

Chapter 44

Blockchain Innovation and Information Technology at GCC: Literature Review and Methodology

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ABSTRACT

Blockchain has become an epidemic and significant decision that organizations may make in the next few years, enabling institutions to integrate business functions, operations, and processes in a decentralized distributed ledger technology. This technology will transform the business world and economy in solving the limitations created by centralization and system inefficiency. Accordingly, with the high demand and complexity of growing economies such as the Gulf Cooperation Council GCC countries, the need for a typical solution technology is a game changer. This will lead GCC to a solid economic base. Blockchain technology can be applicable in many different fields such as Banking, education, Health, finance, government and trade. This article will address the literature review and methodology of Blockchain technology and innovation at the GCC, particularly in Saudi Arabia. Also, more research can be conducted in the future as the system may be integrated in these countries.

INTRODUCTION

Blockchain is an electronic ledger system that available to the public as an open-source technology (Dogru, Mody, & Leonardi, 2018). The ledger system allows disparate users to make electronic records of their transactions through a time-stamping system that links each transaction to previous and next transaction in a chronological manner (Dogru et al., 2018). Each electronic record of a transaction is termed as a block and is liked to a particular user. The linked system allows several users to record transactions in

DOI: 10.4018/978-1-7998-5351-0.ch044

a controlled yet open manner. The ledgers can only be updated after the participants in the transactions reach a consensus (Dogru et al., 2018). Further, all the data entered into the system cannot be erased ensuring that the system retains an authentic and verifiable record, or all the transactions made by the users. The system is secured through cryptography and the networked nature of transactions (Dogru et al., 2018). The nodes of a distributed ledger do not trust each other and independently verify the validity of the transaction record before applying them to new transactions. The encryption used in blockchain transactions utilizes a digital fingerprint generated through the use of a hashing function (Dogru et al., 2018). Each block on the chain is connected to the next by a hash value. The nodes that connect the chain verify the validity of a transaction by automatically determining its conformity to the rules set in the smart contract. Blockchain platforms differ by the confirmation process used to enter new transactions to the ledger.

LITERATURE REVIEW

Diffusion of Innovation Theory (DIT)

The diffusion of innovation theory (DIT) explores the mechanisms that shape the adoption of a new concept, product, practice or perspectives. It was popularized by Everett Rogers (Sahin, 2006). Rogers argued that only a few people are open to new ideas and are willing to adopt them for real life applications. As the early adopters influence more people to adopt the technology a critical mass of adopters develops, and the innovation gets diffused amongst the population until it reaches a saturation point (Sahin, 2006).

Rogers classified the adopters into five distinct categories. The innovators are technology enthusiasts and appreciate technology for its sake (Lyytinen & Damsgaard, 2001). The early adopters are visionaries who adopt the technology and act as opinion leaders. They are natural trendsetters and are attracted to high-risk high reward investments. They are not particularly cost sensitive (Lyytinen & Damsgaard, 2001). The early majority are the pragmatists who adopt innovations that make business sense and have proven reliability. They abhor complexity and only take advice from trusted friends. The late majority is very conservative but adopts technology due to peer pressure and economic necessity (Lyytinen & Damsgaard, 2001). They are very skeptical, cost-sensitive and only adopt innovations in order to keep up with the competition. The laggards are very skeptical of innovations and prefer the status quo and only invest in a technology if there are no viable alternatives (Lee, 2009). The theory asserts that the innovators make 2.5% of the users while early adopters make 13.5% of the users (Lyytinen & Damsgaard, 2001). Early and late majority users comprise 34% respectively while the laggards comprise 16 of the users. The theory aims to streamline innovations such that they meet the needs of all the five categories of users.

The theory considers peer networks to be an important component of the adoption of an application as it is through these networks that innovators and early adopters stimulate mass adoption of the technology. Rogers (cited in Lyytinen & Damsgaard, 2001) identified five predictors of the success of an innovation. The predictors are the relative advantage offered by a technology, observability, compatibility, complexity and trialability (Teo, 2011; Lyytinen & Damsgaard, 2001). Relative advantage is the potential of an innovation to be perceived as better than the technology it replaces. Compatibility is the degree to which an application is perceived to be compatible with the prevailing conditions, experience and the needs to potential users. Complexity relates to the degree to which an innovation is considered difficult to comprehend and use (Lyytinen & Damsgaard, 2001). Trialability is the degree to which an applica-

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