

# Chapter 11

## Sustainability and Urban Innovation by Smart City Implementation

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### ABSTRACT

*Sustainability is a global need, both for companies and people. It is not only a matter of convenience to achieve more excellent business benefits, but it is also accompanied by the concept of a smart city, which is of fundamental importance since it also goes in parallel with Industry 4.0. This chapter describes the technologies associated with the implementation of smart cities, benefits, limitations, and contribution to sustainability. Different examples of smart cities are described, highlighting the requirements for implementation and the associated risks. The amount and type of specific technologies available in implementing a smart city are striking. Sustainable cities and smart cities undoubtedly share many characteristics, so the interconnection of concepts facilitates implementation, knowing all the technological requirements necessary for development.*

### INTRODUCTION

The planet has experienced more severe and rapid climate change in the last years, with significant consequences for humanity. Many authors argue that we live in the Anthropocene era, where human activities have led to vast ecological and geological consequences (CrutzenWill Steffen, 2003). International organizations and governments worldwide have joined efforts to face these current and future problems. Similarly, more people are worried about working on new movements and campaigns to spread

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environmental awareness in society. Global climate change has shown us our vulnerabilities as human beings more closely, and it has exacerbated injustice and inequality around the world. Accordingly, many issues arise that are related to responsibilities and sustainability. The development of fair environmental policies should be sought to address the uncertainties of climate projections and the risks they entail. The increasing concentration of the world population in urban megalopolises has created several challenges, particularly in the growth of resources and the environmental challenges that city planners face (Ershova & Orlovskaya, 2020; Qingsong et al., 2019).

Greenhouse emissions and carbon dioxide are the most significant cause of increasing earth's temperature (Yigitcanlar & Dizdaroglu, 2015). The global energy consumption and the production of gases responsible for the greenhouse effect in cities are 75% and 80%, respectively. In 1959, 30% of people worldwide lived in metropolises; this percentage is likely growth by 66% in 2050 (United Nations, 2019). Furthermore, the urban population growth is one of the leading causes of the Anthropocene era, which currently contributes globally to 75% of CO<sub>2</sub> production, 80% of energy consumption, and 75% of natural resources (Perveen et al., 2017). According to (United Nations, 2016), the world has 7450 million inhabitants, approximately 83 million people are being added to the population each year. Even if fertility levels continue to decline, the world population reach approximately 8600 million in 2030 and 9800 million in 2050. Therefore, cities represent platforms for the consumption of resources in which companies and individuals face activities and services with a high effect on the economy and society.

Rapid population growth, urbanization, scarcity of resources, and global warming have highlighted sustainable cities as a new framework of vital importance (United Nations, 2016). These challenges have given rise to the new term "smart city". The smart city model drives sustainable progress based on energy and environmental policies to reduce, improve, and manage fossil fuel effects and climate change hazards (Arbolino et al., 2017).

Different approaches are known about a smart city, but all are mainly oriented towards innovation and the city's administration and infrastructure. Accordingly, a smart city comprises people, processes, and data connected via information and communication technologies (ICT) to solve urban habitability, viability, and sustainability. They are implementing technology advancement within smart city infrastructure results in a place that always remains connected using real-time information. So, the infrastructure represents the nucleus of a city, where the unification and combination of all the metropolis systems make it a smart city (Nam & Pardo, 2011). In this context, the population and the city are interconnected via different ICTs. Hence, all public services are interactive, such as mobility, education, health, and achieve a comprehensive approach to government by raising the quality of life of each inhabitant of the city (Orecchini et al., 2019).

Smart is a term linked directly to innovative solutions for attaining sustainability. Smart cities are expected to solve all urban issues by integrating new technology into the management and operation of cities (Soyata et al., 2019). Thus, smart urban technologies are vital in the smart city agenda for rolling out an intelligent infrastructure along with the cities (Komninos et al., 2019). Furthermore, the rise of digital social media offers different interfaces to facilitate the activities of citizens by adopting them in their daily lives (White & Marchet, 2021)

Governments and organizations have made significant investments in new technologies to pursue social, economic, political, and environmental development, enhance people's lives, and save our planet (European Parliament, 2014; Yigitcanlar, 2016). Then, smart city discourse leads to public policy speech encouraging environmental concerns through big innovative projects (Cowley & Caprotti, 2018). Policy makers acknowledge the potential of smart advances for achieving effectiveness (Giffinger et al., 2007;

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