

Chapter 4

Using 6G to Boost Smart Cities: New Ways to Connect and Save Energy in Cities

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ABSTRACT

Integration of 6G technology with smart cities significantly advances city infrastructure development, simplifying the process of connecting & operating cities. This chapter discusses two revolutionary ideas in depth, including their features, ways they work together & future impact on development. Technology & data collection play a crucial role in the evolving field of smart cities, enhancing everyone's quality of life & ensuring the smooth operation of city programs. IoT, big data analytics, cloud computing, communication infrastructure & AI help local government make

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cities smarter. ICT involves data collection, storage, retrieval, modification, organization, administration, security & exchange. Automation in smart cities assists respond fast to real-time data from IoT devices. Smart transportation drives smart city urban design. Smart city people need low latency to decide and respond quickly. 6G networks provide telemedicine, virtual consultations & remote patient tracking. The chapter conclude that 6G will transform urban living, making cities more livable, sustainable and responsive to citizens.

1. INTRODUCTION

Urban environments have seen many significant changes due to advancements in information and communication technologies (ICTs). ICTs are being used to enhance the efficiency of traditional services and infrastructure in numerous cities, making them smarter. Various Studies indicate that the smart city sector is expected to grow at a 14.9% compound annual growth rate (CAGR) about \$511.6 billion in 2022 to \$1024.4 billion by 2027 (Research and Markets, 2022) .

Future generations are expected to prioritize sustainability in order to enhance our quality of life and save our nature (UN, 2023). Despite the abundance of technical progress, significant challenges persist in the way of developing a future Superintelligence (SC) in which humans and robots coexist in a highly networked society.

Intelligent technologies like automated machines, internet-of-things (IoT) sensors, and urban air mobility (UAM) will effortlessly connect upcoming wireless networks without data speed, delays, or coverage constraints in our increasingly networked world. The social structure of information and communication technology relies on wireless communication. Our daily lives are crowded with internet-enabled mobile services. Since the 1980s beginning of 1G mobile communication networks, they have evolved significantly. In 2019, 5G networks were commercialized and are now in over 90 countries. It is crucial to note that 5G is enabling business advancement in smart cities. Since 5G technologies were released, academia and companies are researching 6G (Flagship, 2019).

6G wireless communication is the next iteration after 5G communication. From a technological standpoint, it enables the integration of a single network by using higher frequency radio bands, resulting in better throughput, reliability, higher capacity, and lower latency. The advanced characteristics of 6G networks make them suitable for the broad adoption of the IoT paradigm, particularly in the view of the anticipated quick rise of the number of Networked devices inside the Internet of Things (IoT) framework, which is predicted to reach billions in a short amount of time. However, the arrival of 6G communication is certain due to the swift progress in wireless systems (Kamruzzaman, 2022).

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