Chapter 8
Smart Cities and Infrastructure Industry

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ABSTRACT

The rapid urbanization has led to the emergence of smart cities that are developed so as to ensure sustainability and efficiency by way of integrated technologies. The infrastructure, mobility, energy, safety, and resources are all optimized with help of IoT, AI, and data analytics. Real time monitoring as well as prediction maintenance is made possible through smart grids, intelligent transport, BIM, digital twins, automated utilities. The innovations influence improved service delivery, lower emissions and green development. Nevertheless, inclusive and resilient urban futures can be attained, given strong governance and collaboration challenges, such as cybersecurity, data privacy, technological integration.Keywords: Smart cities, infrastructure development, sustainable urbanization, digital transformation, IoT integration

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INTRODUCTION

The challenges that urbanization has placed across the globe have been accelerated beyond anyone's imagination and these need innovative and sustainable solutions. As of now, nearly 55 percent of the world's population lives in urban areas, and this is expected to increase to 68 percent by 2050; (United Nations, 2018). To this rapid urban expansion comes extreme pressure on existing urban infrastructure, resource, goverance mechanisms. Not only does urbanization expand housing demand, transportation, energy, water supply, traffic congestion, pollution, waste management and socio-economic inequality, but it also presents intricate multi-disciplinary problems in housing, energy, and transportation disciplines. Given these manifold challenges, the idea of 'the smart city' has evolved as a new strategic idea to solve the urban landscape issues by merging state of the art technology with sustainability concepts.

A smart city is an urban ecosystem that makes use of digital technologies to achieve high efficiency and performance in urban services and thus improving urban quality of life. Despite the ubiquity, little data exists currently on the implementation of smart cities in the developed countries, but it is generally believed that the core aspects typically include the deployment of the Internet of Things (IoT), Artificial Intelligence (AI), big data analytics and sensor based infrastructure for improving operations such as traffic management, energy consumption, waste disposal and public safety (Batty et al., 2012; Albino et al., 2015). These technologies enable real time monitoring, predictive analytics and data driven decision making that enables the city administrators to understand city urban environment and govern it in a more effective manner.

Smart city technologies have been especially successful in various leading urban centers across the world with most recently adopting them. One example of this is that Singapore is frequently mentioned as an example of a smart city development. Singapore, which launched its "Smart Nation" initiative in 2014 through the biggest tech, for instance, autonomous vehicles, pay as you go payment, AI surveillance system as well as a national sensor platform to make its urban environment extremely connected and effective (Smart Nation Singapore, 2020). A notable project in this regard is its involvement of AI and IoT in its water management system that monitors the leaks, tracks the water consumption patterns, and predicts the maintenance needs to save on both the expenses and the environmental concerns.

Like Barcelona, Europe has also had many smart city strategies piloted by the city, beginning with Barcelona. They have developed an omnibus urban platform referred to as 'Sentilo' that encompasses coding data from hundreds of sensors deployed across the city that measure the the ambient noise and the level of air pollution, availability of parking spots or illumination of the streets (Bakıcı et al., 2013). This smart lighting system in the city has become so bright, that it adjusts