



Chapter 7

Blockchain Integration for Smart City Infrastructure: Advancing Urban Connectivity and Security


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ABSTRACT

Blockchain technology is being integrated in smart city architecture to enhance urban connectivity and safety. The intention of this article is to compare Smart Cities to create that of the 'Quality of Life' through the adoption of digital technology and data, overcoming interoperability, security and data management issues. Here, blockchain offers a solution as it assures security, data integrity, and

DOI: 10.4018/979-8-3693-8876-1.ch007

transparency. It could transform data governance, public services, transportation, and energy management. Decentralized energy grids also engage in peer-to-peer energy trade that helps reduce dependency on centralized power systems. To increase communication security between vehicles and infrastructure in the presented paper, blockchain technology has been successfully used. This can enable people to make better decisions without disrupting the system. It can also enhance public services by providing secure platforms for voter registration, identity verification and public records management.

INTRODUCTION

Due to issues like urbanization, population growth, and sustainable development, metro areas are being developed into smart cities. They leverage state-of-the-art technologies within the sectors of IoT and artificial intelligence, but also big data analytics, to spur economic growth, effective urban services delivery, and livability. These systems are still vulnerable to compatibility, security, and data management issues. For these issues, blockchain technology brings optimistic solutions (Li, 2018).

These features lead to the use of blockchain for smart city applications because it is decentralized, secure, and transparent. It can do this while ensuring data integrity, providing full transparency at public service points, and enabling smooth interchange between city systems. This chapter investigates the potential contribution of blockchain technology to the built environment of smart cities in terms of data governance, public services, energy management, and transportation. At its core, it reviews existing case studies and implementations to give an overall view of the advantages and challenges to the implementation of blockchains in smart cities, as well as potential future use cases. We now have case studies and real-world applications (Singh et al., 2020).

Blockchain technology can greatly enhance energy management by establishing decentralized energy networks, reducing dependence on centralized power systems, and facilitating renewable energy sources. This is where peer-to-peer energy trading is so vital—people and companies are buying and selling excess energy to each other directly in order to increase energy efficiency and promote smart city initiatives for a more sustainable future. It saves events in a distributed manner, which takes out the problem of trust between different networks or organizations. In doing this, it can enable more accurate and reliable data interchange between infrastructure and cars. Combining autonomous vehicles and smart traffic management systems can make urban roads more efficient, less congested, and safer (Rotună et al., 2019).

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