Chapter 12
The Ethics of Data Collection and Usage in Smart City Infrastructure

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ABSTRACT

The rapid integration of data-driven technologies in urban environments offers significant opportunities for efficiency, sustainability, and citizen well-being, yet it introduces complex ethical challenges. This chapter examines privacy, consent, equity, and algorithmic bias concerns in smart city infrastructures. It highlights the importance of human-centered governance, transparency, accountability, and participatory decision-making. Comparative analysis of global frameworks reveals operational gaps, prompting actionable recommendations including ethics-by-design, stakeholder engagement, technological safeguards, and adaptive governance. By embedding ethics into urban data management, cities can achieve socially equitable, trustworthy, and sustainable smart city development.

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INTRODUCTION

The use of the more advanced digital technologies, such as the Internet of Things (IoT) devices, networked sensors, real-time data solutions, and artificial intelligence systems, is becoming one of the defining features of smart cities. With these infrastructures, urban centres can maximize the circulation of traffic, energy, waste, security, and other required services, boosting the efficiency in the process and raising the quality of life among the citizens (Amy, 2024; Go Green, 2024; Stu, 2025). The smart city data ecosystem is humongous and ever-growing, which includes structured data of municipal records as well as unstructured social media and environmental sensors, and behavioral data of connected devices. It is an intricate network of information that provides unparalleled possibilities of innovation, evidence-based urban planning, but it also creates a variety of ethical issues that should be resolved to guarantee responsible governance (Adepoju et al., 2025; Bibri et al., 2023a).

The contemporary concern that drives the interest in analyzing the ethics of smart cities' data collection and usage can be related to the possible risks of pervasive surveillance (Masha, 2023), data leakage (Bibri et al., 2023b), illegal profiling (Sustainability Directory, 2025), and structural bias (Juvenile Ehwi et al., 2022). The lack of awareness or control of how personal information of individuals is recorded and disseminated, as well as the way it is analyzed, tends to raise concerns about privacy, consent, and ownership of data among citizens (Kim et al., 2025). In addition to personal rights, social aspects are involved: an unfair way to access the services, discriminating algorithms, and posing further emphasis on the preexisting societal disparities (Cowls & Floridi, 2018; Eubanks, 2018). Ethics is not a side issue; therefore, in the design and implementation of technologies in smart cities (Sharon, 2021). These problems can be addressed in advance so that they do not harm people, resulting in the establishment of firm relationships between them and building more socially accepted, inclusive urban spaces (Bayat & Kawalek, 2023; Cardullo & Kitchin, 2019).

The purpose of the chapter is to present a detailed analysis of ethical issues in the practice of smart cities with data and to discuss the guidelines of responsible data governance. It shall look at both positive and negative case studies, assess current regulatory strategies, and note what has been learned over global practice. In such a way, the chapter presents policy-relevant research findings by outlining feasible suggestions to policymakers, urban planners, and technologists with an emphasis on recommendations to produce transparent, accountable, and fair policies in data-driven urban projects. The outcome can be to encourage the development of smart cities, humanistic, and to make the technological innovation act in consonance with the values and the ethical aspects of society.

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