Chapter 8
Revolutionizing Urban Living:
Integrating 6G and Blockchain in Smart City Development

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ABSTRACT

The synergistic relationship between 6G and blockchain, showcasing how their integration supports secure, real-time data exchange and robust smart city operations are examined. Practical applications such as smart traffic management, energy-efficient buildings, secure digital identities, and decentralized governance are analyzed through real-world case studies, highlighting successes and challenges. This chapter also addresses technological, regulatory, and societal challenges to the widespread adoption of these technologies, including interoperability, scalability,

DOI: 10.4018/979-8-3693-8029-1.ch008

and privacy concerns. Prospects are explored, considering the role of emerging technologies like AI, IoT, and quantum computing in enhancing smart city development. By providing a comprehensive analysis, this chapter offers valuable insights for policymakers, urban planners, technologists, and researchers dedicated to building the smart cities of tomorrow.

1. INTRODUCTION

Due to the rapid pace of urbanization in the world today, there is a growing demand for social, environmental and economic development within cities that would significantly improve the Quality of Life (QoL) of the urban dwellers. In the last few decades, the rapid increase in the population of the globe has in a way triggered increased rate of urban migration which has brought with it logistics, social and economic problems which are majorly adverse. As per one of the United Nation's reports, about 70% of the world population is anticipated to reside in urban regions by the year 2050 (Angel et al., 2011). However, this process of urbanization has raised the overall quality of life through transport advances, better education and health care, and improved economic prospects. Unfortunately, though, urban populations are usually too high for the equitable distribution and management of resources to be efficient.

The metropolitan development which is characterized by provision of various amenities has led to deterioration of many environmental aspects such as pollution, traffic jams, waste management systems, and emissions of greenhouse gases. These problems pose a typical challenge for cities and highlight the need for new approaches contributing to the efficient development of urban areas, which has led to the emergence of the Smart City concept. The smart city is oriented to the solution of these urban issues aiming at the improvement of the life quality in cities making them more liveable, less polluted and less congested with traffic.

As such, the last years' evolution of Information and Communication Technologies (ICT) and the evolution of the Internet of Things (IoT) have become cornerstones in the quest for smart cities' sustainability (Alavi et al., 2018). The implementation of these technologies brought about health and energy enhancement, promoted social participation, increased democratic accountability, improved service and resource efficiency, and many other advancements such as public transport and traffic management. Smart City places the needs and preferences of citizens at its core and uses evidence-based approaches, education, and technology as the catalysts for building dynamic, sustainable, and just urban communities (Raja Santhi & Muthuswamy, 2023).