Chapter 5
Beyond Cryptocurrencies:
A Review of Blockchain Technology for E-Services in Developing Countries

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ABSTRACT

Blockchain technology is the leading and revolutionary technology in this modern era of computing. Many countries around the world are diverting towards digital currency which is the initial popular service provided by blockchain technology e.g., Bitcoin, Litecoin, etc. The main feature of blockchain is to omit the central authority by introducing distributed ledger structures. The consensus protocols play a vital role in the performance and efficiency of blockchain-based frameworks. This study introduces the solution of different e-services and associated problems that are faced in developing countries for making the system transparent, smart, and secure. These features make Web 3.0 applications, which is the ultimate goal of blockchain-based technology. This study also explains the numerous aspects of blockchain-based e-services infrastructure, implementation issues, advantages, disadvantages, and challenges. This study may help practitioners for making smart, intelligent, highly secure, and robust applications even in developing countries.

1. INTRODUCTION

Blockchain is a prominent technology in the twenty-first century. In 1991, for the first time in history, a research team coined the term blockchain (Ahmad, Lutfiani, Ahmad, Rahardja, & Aini, 2021). The blockchain creator, Satoshi Nakamoto introduced the cryptocurrency name Bitcoin. Blockchain technology has revolutionary effects on different services in developed countries. It is now accepted that the deployment of blockchain technology in several sensitive activities can change the way it works by enhancing data security and efficiency (Salah, Rehman, Nizamuddin, & Al-Fuqaha, 2019). Numerous

blockchain-dependent applications have gained significant popularity in the last few years. For example, e-government, e-commerce, supply chain management systems, interbank transactions, healthcare applications, and many financial use cases are leading areas that focus on blockchain technology (Gao et al., 2021). However, in developing countries, the implementation of these services through blockchain is neither simple nor feasible due to the lack of infrastructure, required expenses, and trust by the layman.

Besides, in this chapter, we focus on blockchain-based e-services in developing countries as there are lots of issues regarding privacy, transparency, and security. The crux of the chapter is to describe blockchain technology from different aspects including brief yet comprehensive discussions on research gaps.

The rest of the chapter is divided into seven sections. Section 2 described the basic features. Section 3 discusses the basic flow and architecture of blockchain, types of blockchain are discussed in section 4, and the revolutionary applications of blockchain are highlighted in section 5. Section 6 discusses the theoretical findings and challenges. Section 7 concludes the chapter. References are enlisted in the end.

2. BASIC FEATURES OF BLOCKCHAIN

There are several key features of blockchain technology, such as decentralization, distributed ledgers, transparency, security, immutability, and independent network. These features make it different from any other network or database. In sub-sections, all these features are discussed in detail.

2.1 Decentralization

The blockchain contains multiple nodes having full access to sharing, creating, or uploading something new to their blocks. All miners have to trust the system instead of any third party to complete their work or to perform their transactions. We can take the bank system as an example, which is centralized, and everyone needs a bank to make secure their money as well as transactions upon this money i.e., transferring, depositing, withdrawing, and other services. Here, we can say that our money is secured. However, from another perspective, it may be a high risk because of the involvement of a third party (bank) in the middle. Therefore, a user wants to secure their money with little involvement from other parties. Here the technique, which truly works is called decentralization in the blockchain. The best examples of the financial use case of blockchain technology having the full implementation of decentralization are Bitcoin, Ethereum, Litecoin, etc.

Decentralization is the most important and basic feature of blockchain that works as a key component in a public-type network where decentralization is completely implemented. Previous studies show that the abstract view of a decentralized system and its implementation in a network of distributed information are two different platforms. Therefore, for every user, it is important to realize first whether they are working in a real decentralized system or not (Lee, Lee, Jung, Shim, & Kim, 2021). The public-type blockchain is an example of a decentralized system, where users or miners work in a truly independent environment. We can say it is more secure than the existing centralized systems. Figure 1 demonstrates the difference between decentralized and centralized systems.

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