Chapter 4
Blockchain:
A Disruptive Technology

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ABSTRACT

Blockchain is distributed ledger technology. Its advancement has been compared to the rise of the internet with debate about the technology's probability to disrupt multiple industries including healthcare, transportation, real estate, public domains, manufacturing, intellectual property, education, and financial services. It is predicted that the blockchain will have a major impact on many trust-based environments due to its nature of recording any digital transaction that is secure, efficient, transparent, auditable, and resistant to the outage, thereby providing the much-needed security in the transfer of assets in cyberspace. This chapter will highlight some of the business processes that can be disrupted by blockchain technology.

INTRODUCTION

In recent years, the implementation of Blockchain technology has materialised rapidly with the potential to revolutionise not only the financial domain but also various spheres globally. This technology gained vast attention all over the world after the cryptocurrency known as Bitcoin was introduced by the pseudonym '*Satoshi Nakamoto*', an unknown entity (Baki, 2019). This technology is receiving significant

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attention because of its usability and faultlessness. The decentralised architecture of Blockchain technology empowers a distributed consensus where transactions are verifiable and data is immutable. Therefore, advantages of transparency, security, efficiency, cost-effectiveness, adaptability and many more can be achieved perfectly through proper utilisation of Blockchain. It preserves data integrity and quality by enabling decentralised defence (Zheng et al., 2017). The decentralised concept makes the Blockchain a distributed database where all node contains the entire copy of records. Distributed nodes are used in this Peer-to-Peer network to access, verify and transmit data that cannot be fabricated (Iansiti & Lakhani, 2017). In order to appreciate the true disruptive potential of this technology, five core principles of Blockchain, such as Distributed Database, Transparency, P2P Transmission, Computational Logic and Immutable Records are required to be considered.

TECHNOLOGY

A Blockchain is a form of distributed ledger that records the transaction in 'Blocks'. A set of transactions are stored in the Block which contains a link to the previous Block, consequently, a chain of sequentially ordered Blocks is formed (Mayes, Jayasinghe & Markantonakis, 2014). A distributed ledger is the core of Blockchain through which data can be inserted and amended using the nodes' Consensus mechanism in the network. Every collaborating node in a Blockchain contains a copy of the entire records in a sequence of the interconnected system (Valduriez & Ozsu, 2011). In a Blockchain, the cryptographic hash function is used to link sequential Blocks together in such a way that, any modification of transaction data in a Block would alter the hash value of the following Block and consequently this alteration process goes on for the rest of the subsequent Blocks in the chain. This mechanism introduces easily noticeable discrepancies in the event of any slightest alteration to the Blockchain (Ferretti, D'Angelo & Marzolla, 2018). In order to provide a reasonable level of anonymity, Blockchain utilises digital pseudonyms which are hashed public keys. This pseudonym can be used to trace the actions of an individual. However, correlating a pseudonym to an exact individual is resource-intensive (Zhu et al., 2016).

The fundamental properties of Blockchain technology are Decentralisation, Transparency and Immutability. Decentralisation refers to the process that enables the function of dispersing and restraining control from centralised authority or location. It contains the potential to facilitate the transaction of data in a transparent manner without the requirement of a trusted third party. The structure of a decentralised system ensures that one single entity does not store the information, but every