'Developing a Critical Understanding of Smart Urbanism'?

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Abstract

Smart Urbanism (SU) is emerging at the intersection of visions for the future of urban places, new technologies and infrastructures. SU discourses are deeply rooted in seductive and normative visions of the future where digital technology stands as the primary driver for change. Yet our understanding of the opportunities, challenges, and implications of SU is limited. Research in this field is in its infancy, fragmented along disciplinary lines and often based on single city case studies. As a result, we lack both the theoretical insight and empirical evidence required to assess the implications of this potentially transformative phenomenon. Given the significant implications of SU there is an urgent need to critically engage with why, how, for whom and with what consequences SU is emerging in different urban contexts. The aim of this review is to unpack the different logics and rationales behind SU discourses and proposals, and in this way understand the ways by which imaginaries of urban futures are currently being constructed along with their socio-technical and political implications for future research priorities. The paper is structured in 4 sections. First, an overview of the recent research literature on smart urbanism identifying the need for a more critical assessment of the phenomena. Second, a review of the key challenges involved in developing a critical research agenda and what is required to addresses these. Third, identifying three research themes that could constitute a critical agenda. Finally the conclusion focuses on three new future research priorities: the development of ways of theorizing and conceptualising SU, an examination of its normative nature and of the extent to which alternative understandings of the city can be developed through SU, and the advancement of a comparative approach around the multiple and varied practices around SU.

Key words: Smart, urbanism, cities, digital, critical

1. Introduction

Smart Urbanism (SU) is emerging at the intersection of visions for the future of urban places, new technologies and infrastructures. Promoted by international organisations, the corporate sector, and national and local governments alike, the dominant vision is of the meshing of interactive infrastructure, high-tech urban development, the digital economy and e-citizens. SU discourses are deeply rooted in seductive and normative visions of the future where digital technology stands as the primary driver for change. SU, it is argued, provides a flexible and responsive means of addressing the challenges of urban growth and renewal, responding to climate change, and building a more socially inclusive society (European Commission, 2012). Yet our understanding of the opportunities, challenges, and implications of SU is limited. Research in this field is in its infancy (Caragliu et al., 2011; Luque, 2014; Luque et al., 2014), fragmented along disciplinary lines (e.g. Hollands 2008) and based on single city case studies (Mahiznan, 1999; Mejia et al., 2011). As a result, we lack both the theoretical insight and empirical evidence required to assess the implications of this potentially transformative phenomenon. Given the significant implications of SU there is an urgent need to critically engage with why, how, for whom and with what consequences SU is emerging in different urban contexts.

This commentary draws on a synthesis of the presentations and discussions of the international workshop *Smart Urbanism - Utopian Vision or False Dawn?* funded by the Urban Studies Foundation as part of its Urban Studies Seminar Series[1]. The aim of the workshop —hosted by Durham University in June 2013— was to unpack the different logics and rationales behind SU discourses and proposals, and in this way understand the ways by which imaginaries of urban futures are currently being constructed along with their socio-technical and political implications. It involved the participation of over 20 scholars from universities in Europe, the United Kingdom, South Africa, Brazil, Australia and the United States and 4 practitioners working in organizations —both with the public and private sector— delivering smart initiatives in different urban contexts. The workshop challenged participants to explore the implications of the

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[1] The final report of the conference is available at: http://www.urbanstudiesfoundation.org/wp-content/uploads/2011/10/Smart-Urbanism-Report-FINAL.docx (accessed July 2014)

deployment of smart technologies and discourses in the city, their possible splintering or integrating nature, their real potential for the delivery of the promise, and the possibility of imagining alternative urban futures through SU means. This task required a strongly interdisciplinary approach and comparative assessment.

The rest of this paper is structured in 4 sections. Section two provides an overview of the recent research literature on smart urbanism identifying the need for a more critical assessment of the phenomena. Section three identifies the three key challenges involved in developing a critical research agenda and what is required to addresses these. Section 4 identifies three research themes that could constitute a critical agenda. Section 5 concludes by identifying three future research priorities.

2. Critical Gaps in Understanding Smart Urbanism

A new language of "smartness" is reshaping debates about contemporary cities, along with a new set of programmes and practices that are intent on realising smart urbanism. This is visible in, for example, the importance given to 'smart cities' in the EU Strategic Energy Technology Plan (European Commission, undated), the prolific development of 'smart city initiatives' in Asia, Australia, the US and elsewhere (e.g. EPRI, 2012; SmartGrid.gov, undated), and the emergence of dedicated teams aimed at developing business opportunities in SU projects within global engineering, telecommunications and utilities companies such as IBM, Cisco, Toshiba, Google, General Electric, Hitachi and others (Luque, 2014). SU is projected, often following normative or teleological approaches, as a futuristic solution brought to the present to deal with a broad multiplicity of urban maladies, including issues of transport congestion, resource limitation, climate change and even the need to expand democratic access, amongst others.

Taken together, these new drivers and programmes are creating a new lexicon through which the development of (smart) cities is being forged —urban apps, big data, intelligent infrastructure, city sensors, urban dashboards, smart meters, smart buildings, and smart grids. While often radically different in ambition and scope, the

shift from conventional to smart logics is accompanied by new expectations of network flexibility, demand responsiveness, green growth, new services, and connected communities. These expectations, in turn, are driving investments and reshaping policy priorities leading to the accelerated rollout of SU globally.

Yet, the potential, limitations and broader implications of this transformation have seldom been critically examined. Existing research in the field has focused on the technical, engineering and economic dimensions of smart systems (Jamasb and Pollitt, 2011; Bakıcı et al., 2013; Alawadhi et al., 2012; Wade et al., 2011). This research tends to have a 'problem solving' focus, concerned with achieving optimal outcomes for smart systems under current technical, political and market conditions (NEDO, 2011; Kanter and Litow, 2009; Leydesdorff and Deakin, 2011; Batty et al., 2012), with limited critical analysis (Hollands, 2008). Whilst urban studies has a long tradition of critically examining the interface between space and digital technologies (Graham, 2002; Graham and Marvin 1999; Boyer, 1992; Crang, 2010; Crang and Graham, 2007; Thrift and French, 2002), and information studies has targeted the city as one of its key domains of study (Forlano, 2009; Foth, 2009; Galloway, 2004; Middleton and Bryne, 2011), narratives and practices around notions of 'smartness' have been largely absent. In this context a limited number of practitioners and scholars are starting to question the problem-solving powers of 'smart', by asking questions around democracy and citizenship (Townsend, 2013; Greenfield, 2013; Halpern et al., 2013), drawing attention to the specific mechanisms through which code operates (Kitchin and Dodge, 2011), pointing to the risks of big data and a city with 'sensory capabilities' (Thrift, 2014a; 2014b; Klauser and Albrechtslund, 2014) and examining how smart rationalities and techniques alter contemporary functionings of power, space and regulation (Klauser, 2013). More recently, scholars working on the interface between politics, life and the environment —drawing on post-structuralist thinking and often outside the world of urban geography— have been examining the ways in which the material manifestations of such smart logics (through, for example, the ubiquity of environmental sensors and dashboards) are transforming modes of governing both the city and society as a whole (Braun, 2014; Gabrys, 2014).

We argue that, with the notable exception of some of the works cited above, current understandings of SU lack a critical perspective compounded by an undue emphasis on

technological solutions that disregard the social and political domains. As evidenced by the analysis of multiple other design-based and techno-utopian interventions in urban systems, such as grid-based infrastructures (Hughes, 1983; Nye, 1999; Graham and Marvin, 1999, 2001), modernist urban planning (Sandercock, 1998) and new urbanism (Harvey, 1997), the urban plays a critical role in shaping, translating, and contesting the desired —and often failed— transformation. Urban studies' scholars have previously alerted us of the extent by which contemporary understandings of the city have tended to neglect the material, technological and environmental dimension (Monstadt, 2009). In response, there is growing interest in the political ecologies and cyborgian nature of cities (Gandy, 2005; Heynen et al., 2006) as well as in the social and political dynamics of infrastructure, urban sustainability and low carbon transitions (Bulkeley et al. 2011; Hodson and Marvin, 2010; McFarlane and Rutherford, 2008). These perspectives, when viewed through the lens of the claims enacted by SU, highlight the need for a more in-depth examination of the manner in which the transformational potential of SU is created. Such claims and potential, fundamentally produced with and through digital technologies operating under specific political rationalities and governmental techniques (Klauser et al., forthcoming), currently remains beyond the reach of social science (Hudson, 2011).

Within this context, a critical assessment of SU is needed. From one perspective, SU may serve to further deepen the splintering of urban networks that dominated the last part of the twentieth century for many cities, creating deep divides between those with access to 'smart' and those without (Datta, forthcoming). Alternatively, in some guises, SU may serve to promote more 'community', 'civic' or 'metropolitan' forms of service provision and urban life (SENSEable City Lab, undated; Map Kibera, undated). Beyond this, smart might be interpreted as yet another strand in the consolidation of dominant circuits of capital and a neoliberal governmentality (Vanolo, 2013) or as a new governmental form altogether (Gabrys, 2014). Internationally comparative research is critical in order to develop a nuanced understanding of how and why this varies across urban contexts. Understanding these processes will enable us to consider the current trajectories of SU and to examine what is the potential for SU in cities where it has yet to

become established. The limits of current disciplinary approaches mean that addressing the critical challenges of SU cannot be achieved without a step-change in thinking.

3. Developing a Critical Agenda?

In developing a response to these gaps in the existing research landscape there are three key challenges. First, to develop an interdisciplinary conceptual approach for the analysis of SU. This means examining how SU is currently conceptualised within the sciences and social sciences, identifying areas for agreement, dialogue and dissent. And from this, considering what theorisations of the co-constitution of social and technical systems offer for the conceptualisation of SU. Second, to analyse the social and political implications of implementing smart logics —both materially and discursively— and examine how specific urban conditions enable and constrain SU transitions, and to co-produce alternative pathways. Understanding the potential and implications of the transition to SU, and the possibilities for creating more sustainable and socially inclusive pathways, requires the intensive examination of how SU is produced and reproduced in particular urban contexts. Third, to generate new knowledge about the forms, dynamics, and consequences of SU in an internationally comparative context. Existing work on SU is in its infancy, confined to particular disciplines and single cases. There is a lack of comparative analysis and a dearth of knowledge about the range of urban contexts within which SU is emerging. Far from being passive backdrops, cities variously complicate, enable, disrupt, resist, and translate SU.

Our ambition in the *Smart Urbanism - Utopian Vision or False Dawn?* workshop was to explore the challenge of re-conceptualising SU as co-produced through social and technical systems —and develop a critical analysis of the dynamics and consequences of these entangled relations. To this end, the programme adopted a radically synergistic interdisciplinary, internationally comparative and collaborative approach. A structured approach was followed to identify potential speakers: following from previous work mapping the dynamics of smart city initiatives worldwide (Luque and McFarlane, 2011; Luque, 2014), we undertook a secondary literature review and web search to identify potential participants. This process revealed the following. First, there is a very small

cadre of researchers who look at SU from a critical or reflexive perspective and these are highly fragmented across disciplines and across different geographical contexts. Second, most researchers working on SU, from academics to staff members of think tanks and consultancy firms, often tend to reflect the needs and interest of the developers of the technological infrastructures and software that supports smart urbanism — tech companies, software houses, engineering consultancies and companies interested in the scale of the market. Finally, there are a wider set of societal interests that are not currently being involved or engaged in the industry led conferences and workshops that reflect current practice.

Most of the existing debate on SU is primarily undertaken by a relatively exclusive set of commercial, technology and policy interests who are promoting the idea and vision of SU as inherently transformational and positive. Stepping away from such dominant approach, the workshop sought to enlarge the set of participants and the nature of the debate around SU and its implications. Consequently, there were three critical deficits that needed to be addressed; the theorisation of smart; an understanding of the politics of its implementation; and the tensions and possibilities of normative and alternative agendas. This meant developing critical abilities within SU thinking, engaging directly with the distinctive specificity of cities in the global North and South, and furthering the engagement of the reflexive mainstream in the identification and production of alternative agendas. In order to highlight and engage a variety of relevant and often silent voices on SU —such as those resisting or developing unconventional approaches— we identified researchers as well as organisations and campaigns resisting and contesting SU, alongside communities, developers and artists working on alternative models.

4. Emerging Themes and Contemporary Issues

Together through dialogue and discussion this wider community of social science and technology researchers, alongside representatives from a large technology company, urban local government and an environmental NGO, identified three themes that could constitute a critical agenda.

4.1 Critical abilities and knowledge

Unpacking 'smart' starts with the development of an overview of the key debates and players involved in the development of SU strategies —in particular the key role of coalitions between cities and ICT companies. This requires placing particular attention on the urban implications of a multiplicity of 'coded objects' and 'coded infrastructures' (Kitchin, 2014). The discussion around these implications goes beyond traditional academic subjects within the IT-urban interface, such as urban surveillance and the promise of real-time analytics, touching upon debates around the role of the smart city in an era of austerity, the ways by which data —rather than materiality— shape the city (Shepard, 2014), and the presence of mainstream as well as alternative ways in which smart urbanism is being rolled-out in practice in cities, by communities and across infrastructural grids (Luque et al., 2014). New research abilities are likely to be required for critically unpacking the emerging broad trends within the field of SU, such as the role of social media in the constitution of smart cities, the emergence of digital mechanisms for the establishment of forms of accountability in urban service provision, and the challenges associated with the acceptability of smart technologies amongst the public.

Inevitably, advancing a critical agenda around SU involves embracing the tensions between corporate perspectives and critical research on smart cities. Critical research perspectives are increasingly focusing on the claims being made by corporate smart city initiatives, in particular highlighting the rather narrow range of stakeholders involved, the focus on economic and market making as opposed to wider social or environmental priorities, the claims of transformation that would result from technological applications and the attempt to lock-in cities around selected proprietary technologies (Söderström et al., 2014; McNeil, forthcoming). Yet, as discussed throughout the workshop, representatives from the user and developer communities counter these views by arguing that, within the corporate sector, there is much more uncertainty about how smart might be developed, what role it should play in corporate strategy and what its potential benefits and profitability are in an urban context. Rather than the smart agenda being closed and locked-in to a particular logic of development, there is the need for a more experimental character and companies involved in the roll-out of

SU are still learning about whether it is possible to develop the urban sector as a viable market segment. These tensions point to how there is no wider societal (or research) context within which the uncertainties and risks associated with smart urbanism are being identified and discussed, and instead these are largely taking place separately inside research forums and corporates.

4.2 Politics of the implementation of smart

Understanding the politics of the implementation of smart requires exploring how the smart city is constituted discursively, techno-materially and spatially. Discursively, SU is constructed through the constitution of technology as an obligatory passage point (Söderström et al., 2014), and the development of a new moral order through technological parameters (Vanolo, 2013). It would be a mistake to assume that all SU discourses are the same. For example, the different rationalities underpinning SU (e.g. IBM vs. Google) are likely to embed different approaches to the interface between 'smartness' and citizenship (McNeill, 2013), uncovering a differentiated politics of 'smart'. Spatially, SU is underpinned by a combination of decentralization and centralisation, with the emergence of new nodes of control such as highly specialised control rooms (Gordon et al., 2013). Here it is possible to identify the dominance of a particular representation of smart urbanism around future paths and promises. Such populist utopian scenarios are unhelpful, as they miss the socio-political dimensions of smart urbanism and overlook how emerging narratives of the city are aligned towards particular techno-entrepreneurial interests (Hollands, forthcoming). There is an underlying assumption that SU implies changing dynamics of power. Yet, in private, corporate stakeholders involved in developing smart urbanism, rather than speaking about promises, manifest concerns about risks, uncertainties and the limited potential of alternatives. This evidences clear contradictions and tension in how smart technologies are being mobilised.

Part of neo-liberal project BUT – multiple trajectories, resistance, alternatives…

4.3 An understanding of smart across contrasting geographies

Finally, a critical research agenda around SU demands exploring the different ways in

which its rationalities, techniques and subjectivities are being rolled-out across contrasting geographies. This approach calls for a specific understanding of how smart logics configure space, discussing the broad ways in which SU projects relate to urban form (Wigg, 2013). But beyond such major interventions, it also deems querying the intricate and minor ways in which such SU shapes everyday life and constitutes unexceptional and quotidian spaces in the city (Shepard, 2014). Whilst notions of optimization and risk avoidance tend to play a key role in the rollout of SU, not all forms of SU respond to such drivers. SU technologies play a role in enabling digital connectivity and, through this, the development of a digital geography of the city (which ranges from Internet access to e-governance, amongst others). Community stakeholders often embrace SU for a variety of purposes beyond an incessant search for efficiency, including the deployment of art installations that operate as digital monitoring devices for resource quality and consumption (Calvillo, 2012) and the appropriation and enjoyment of public space through digital gaming (Invisible Playground, 2014).

At the same time social media and apps may also misrepresent or hide the social geography of the city. For example the greatest number of tweets about hurricane Sandy came from Manhattan with its high level of smartphone ownership and Twitter use. This created the false assumption that Manhattan was the nexus of the disaster while few messages originated from the much more severely affected locations. In another example the city of Boston released the Streetbump app, that utilises the functionality of smartphones accelerometer and GPS to passively detect and report potholes to the city[2]. Yet people in lower income groups are less likely to have smartphones for the elderly penetration rates can be as low as 16%, excluding inputs from significant parts of the population. As Crawford argues the data does not accurately reflect the social world and instead there "are significant gaps, with little or no signal coming from particular communities"[3].

Such geographically orientated line of research is of particular importance when considering SU as a global phenomenon. SU logics extend across the global North and South, yet, with limited exceptions (see Odendaal, 2006; Datta, forthcoming), there is a

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[2] See http://www.cityofboston.gov/DoIT/apps/streetbump.asp

[3] See http://blogs.hbr.org/2013/04/the-hidden-biases-in-big-data/

limited understanding of the different ways in which SU agendas are being rolled out in cities of the global South. Yet existing work on ICTs and Smart in the global South already raises questions around the apparent fit between development priorities and the smart agenda. In a South African context Odendaal (2006) has demonstrated the complex ways in which digital technologies have unexpected consequences that can also reinforce existing social disparities. The rollout of smart technologies may further exacerbate these tendencies associated with digital and mobile technologies. While in more recent work on the early development of the 100 cities smart programme in India Datta shows how the first mover city of Dholera exemplifies a new model of entrepreneurial urbanism with only a weak commitment to enhanced social justice (Datta, forthcoming) [4].

5. Conclusions: Future Research Priorities

This paper has focused on a wider set of critical debates about the potential development and societal implications of smart urbanism. We have grouped these together within three particular sets of issues that deserve further inquiry through a critical research agenda: the development of ways of theorizing and conceptualising SU, an examination of its normative nature and of the extent to which alternative understandings of the city can be developed through SU, and the advancement of a comparative approach around the multiple and varied practices around SU.

5.1 Conceptualise and theorise
Rolling out SU is fundamentally a political exercise. Smart urbanism operates through strategic economic interests and everyday social practices to facilitate place specific ways of the control and regulation of increasingly fragmented cities and unequal societies. Central to understanding this project is the need to explore the creation of new smart subjectivities conducive to the demands of the neo-liberal city. To unpack this political nature, an innovative set of theoretical frameworks is required, examining how the knowledge and expertise on smart urbanism is being constructed through specific contexts with a particular history and mediated through specific institutions

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[4] See also http://www.theguardian.com/cities/2014/apr/17/india-smart-city-dholera-flood-farmers-investors

and power relationships. Of particular relevance are approaches that can help analysing the interrelationships between new technologies, socio-technical infrastructures, economic competiveness, ecological resources and flows as well as urban politics and social justice. The 'promises' of flexibility, control, growth, transformation etc. offered by smart urbanism have the potential to reshape the future priorities of urban governments. An emerging set of detailed conceptual work is needed to illustrate how smart technologies —data analysis, software systems, networked infrastructure and new digital systems such as sophisticated control and pricing technologies— are used to more intensively unbundle and rebundle users, space, services and networks. Further conceptual and empirical work is needed to examine what political rationalities are embedded within such responses, and which stakeholders are excluded from the future 'smart city'.

5.2 Normative alternatives

The second proposed line of inquiry calls for an exploration and interrogation of the purposes of smart urbanism through an engagement with its normative nature and the possibility of constructing alternatives. At first sight, an analysis of the differential logics of smart urbanism indicates the presence of 'dominant' ('top-down', formal or supply based) vs. 'alternative' ('bottom-up', informal or demand-based) discourses and approaches. Dominant logics are characterised by a rather select and exclusive group of institutions, often more supply orientated, usually concerned with growth and economic priorities and more formal modes of social organisation. But the future possibilities associated with these responses are uncertain and potentially transformative. The strategies of governing through smart citizenship are open, experimental and potentially modifiable – they can be refused or reversed by citizens and potentially redirected through new forms of urbanism. While corporate and municipal interests are developing smart citizens who are constructed as subservient to individualised and marketised social relations there are also other forms of SU is being rolled out through a multiplicity of dispersed and disconnected initiatives under the initiative of communities, ad-hoc volunteer groups and local organizations. Examples of this abound, including the rise and fall of amateur Wi-Fi networks providing free Internet access (Powell, 2011), community organizations using big data "to build an economy of information more open to civic intervention" (Couldry and Powell, 2014: 1),

attempts to bypass traditional commercial digital connectivity through user generated fixed-line broadband (Middleton and Bryne, 2011) and the informal establishment of digital sensors in urban infrastructure towards civic uses (Shepard, 2014). Thus, alternative responses are characterised by a much more diverse and inclusive group of participants, often more user or demand focused, concerned with a wider set of social and environmental priorities and with more informal modes of social organisation. However, despite differences in who is involved and their priorities, an in-depth analysis reveals much closer similarities in the smart technologies, techniques and rationalities underpinning both dominant and alternative approaches. The distinction between these two categories is often subtle, as, in practice, the landscape of SU does not follow black and white logics. Rather, it is a case of 'middleware'. Given the presumptions built into smart software, it is worth asking whether there are significant differences between dominant and alternative approaches given their use of similar technological platforms, working techniques and thinking rationalities. In practice, community involvement in SU shows that notions of 'top-down' and 'bottom-up' do not adequately reflect the complexity of issues at play. Rather than idealising such alternative modes, critical research needs to examine the challenges associated to forms of SU from the bottom-up and the risks and opportunities of sustaining informal modes of SU, whilst interrogating the very rationalities giving rise to such alternatives.

5.3 A comparative approach

Furthering the development of an analytical framework for SU requires a wider discussion around the potential interactions and crossovers between contrasting SU logics across geographies. Most of the research discussed in this commentary took a specific view of one single domain of smart —focused either on individual case studies or specific approaches, often in significant depth. Work has not focused on the wider landscape of SU across locations and perspectives. There is a need to explore the contradictions of smart urbanism, its differential expression across global North and South, and the potential this creates to develop more oppositional, contested forms of knowledge and subjectivity that emerge from these contexts. While the dominant logic of smart is designed to test and explore the creation of smart subjectivities conducive to the demand of the neo-liberal city this is complex and does not take place in a linear and manner. Neoliberalism in practice is far from uniform in time and space and varies in

its responses through hybrid formations that are clearly conditioned by geopolitics but also particular local contexts and existing urban trajectories. Consequently, an agenda around how these relationships might be understood is needed for a critical understanding of SU — for example, did alternatives provide a context for experimentation and testing that might be upscale and developed in formal approaches? Who is developing the capacity for wider societal learning about the implications of smart experimentation? What sort of intermediaries could develop the capacity and knowledge for developing active and configurational transitions? A dialogue about the multiple ways in which SU is being imagined and enacted, taking place in different urban contexts and aiming for a systematic comparison of SU, would be a significant step in this direction.

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