

Chapter 9

Theories, Approaches, and Metrics in Smart, Learning, and Future Cities:

Understanding Urban Life and the Ambient

ABSTRACT

The purpose of this chapter is to explore understandings of urban life and the ambient in smart, learning, and future cities in relation to urban theories, approaches, and metrics. As such, a review of the research literature is conducted in the context of smart cities and regions pertaining to urban theories, methodologies, and metrics. Issues, controversies, and problems emerging from the literature review are highlighted, contributing to formulation of a conceptual framework for theories, approaches, and metrics in relation to urban life and the ambient in smart cities. Using an exploratory case study approach combined with an explanatory correlational design, variables pertaining to the exploration are identified, and the nature of their relationship is assessed. Through the lens of urban theories, approaches, and metrics, urban life and the ambient is explored in smart cities while informing directions for future research and practice.

1. INTRODUCTION

Harrison and Donnelly (2011) point to the instrumentation of smart cities “as a key enabler for new theories of cities.” Schmitt (2015) identifies methodologies for smart cities and future cities such as simulation and experiment. Batty (2020) articulates the notion of high and low frequency cities where change occurs “over very fine time intervals” as in “seconds minutes, hours, days” for the former and “over years, decades, centuries” for the latter with implications for the adapting of theory, approaches, and tools more generally for the understanding of cities and more particularly, smart cities. In response, this chapter is significant in that it seeks to explore urban life and the ambient in smart cities through the

DOI: 10.4018/978-1-6684-4096-4.ch009

lens of evolving theory, approaches, and metrics giving rise to the motivation for this work as described in the objectives below.

Objectives: The main objectives of this chapter are to: a) provide a review of the research literature for urban life and the ambient in the context of smart cities pertaining to theory, approaches, and metrics; b) formulate a conceptual framework for urban life and the ambient in smart cities in relation to theory, approaches, and metrics; and c) explore the relationship between variables in smart cities such as collaborating and data visualizations as factors shedding insight on the evolving of theory, approaches, and metrics in smart environments.

These objectives give rise to the main research question under exploration in this chapter – *Why are tools such as theory needed for understanding urban life and the ambient in smart, learning, and future cities?*

2. BACKGROUND

The notion of innovating metrics for smart cities is advanced by McKenna (2019) as is the proposing of ambient theory for smart cities (McKenna, 2021) in accommodating the aware people and awareness-enabling technologies dimensions of smartness in urban environments and regions. Considerable work has been undertaken by many, such as, the United Nations, European cities, and the International Standards Organization (ISO) on metrics for smart cities as described by the OECD (2020) in the context of measuring the performance of smart cities. Lopes and Rodrigues (2020) explore methodologies for the design, development, implementation, and evaluation of smart cities, proposing a five-phase approach consisting of context analysis, capability assessment, strategy, action plan, and evaluation. Qaed (2020) describes design thinking as an approach to smart cities “to strengthen the human dimension.” Backhouse (2020) develops a taxonomy for smart cities based on the identification of four types of measures “indicator standards, models, composite indices, and other measures” in coming to an understanding of measures, their uses, differences, and potentials.

2.1 Definitions

Definitions from the practice and research literature are provided for key terms used in this chapter.

- **Metrics:** In the context of an online course on smart cities, The Open University (2020) describes metrics as “measurements that are based on a standardised method.”
- **Theory:** Gregor (2006) describes theory as that which is able “to encompass conjectures, models, frameworks, or body of knowledge” adding more recently (2017) that “theory can serve multiple purposes, from sense-making to predicting.”

2.2 Overview

This chapter provides a review of the research and practice literature for urban life and the ambient pertaining to theory, approaches, and metrics, in understanding evolving renderings of smart cities. This review enables the highlighting of key issues, controversies, and problems and the formulation of a conceptual framework for theories, approaches, and metrics in relation to urban life and the ambient

17 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

www.igi-global.com/chapter/theories-approaches-and-metrics-in-smart-learning-and-future-cities/314652

Related Content

Fostering Creativity In The Tech-Start Education

Venkata Reddy Machaand Joseph Ratna Jayakar T. (2025). *Smart Education and Sustainable Learning Environments in Smart Cities* (pp. 207-238).

www.irma-international.org/chapter/fostering-creativity-in-the-tech-start-education/370168

Exploring E-Planning Practices in Different Contexts: Similarities and Differences Between Helsinki and Sydney

Sirkku Wallin, Joanna Saad-Sulonen, Marco Amatiand Liisa Horelli (2012). *International Journal of E-Planning Research* (pp. 17-39).

www.irma-international.org/article/exploring-planning-practices-different-contexts/70080

Technology Use by Urban Local Bodies in India to Combat the COVID-19 Pandemic

Falguni Mukherjee (2021). *International Journal of E-Planning Research* (pp. 109-115).

www.irma-international.org/article/technology-use-by-urban-local-bodies-in-india-to-combat-the-covid-19-pandemic/262512

Entrepreneurship and Innovation in Low-Density Territories: An Overview of the Centro Region of Portugal

João Almeidaand Ana Dias Daniel (2021). *Handbook of Research on Cultural Heritage and Its Impact on Territory Innovation and Development* (pp. 1-18).

www.irma-international.org/chapter/entrepreneurship-and-innovation-in-low-density-territories/266186

The Feasibility of Integrating Wearable Cameras and Health Trackers for Measuring Personal Exposure to Urban Features: A Pilot Study in Roskilde, Denmark

Zhaoxi Zhang, Prince Michael Amegborand Clive Eric Sabel (2022). *International Journal of E-Planning Research* (pp. 1-21).

www.irma-international.org/article/the-feasibility-of-integrating-wearable-cameras-and-health-trackers-for-measuring-personal-exposure-to-urban-features/313181