Chapter 90
Optimizing Health, Education and Governance Delivery Through Blockchain

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ABSTRACT

Blockchain technology and cryptocurrencies are generating profound transformations in most sectors of the society, including healthcare, education and governance sectors that are uplifting communities out of despair in regions around the world. In these sectors, they are remaking financing and usher in an era of how institutions are structured, functioning and their relationships with their publics. This chapter identifies transformative research papers, White Papers, reports on these themes, and then analyzes their contexts, relevance and contributions to the transformations underway in the selected sectors. Using modified Cornell Notes template, for the healthcare, education and governance sectors data is collected, analyzed and categorized into four approaches to technology adoption: transformation, Substitution, Localization and Single Use. The chapter is organized in four main parts: the introductory, background, focus of the study, and the conclusion part.

INTRODUCTION

The tremendous benefits and solutions the introduction of the Internet brought to the world, has increased the faith of humanity in technology to help solve many of its increasingly complex problems (Mihyun & Kim, 2016; Loveneesh, 2017). Despite technology's tendencies to discriminate, disrupt, and infiltrate most aspects of institutions, business, and industry, this faith has not wavered. With the rapid urban growth in Asia in the past few decades and the prediction of even more intense and complex urbanization to occur in Africa in the next decades (Abubakar & Dano, 2018; Benna & Benna, 2017), there is increasing pressures on institutions and businesses to find suitable technologies and funding that could meet expected demands for the current and future urbanization growth (Abubakar, 2018; Abubakar & Doan, 2017). It seems that one of such promising, yet disruptive technology is blockchain and possible

its related cryptocurrencies will generate the funding. However, both blockchain and its funding systems are still at an early stage of development and require more time to realize their full potentials (Tapscott & Tapscott, 2017a; Wagenaar & Zimakova, 2017).

Much of the hype surrounding blockchain's potential has been related to the financial services industry. Other urban services, however, such as healthcare, education, water supply, sanitation and governance are facing similar exponential growth challenges (Abubakar, 2017a; Abubakar, 2017b) that blockchain may have the capacity of solving (Uka et al., 2017; Grech & Camilleri, 2017; Wilkinson et al., 2017). Therefore, this chapter seeks to explore how blockchain technology is helping to optimize the current and potential future delivery of healthcare, education and governance services across the world. It seeks to achieve the following objectives:

- To define blockchain technology and its general application in urban development;
- Explore the experiences in the adoption of blockchain technology for the delivery of healthcare, education and governance services;
- To identify research directions for adopting blockchain technology in the delivery of these urban services.

BACKGROUND

This section provides the background information about blockchain technology against which the current stage of its application in optimizing urban services is to be explored based on the evidence presented by the hand-on actors in this nascent field. After explaining what it is, what it does and how, its opportunities and challenges, a tooling-up toward the research is set by developing an analytical framework and research methodology outlined before moving into the section of the study focus.

Brief Profile of Blockchain

A blockchain is an expandable list of verifiable and permanent records that are linked, peer shared and secured by means of cryptography (Deloitte, 2016; Perez et al., 2018). Each peer maintains own information copy and any updates, which must be validated by all through a consensus process. Although initially concerned with recording cryptocurrency transactions, blockchain has evolved for use in many areas that enable decentralized sharing of information and application operations. So far, some of its key features that have endeared it to its users include (Deloitte, 2016): transparency (all participants can view unchangeable data), disintermediation (enabled transparency and trust eliminates the need for traditional intermediary), trust (connected data blocks and distributed validation structure created trust between actors), and suitability (its immutable and everlasting qualities enable lasting recordkeeping).

While blockchain has many capabilities, there are limits to these qualities, and there are few examples (Deloitte 2016, Narasimhan 2017). First, blockchain and bitcoin are not the same; although the former provides the underlying technology that has enabled the latter and all cryptocurrencies to become popular. Second, blockchain is different from an enterprise database in that it is more powerful and designed to be shared across a network of parties with great transparency, collaboration, and immutability- updating data. Third, security in blockchain implies temper-proof but not privacy. Fourth, blockchain is not always public, because it can be public, private or consortium in ownership and use.

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