Chapter 8
Conceptual Blockchain Analysis for Disaster Management

Ashutosh D. Gaur
https://orcid.org/0000-0003-4322-5747
Mangalmay Institution of Management and Technology, India

ABSTRACT

Blockchain is a transparent, encrypted, distributed database. It is utilised effectively by financial instruments, e-government, supply networks, and others. This paper examines emergency uses for the Blockchain. There needs to be a sound information system for managing and controlling disasters, making decisions, and creating a conceptual model from disaster and blockchain literature. This chapter discusses parties exchanging and storing data on one platform. This study proposes a system model for pre-, during-, and post-disaster user scenarios. The methodology asserts holistic disaster resolution.

INTRODUCTION

Disaster management, as an essential component of ensuring the safety and well-being of communities, has seen remarkable advancements in recent years, driven by technological innovations and novel approaches to handling crises (Smith, 2019; Federal Emergency Management Agency, 2022). From early warning systems that provide vital seconds to prepare for impending disasters to artificial intelligence-driven predictive models, the landscape of disaster management has been evolving

DOI: 10.4018/978-1-6684-7649-9.ch008

rapidly. Yet, amidst these advancements, one technology has remained relatively underexplored, with the potential to revolutionize the field: blockchain.

Blockchain, the distributed ledger technology initially devised for cryptocurrencies like Bitcoin, offers a decentralized, transparent, and secure framework that holds significant promise for enhancing the various phases of disaster management (Johnson, 2020; Coco et al., 2017). It presents an opportunity to transform the way disaster risk reduction, preparedness, response, and recovery activities are carried out. By establishing an immutable record of transactions and data, blockchain can bolster the reliability and integrity of information, streamline the allocation of resources, and facilitate efficient communication among stakeholders (Adams, 2022).

While the theoretical groundwork for implementing blockchain technology in disaster management has been established through various conceptual models and frameworks (Blockchain for Disaster Management Consortium, 2021; B. Egeland-Müller et al., 2017), the transition from theory to real-world practice remains an underexplored area. The existing literature offers a valuable foundation for understanding the potential advantages of blockchain in this context. However, a significant research gap persists, particularly in terms of empirical, quantitative assessments of the actual impact of blockchain technology on disaster management.

To date, the discourse surrounding blockchain in disaster management largely consists of theoretical discussions and conceptual proposals. While these discussions are vital for generating ideas and laying the groundwork, the absence of empirical investigations quantifying the technology's real-world influence is conspicuous (Rodriguez, 2017). It remains largely unknown how blockchain, when deployed in disaster-affected regions, affects the speed and efficiency of disaster response, the optimization of resource allocation, and the overall resilience of disaster management systems.

This research gap is a significant obstacle in fully understanding the potential of blockchain technology in disaster management. Theoretical models and conceptual frameworks can provide insightful suggestions, but they often lack the empirical support required to convince stakeholders of the real-world utility of blockchain in disaster-prone areas. Addressing this gap through empirical investigations is imperative to bridge the chasm between theory and practice.

Moreover, deploying blockchain in disaster-prone areas, which often feature limited technical infrastructure and expertise, presents unique challenges. This socio-technical dimension remains an under-explored domain in the existing literature (Nguyen, 2016). Overcoming these challenges is essential, and this article aims to investigate potential solutions to make the adoption of blockchain in such contexts more feasible and effective.

In summary, this article seeks to explore the potential of blockchain technology in disaster management while highlighting the research gap that calls for empirical