

Smart Cities

And How to Approach Them Critically¹

The main aim of this briefing paper is to map out the methodological landscape for the critical studies of smart cities and smart city technologies.

The briefing paper will conclude with a mini case study of UrbanSim, an open source urban simulation system, in particular how the earlier versions of the system used a different

The briefing paper will conclude with an example of how certain ideological narratives can find their way into the algorithms by briefly discussing the case of UrbanSim, an open source urban simulation system.

1. Defining Smart Cities

The term ‘smart city’ captures a particular vision of cities that are *“increasingly composed and monitored by pervasive and ubiquitous computing”* and *“whose economy and governance is being driven by innovation, creativity and entrepreneurship”* (Kitchin 2014, p. 1). Although the term ‘smart city’ has been gaining traction in business, government and scholarship since mid 1990s (Cocchia 2014), there is yet no universally accepted definition of the term, with some scholars emphasising the technological (e.g. Sproull & Patterson 2004) and others underscoring the social and communal aspects of smart cities (e.g. Moser 2001). Without privileging one definition over others, it may therefore be operationally useful to interpret the term ‘smart cities’ as referring to a multifaceted phenomenon (e.g. Nam & Pardo 2011), involving, among others, *social-communal, social-epistemic, technological and institutional* dimensions:

- **Social-communal aspect:** Smart cities consist, first of all, of communities of people, where urban life is organised through practices enacted by ‘smart’ people, such as innovators and entrepreneurs. E.g. *“smart communities”* (Coe et al. 2001), *“creative class”* (Florida 2002).
- **Social-epistemic aspect:** Smart cities involve the creation and use of ‘smart’ knowledge about urban and social processes through analyses of various kinds of data and information. E.g. *“knowledge city”* (Edvinsson 2006; Yigitcanlar 2008), *“information city”* (Sairamesh 2004; Sproull 2004).

- **Technological aspect:** Smart cities are increasingly composed of and enabled through ‘smart’ technologies, such as information and communication technologies and networks, software algorithms, data analytics tools, etc. E.g. *“digital city”* (Anthopoulos 2005), *“wired cities”* (Dutton 1987).

- **Institutional aspect:** Smart cities are governed through administrative rules, norms and practices that are technologically intelligent and flexible. E.g. e-governance for smart cities (Coe et al. 2001), e-cities and the rule of law (Eger 2010).

2. A multi-perspectival approach to smart cities

Smart cities being multi-dimensional phenomena, a critical study of such cities would correspondingly require a *multi-perspectival* critical approach that can appropriately address the various facets of such cities. Thus, for instance, the technological aspect of smart cities can be studied from the engineering-design perspective, whereas the institutional aspect can be approached from the political-economic or critical-legal perspectives. In this briefing paper, I propose the following four perspectives as highly pertinent to the critical study of smart cities:

- (1) Engineering-design perspective;
- (2) Political-economic perspective;
- (3) Political-normative perspective;
- (4) Critical-legal perspective.

In what follows, I expound on each of the above perspectives, as well as propose different methods and approaches for each of these perspectives.

2.1. Engineering-design perspective

This perspective looks at how various values, norms and narratives become embedded in or embodied by the hardware devices and software applications underpinning smart cities, with particular attention to the role of engineers, innovators and other stakeholders in such processes. A critical study of smart cities from the engineering-design perspective might employ approaches and methods extant in the engineering design, computer ethics and communication and media studies – approaches such as *value sensitive design*, *disclosive computer ethics* or *critical discourse analysis*. Let us briefly consider them one by one.

Value Sensitive Design (VSD) is a philosophically grounded approach to the engineering and design of technological artefacts and systems that takes account of *“human values in a principled and comprehensive manner”* (Friedman et al. 2008, p. 69). VSD consists of a tripartite methodology, consisting of *conceptual, empirical, and technical* inquiries. *Conceptual* investigations aim to ascertain the values implicated in the design in question and the way in which competing values should be traded off in the said design process. *Empirical* investigations consist of observation,

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measurement and documentation of the human context in which the technical artefact will be situated. *Technical* investigations can, on the one hand, focus on how existing technical properties can support or hinder certain human values, and, on the other hand, involve a proactive design and engineering of technologies to support the values identified in the conceptual stage of investigations. These three levels of investigations can be iterative, insofar as designers are allowed to modify their products in a continuous and ongoing manner.

Disclosive Computer Ethics (DCE) is the name proposed by Brey (2000) for a family of recent approaches in computer ethics – approaches that are mainly concerned with “*the moral deciphering of computer technology*” (Brey 2000, p. 11). Such disclosive approaches distinguish themselves from mainstream computer ethics and traditional applied ethics in two different respects: first, disclosive approaches aim to uncover moral issues in computing that are not yet recognised as such; and second, disclosive approaches focus on the design features of computer technology. Disclosive approaches in computer ethics are thus “*concerned with disclosing and evaluating embedded normativity in computer systems, applications and practices*” (Brey 2000, p. 12). In this manner, the main contribution of disclosive approaches to computer ethics is not so much found in the development or application of ethical theories, but instead in revealing the moral relevance of computer technologies and related practices.

Critical Discourse Analysis (CDA) is a name for a family of approaches in the social sciences that employ linguistic analysis as a method for studying social change. Discourse analysis has emerged out of the recognition that social changes are invariably accompanied by linguistic changes (Fairclough 1992). Following the dictum that

Critical discourse analysis (CDA) is a type of discourse analytical research that primarily studies the way social power abuse, dominance, and inequality are enacted, reproduced, and resisted by text and talk in the social and political context. With such dissident research, critical discourse analysts take explicit position, and thus want to understand, expose, and ultimately resist social inequality.

The above described approaches and methods

2.2. Political-economic perspective

How various business, civic and political interest groups, alone and in their interactions with one another, affect and shape smart city markets, smart city initiatives and smart city projects? In studying the political economic landscape of smart cities, one might employ the

2.3. Political-normative perspective

This perspective critically focuses on the extent to which various smart city initiatives and projects create and remove economic, social and political inequality among urban populations. In doing so, it can critically evaluate the extent to which different smart city initiatives and projects conform to the normative political ideals of equality, justice, freedom, and democracy.

2.4. Critical-legal perspective

What is the legal, regulatory and administrative context of particular smart cities and how they influence, enable or constrain different smart cities initiatives and projects?

Striking the right balance between theory and practice

The chief recommendation for conducting critical studies of smart cities and smart city technologies is to strike the right balance between the theoretical, empirical and practical components of such critical studies. As is often the case, critical theoretical studies of smart cities might be lacking in terms of engagement with empirically driven and policy oriented studies. Whereas empirical studies of smart city might be factually rich but not philosophically grounded. For these reasons, it is important to bring together theory and practice in a coherent unity, by striving for empirically-informed critical theories and philosophically grounded practical and policy guidance and recommendations... One of the principal reasons why one-size fits all narratives and canonical examples dominate present academic accounts is the lack of in-depth empirical case studies of a range of smart city developments and comparative research of similar initiatives in different locales...

how the discursive terrain of a smart city is fashioned in local and regional context;

how the rhetoric deployed dovetails with or diverges from other economic and governance initiatives designed to refashion the city;

how specific initiatives are formulated and draw on and adapt arguments from elsewhere;

how initiatives gain political and financial backing, negotiate local and national policy debates and unfold over time;

the ways in which initiatives are rolled out in practice and are fractured and reworked in the messy realities and politics of implementation and contestation;

how different initiatives, led by a plethora of stakeholders, work together or compete to produce a certain kind of smart city;

what the effects of different techno-social arrangements are on urban systems, economic sectors and populations;

the extent to which initiatives create or perpetuate inequalities between communities;

how initiatives are evaluated and their costs and benefits communicated to the public.

the production of software underpinning smart city technologies and how software developers translate rules, procedures and policies into a complex architecture of interlinked algorithms that manage and govern how people traverse or interact with urban systems.

the political economy of smart city technologies and initiatives; the creation of smart city markets; the interrelation of urban (re)development and smart city initiatives; the relationship between vendors, business lobby groups, economic development agencies, and city administrations; financialization and new business models; or,

the relationship between the political geography of city administration, governance arrangements, and smart city initiatives; political and legal geographies of testbed urbanism and smart city initiatives; smart city technologies and governmentality; or,

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Further reading:

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