusion

The implementation of blockchain technology is more theoretical than practical and may take some decades or more to actualize, if at all. Nevertheless, during the last few years, blockchain has been addressing its initial growth pains – including poor user interface design, scalability, and the need for increased privacy to safeguard enterprise intellectual property – and has demonstrated the ability to address real but more particular concerns about data reliability and availability.

Among the intriguing elements of blockchains is the platform it offers for development and flexibility. While its first deployment will encounter the same

restrictions as current technologies, the open nature of blockchain will stimulate and support industry-wide innovation for coming years.

Tech-literacy training should be conducted to train public personnel about new technologies(Alhaddad, 2017). Nevertheless, even when the government sector outsources coding jobs to the private industry, it is vital to retain a benchmark of in-house expertise to guarantee that resources are managed effectively and securely, and that the presumptions and judgments included into Blockchain technology are understood and have the intended impact.

It is the duty of the government to guarantee that personal data is protected and that suitable choices have been taken in the creation of Blockchain services and algorithms. Given industry's expertise and experience, governments should explore adopting methods for engaging and collaborating with the private industry to advance Blockchain objectives.

It would appear that blockchain would be acceptable when all persons engaged are needed to preserve some sort of data record, access it, verify it in instantaneously and therefore enable to keep a fully transparent, traceable and trustworthy historical evidence of all activities.

It is critical to encourage technology for its effectiveness, but also to be monitored, which means avoiding any prejudice or discrimination in its usage while constantly respecting individuals' rights and guarantees in all areas, beginning with the security of their personal data.

Technologies should not concentrate on substituting public powers, but rather expand or complement human capabilities, so that individuals may add value to their duties, while at the same time, promote and enhance of the government functions for citizens. It is especially crucial to focus on training government employees, so that wider society can benefits from this new technology.

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