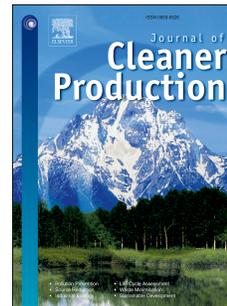


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Smart cities: Under-gridding the sustainability of city-districts as energy efficient-low carbon zones

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# SMART CITIES: UNDER-GRIDDING THE SUSTAINABILITY OF CITY-DISTRICTS AS ENERGY EFFICIENT-LOW CARBON ZONES

## Abstract

This paper reviews the literature on smart cities. Offering a critical synthesis of the material, it advances a Triple Helix inspired account of smart cities as future internet-based developments. In particular, as future internet-based developments covering the digital infrastructures, data management systems, renewable energies and cloud computing of a regional innovation in the Internet of Things (IoT). More specifically, as a regional innovation in the IoT that covers the morphology of urban extensions, infill and mass retrofits, which smart cities call for the development of. Focusing on the metrics of mass retrofit proposals, the paper also serves to demonstrate how the urban morphology of such regional innovations matter in the sense they tell us that being aware of the considerable energy savings and CO<sub>2</sub> reductions, which IoTs offer cities to be smart, is not enough. Not enough, because without knowing whether the costs and benefits under-gridding the sustainability of city-districts are shared equally, it is impossible to say if the 65% energy saving and 78% reduction in CO<sub>2</sub>, attributed to the data collection, information processing and smart (micro) grids of mass retrofits is socially just. The paper suggests that in order to verify this, it is necessary for smart cities to first baseline the social-demographic structure of retrofit proposals. Then draw upon the environmental profile this evaluation generates to assess whether the regional innovation creates the wealth needed to under-grid the sustainability of city-districts. Under-grid the sustainability of city-districts as the energy efficient-low carbon zones of an inclusive growth strategy seen to be socially just. Seen to be socially just, because the costs and benefits underlying the 1.5 hectare ecological footprint that surfaces from this regional innovation are equally appropriated as the proceeds of a wealth creation, which contributes to the resilience of city-districts as energy efficient-low carbon zones. As energy efficient-low carbon zones, whose inclusive growth strategy also emerges as a post-carbon economy claiming to be climate neutral.

Keywords: smart cities, legacy systems, digital infrastructures, data management systems, renewable energies, internet of things, regional innovation, urban morphology, under-gridding, city-districts, sustainability, mass retrofit, energy efficient-low carbon zones.

## 1. Introduction

This paper shall summarise the findings of a literature review on smart cities and go on to provide an overview of the critical insights it offers into the metrics of a future internet-based development promoted by Manchester, Amsterdam, Malmö and Barcelona to under-grid the sustainability of city-districts. That type of sustainable city-district, which London, Stockholm, Rome, Vienna and Hamburg are also in the process of developing as energy efficient-low carbon zones.

Against this backdrop, the paper goes on to examine the digital infrastructures, data management systems and renewable energies underpinning the mass retrofitting of Hackbridge (a suburb in the London Borough of Sutton) as a city-district. In particular, as the city-district whose digital infrastructures, data management systems support future internet-based developments on the grounds the cloud computing and IoT they found, constitute the governances of a smart, sustainable and inclusive growth strategy. Constitute the governances of a growth strategy that is not only smart in getting the cloud computing of an IoT to support future internet-based developments, which under-grid the sustainability of city-districts as energy efficient-low carbon zones, but that also holds out the prospect of creating wealth from a regional innovation, which is inclusive.

## 2. Literature review

Reporting on the findings of a bibliometric analysis, de Jong et al. (2015:34) state:

*"...the category 'smart city' has proven particularly popular not only among adopting cities, but also among large engineering firms, because it offers concrete innovation and investment opportunities for physical urban and infrastructure development. It promotes engineering system solutions".*

Deakin (2011, 2013, 2014) and Deakin et al. (2012a, 2012b, 2014) also examine the popularity of the "concrete innovation and investment opportunities" smart cities offer in terms of "physical and infrastructural development". Here, the analysis progresses not by way of a bibliometric analysis, but literature review and critical synthesis of the emerging accounts of smart cities this captures. In particular, that literature, which

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