# Varieties of smart urbanism in the UK: discursive logics, the state, and local urban context

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## Abstract

The paper analyses the varieties of smart urbanism to be found in the contemporary urban landscape in the UK. In so doing, it builds on and extends two currently dominant sets of critiques of the smart city: those that call into question its technocratic and top-down modes of governance, and those that describe the smart city as an empty signifier. The paper makes sense of the UK's variegated local smart urban practices, by tracing the emergence of a national, state-led cultural economy of smart urbanism. Based on an analysis of smart city programmes in 34 UK cities, we identify two broad discursive logics through a national variation of smart urbanism is produced and performed. First, the invocation of *crisis* forms a discursive foundation on which place-specific logics are based. Second, a set of what we term *variegated logics* are differently combined to build on the 'foundational story' of crisis, in the construction of local smart agendas. We discuss three of these variegated logics: the city portrayed as *technological simulacrum*; the focus on specific *sectoral* activities; and a *chameleonic* tendency to envelop previous eco-urban agendas into smart urbanism. The critical questions raise by these UK-specific logics demonstrate the value of considering particular multi-scalar constellations of smart urbanism through a cultural economy lens.

**Introduction**

It is increasingly popular to think about the urban future through the lens of smart city policies and imaginaries. However, the smart city has also been criticised as a temporary rhetorical device (de Jong *et al.* 2015), or an empty signifier (Davidson 2010). The question arises of how to theorise and analyse the processes through which a nebulous concept such as smart urbanism can lead to tangible urban materialities. We understand smart urban discourses as constitutive of emergent urban materialities: as Kong and Woods (2018, 698) highlight, smart urbanism is, 'in its abstract form, […] a discursive construct that will morph over time and space; in its applied form, it is an urban response to the digital era.' We acknowledge both of these (discursive and practical) aspects by tracing the emergence of a cultural economy of smart urbanism in the UK, identifying some ways in which it is discursively performed at local level in response to state-led steering. Making the discursive logics of this cultural economy visible opens up space for debate over the nature and purposes of smart urbanism-inflected visions of the urban future. Specifically, it highlights the key role of three intertwined factors: the use of notions of crisis as springboards for policy, the enduring role of the state in stimulating local (smart) urban development, and the importance of city-specific context when considering the translation of smart urbanism into local realities.

Smart urbanism is understood, here, as an increasingly dynamic relationship between cities, the market, governance arrangements (at various scales) and data (Leszczynski 2016). It has been the focus of significant institutional and corporate activity in the UK. In 2013, the UK's Department for Business, Innovation and Skills (DBIS) identified the smart cities market as a national strategic economic development opportunity (DBIS 2013), and commissioned the British Standards Institute (BSI) to produce a smart cities standard (Joss *et al.* 2017). Organisations with more specific remits have emerged, such as the smart ticketing-focused

Smart Cities Partnership, founded in 2013 (Smart Cities Partnership 2016). Professional Service Provider (PSP) corporations in the sector include global law firm Osborne Clarke, describing itself as 'the smart cities law firm' (Osborne Clark 2016). New industry bodies include SmarterUK, representing smart technology firms as part of the techUK grouping of 900 companies (techUK 2016). Meanwhile, as of 2018, three UK universities run smart city-specific Masters programmes, and another seven institutions offer programmes in related areas (such as urban analytics and the Internet of Things, or IoT). Far from constituting a disembodied vision, the 'UK smart city' describes a fluid assemblage of discourse, dispersed institutional agency, and material practices (Taylor Buck and While 2017). Thus, a concept often used vaguely by policy, corporate and academic actors (Albino *et al.* 2015; de Jong *et al.* 2015; Hollands 2008; Wiig 2016) has the potential to induce urban change lasting far longer than the 'smart' label itself. Urban change is thus co-constituted by discursive and material practices that leverage the smart city ideal.

The following argues that smart urbanism in the UK is usefully understood through a cultural economy lens. This conceptualises economic phenomena as self-realising, emergent, and rooted in practices that *perform* the economy (Berndt and Boeckler 2009, Shelton 2017). This approach helps make sense of the UK's variegated landscape of smart urban practices, by identifying commonalities in the logics underpinning their discursive justification. In using the notion of variegation, we build on work that understands the variegation of urban sustainability practices as geographical differentiation across different scales and 'conjunctural experimentations shaped by local contestations, contradictory evolutions, and multi-scalar regulatory forces' (Chang and Sheppard 2013, 73). While the focus is on initiatives at the city scale, it is important to remain aware that urban experimentation often consists in incremental change based on piecemeal projects rather than locally-translated national strategies (Taylor Buck and While 2017). Nonetheless, the analysis below highlights

how a local collage of smart urban projects and activities can emerge and be discursively framed into a city-wide vision that speaks to nationally-set funding streams and policy imperatives.

The analytical approach is explained below, followed by discussion of the cultural economy of smart cities. The discursive logics within which the emergence of UK smart urbanism can be situated are then analysed. The concept of discursive logics builds on work by Luque *et al.* (2014) defining logics as narrative devices that help constitute specific understandings of urban development trends. Such logics are textual, spoken and image-based 'efforts to… image the future city' (Luque *et al.* 2014, 82). They function as key organising themes in a cultural economy of smart urbanism through their work as strategic legitimisations (Sum and Jessop 2013) for urban initiatives. In so doing, they are central to the performance, calculation, framing and materialisation of smart urbanism in the geographically-specific contexts considered below. In a UK urban context, they help to elucidate how the complex landscape of local smart city initiatives emerged in response to the emergence of state-led funding streams aimed at smart urbanism.

The first identified logic constructs the smart city as a response to notions of impending *urban crisis*. This tendency is more or less explicitly evident across the cases considered, and forms the broad landscape within which more localised and nuanced logics operate. Three of these are identified, constituting local enabling narratives: a.) the *technological simulacrum* as urban anchor point for related initiatives; b.) a *sectoral focus* justifying local smart strategies with recourse to notions of geographically-specific entrepreneurial competitiveness; and c.) *chameleonic* discourses, enveloping previous, eco-urban agendas (i.e. around low-carbon initiatives, resilient urbanism, and eco-urbanism) into 'smart'

agendas, as a way of making sense of local priorities and initiatives to a national and international policy and corporate audience.

**Methodology**

The paper is based on in-depth, qualitative investigation of smart city discourses produced by UK cities (city councils, boroughs, urban authorities such as the Greater London Authority, and other urban municipal institutions). Based on preliminary content analysis of the policy documents produced in the 76 UK cities with a population above 100,000, 34 were identified as having substantial smart city programmes either planned or underway. Documents (policy reports, city council strategies and visions, websites, and minutes of city council meetings) produced between 2012 and 2016 by these 34 city councils, as well as urban agencies and the national government, and focused on the smart city or cognate initiatives (for example, around the digital city), were collected and analysed.

Thematic coverage of smart city-focused documentation was mapped for the 34 cities, across six discursive regimes: urban governance, economy, environment, mobilities, social sustainability, and grassroots initiatives. Discursive categories covering a range of different themes within these regimes were analysed and segmented. Categories were selected based, initially, on existing smart city mapping research (European Parliament 2014), supplemented with smart city categorisations proposed by Yin *et al*. (2015). These were expanded into a total of 191 sub-categories, through which the documents were analysed.

The resulting comparative data enabled the selection of ten cities for closer analysis, based on three criteria: a.) each should display relatively well-developed smart city policies and/or programmes of activities; b.) each city should demonstrate relative breadth of sectoral coverage (for example, cities whose smart policies largely targeted a single field of activity,

such as parking, were excluded); c.) the cases as a whole should exhibit geographical spread. The ten selected cases (Birmingham, Bristol, Glasgow, London, Manchester, Milton Keynes, Newcastle, Nottingham, Peterborough, and Sheffield) are not intended to constitute a representative cross-section of *all* UK cities at different stages of mobilising and implementing smart city ideas. The aim was to capture the *variety* of more fully developed local discourses that are part and parcel of corporate, governance, and technological processes which co-produce the 'actually existing smart city' (Shelton *et al.* 2015).

**A cultural economy of smart urbanism**

The paper begins by acknowledging the key role of constructed logics of smart urbanism (Kitchin 2015; Kitchin *et al.* 2016; Krivý 2016; Luque-Ayala and Marvin 2015; Vanolo 2013). The range of logics analysed in this paper is diverse in terms of the actors and networks that produce them (Calzada 2017; McNeill 2015, 2016; Söderström *et al.* 2014), and also with regards to their strategic aim. White (2016), for example, shows how smart city visions often depend on 'anticipatory logics', constructed notions of crisis and technocratic necessity that often become self-fulfilling fictions (Picon 2015). The multiplicity of these meanings and discourses is not surprising. This is because 'smart' could be described as an 'empty signifier', a conceptual envelope up for grabs and open to debate (Swyngedouw 2010). It is also unsurprising that smart city discourses (both policy and corporate) are unclear and variegated (Wiig 2016). The lack of conceptual clarity makes smart urbanism appealing: the 'smart' concept can be mobilised for whatever ends are required in a specific (urban, governance, market, national or global) context.

Definitional debates around smart urbanism can be placed within the framework of what can be termed a cultural economy of smart urbanism. A key insight from cultural economy is that there is no clear distinction between market-based and non-market phenomena (Barry and

Slater 2002; Berndt and Boeckler 2009; Lépinay 2011), leading to studies of how 'the practical self-realization of economic knowledge' (Berndt and Boeckler 2009, 536) arises, in areas as diverse as housing markets (Smith *et al.* 2006) and new economic sectors (Caprotti 2012). We add to this by arguing that smart urbanism, as an organising concept for thinking about future urban trajectories (not restricted to the urban economy), can be understood through the ways in which smart cities are *performed*, *calculated* and thus *framed* and *materialised* through specific discursive logics.

Performance is the cultural process through which multiple actors construct and enact, both through discursive and practice-based actions, specific visions and iterations of the smart city (Butler 2010; Muniesa 2014). These iterations are performed relationally and collectively, at the same time that they become territorialised. In the case of urban authorities devising smart city strategies, performance becomes a way through which cities, not driven by a purely economic logic, 'are responsive to wider logics and imperatives that frame and are intertwined in economic action, and are influenced by the varying values, beliefs and agendas' (Dowling *et al.* 2016, 40) of urban actors.

Calculation, meanwhile, involves processes through which smart urbanism is measured, defined and (sometimes) quantified. It is constitutive of the performance of markets through the action of calculative actors with 'a clear notion of how they expect [smart urbanism] generally, and [the smart city in the UK] in particular, to behave' (Smith *et al.* 2006, 86, authors' text in brackets). As it applies to the smart city, calculation can take place through smart city metrics, indicator systems, evaluation frameworks, and Key Performance Indicators (KPIs) (Joss 2015). One example is the negotiation of the British Smart Cities Standard, which produces standardised, serial meanings around what it is to be a smart city in the UK (Joss *et al.* 2017). As Zook (2017, 11) argues when critically analysing the use of Big

Data in smart urban governance, 'metrics don't simply measure…these data are simultaneously defining what cities are.' Thus, while the UK smart city may be partially rooted in highly technical flows of data, code and technological know-how, these are all *made sense of* and integrated into a matrix of meanings through discursive practices around the multiple meanings of the urban. The performed and calculated smart city is also framed within variously fluid or specific discursive limits through processes of framing. Framing, in turn, is predicated on the existence of specific discursive logics which establish the limits of the frame, and which also function to *justify* specific framings.

A key example of the performance of a cultural economy of smart urbanism in the UK is the 2012-13 Future Cities Demonstrator (FCD) competition for smart city projects. In this competition, £25.5m was allocated for 30 cities to submit project proposals outlining specific smart city visions. This opened up a marketplace for the framing and 'selling', by local governments, of city projects along specific lines developed by the UK government's innovation agency. The FCD initiative thus provided the contextual envelope within which city councils, and other actors, could begin to seek government funding by aligning urban policies and priorities to a 'smart' urban agenda. This brings us to our final conceptual foundational point, namely the importance of considering the way(s) in which the performance of the smart city becomes grounded in place, and materially expressed in policies, strategies, projects, initiatives and built environments. We argue that geographically-specific iterations of smart urbanism in the UK city emerge through what Kennedy (2016) has called a process of *argumentation*. This is the process not only through which specific smart city policies and projects are defined, debated and operationalised, but also the socio-cultural and techno-economic process through which one (internal) round of argumentation (focused on the elaboration of specific policies) enables an (outward-facing) presentation of policies and projects so as to appeal to, or make sense of, these self-same

strategies *in the key of smart urbanism*. It is in this context that discursive logics really come to the fore: in both helping to frame and justify specific visions and strategies for the smart city with reference to broader imperatives (for example, crisis, broadly defined).

**Varieties of smart urbanism**

Our analytical focus highlights the multiple ways in which smart city discourses, based on particular logics, become grounded and rooted in individual urban projects and strategies. Indeed, and as noted above, smart city discourses are rooted in attempts to connect often geographically-specific projects to wider urban agendas through the use of the 'smart' label. We use the term 'geographically-specific' to identify smart city activities based in individual cities: this contrasts with the wider circulation of discourses around smart urbanism that are promoted by national and global policy and corporate actors. It can be expected that different UK cities will develop and perform sometimes very different strategies nonetheless labelled 'smart'. Thus, smart urbanism is not only variegated *across* space and *between* cities, but also *within* specific cities (Goh 2015). Indeed, while 'the smart city is being realised in tangible and ordinary locales, there is scant evidence and critical reflection on how this is taking place' (Karvonen *et al.* 2018, 1). Thus, we focus on the 'actually existing smart city' (Shelton *et al.* 2015) in the UK, in vision and practice, rather than blueprints for flagship, greenfield and new-build smart cities.

How did the various iterations of smart urbanism in the UK begin to emerge? A key moment in the production of discourses and visions of the smart city was the organisation of the state-led 2012-13 FCD competition, mentioned above. This can be understood as a breakthrough event that placed smart city strategies at the forefront of city council agendas (Taylor Buck and While 2017). The competition was enabled by a £25.5m fund administered by Future Cities Catapult, a London-based innovation accelerator funded by Innovate UK (a UK

government-financed agency). The competition can be seen in the broader context of trends in UK urban policy: since the 1970s, this has been partly based on the project of translating and communicating national policy imperatives to the city level. More recently, national urban policy has exhibited an area-based focus, and a 'localism' agenda attempting to encourage city councils to prioritise economic growth (Harding *et al.* 2015). Thus, the FCD initiative was significant in that it became the conduit through which state funding was made available to UK cities, and at the same time it shaped a discursive context within which local city authorities had to operate in their discursive performance of future-focused smart city projects.

The Future Cities competition was significant not only in its state-led nature, but also in the low participation of private sector actors in kick-starting the competition. While this underlines the key role of the state in directing urban development trends, it also highlights the functional constraints under which state steering operates. In the case of the Future Cities competition, 'it is difficult to avoid the conclusion that municipal governments were being asked to prospect for private-sector investment on behalf of central government but with limited generative power' (Taylor Buck and While 2017, 515). The competition made available an initial round of £50,000 grants to fund feasibility studies and proposals to host a smart city demonstrator project, for which the single winner would receive £24m. In 2013, 30 studies were funded out of 50 applications. Based on this, 26 cities submitted a bid for the £24m demonstrator grant, finally awarded to Glasgow (InnovateUK 2016). In developing feasibility studies, city councils commissioned consultancies and other groups to conduct research, design reports, and craft proposals that would effectively *frame* and *perform* their version of the smart city for a national funding audience.

A key result of the FCD initiative was its function in sparking the production of multiple smart city visions by UK city councils. Few UK cities had anything that could be described as a smart city vision or plan prior to 2012 (with the exception of London's smart 2012 Olympics focus). The competition catalysed the development of a spatially variegated landscape of smart urbanism by the end of 2013. This was part of the formation of a cultural economy of smart city discourses representing different actor networks, priorities, and understandings of the role of 'smartness' in the city. While actors (consultants, designers, and others) engaged in national and global smart urban discourses are often active in circulating similar smart city visions and blueprints across different urban contexts, the involvement of city councils in the UK competition meant that these circulating discourses were translated for each local context, and thus framed in local priorities and historical trajectories. The result is that 2012-13 saw the creation of 50 distinct visions for the UK smart city. Whether or not these became operational, what is significant is that state action (through the competition) sparked the emergence of smart urban visions (led by local government), ranging from the very high-tech to more nuanced strategies. The following explores the broad discursive mechanisms through which geographically specific ongoing strategies have since then been framed and justified.

**Discourses of urban crisis**

The first, broad discursive logic identified is that of the smart city as a response to constructed notions of urban crisis. The use of crisis discourses to justify technological, political, and other interventions at the heart of the city has been widely explored (Jones and Ward 2002). For example, climate change (Caprotti 2015; Doulton and Brown 2009) or austerity (Pollio 2016) crisis discourses have been used to justify specific smart urban visions and strategies. More broadly, White (2016) identifies three main crisis discourses used as justifications for smart urbanism, focused on demographic and resource pressures, climate

change, and fiscal austerity, narrowing the discursive arena around potential urban development pathways (White 2016). The construction of crisis, therefore, functions as a mechanism through which deeply modern notions of using technology to *liberate* the city (Harvey 1996) can be deployed and justified. Crisis, then, forms a discursive backdrop, justifying the production of local smart city storylines that can be used to perform urban projects to state-level initiatives such as the FCD competition.

British urban policy has been stimulated and influenced by cycles of crisis (Jones and Ward 2002). With regards to smart cities, various crisis discourses function as logics to make sense of a municipal 'turn' towards smart city projects. Future Cities Catapult and Arup (a built environment-focused PSP) argued, in a 2014 report on the 'future cities market', that:

> '[P]ublic authorities are demanding better and more cost-effective ways to deliver
> services that exploit the promise of new technologies in a context of strained budgets
> and intensified future risks.' (Walt *et al.* 2014, 6)

Based on this, it appears that the British smart city's foundational story more often than not rests on a stated need to 'respond' to crisis (although how crisis is articulated differs depending on the specific city). The UK government's innovation agency, in a blog post reflecting on the 2012 FCD competition, framed its discussion of smart cities by stating that 'city life and its management is becoming ever more complex' (Saraf 2015, np). The UK's urban condition is then swiftly diagnosed as being in a state of crisis:

> 'Some of our cities are at crisis point and it is therefore imperative that this is
> addressed. Doing so will help the competitiveness and sustainability of the UK's

cities, and also support the UK businesses offering such solutions […] before taking them to the rest of the world.' (Saraf 2015, np)

This underlines the link between notions of crisis and a constructed need to improve 'competitiveness and sustainability' and 'support UK businesses'. It is not surprising, then, that local smart city strategies discursively perform attempts to 'solve' crisis, while often omitting any mention of crisis areas outside the economic sphere.

At the city scale, the 2012 Future Birmingham strategy is an example of the justification of urban initiatives, in part at least, through reference to the 'major threat to Birmingham's economic well-being and social cohesion' posed by perils including 'the banking and Eurozone crisis, and the Government's resulting deficit management policies', with the city at the mercy of 'global economic forces' (Birmingham City Council 2012a, 8). The focus on economic crisis in framing the need for a smart urban response was consistently echoed throughout policy documentation: for example, in the city's smart roadmap, the 'national and international financial situation' are blamed for deepening 'many of the inequalities in the city', while the national austerity landscape 'significantly affect[s] the ability and freedom' of Birmingham to develop anything more than basic public service offerings (Birmingham City Council 2012b, 8). The crisis envelope is underlined in a blog post by Annette King, innovation manager for Digital Birmingham. The post argues that the economic crisis context requires a response from the city council which develops Birmingham into a smart city, because otherwise 'our citizens, businesses…will not become competitive….we will be left behind and economic growth will stagnate' (King 2014, np).

In another example, Glasgow City Council's (GCC) urban resilience strategy leverages notions of continued, pressing crises to call for solutions to be implemented at the urban scale

(GCC 2016). The strategy thus focused on deploying smart urbanism to securitise the city in the face of challenges to its current and near-term resilience (Evans and Reid 2014). It highlights both chronic stressors (that may last decades, like industrial change), and acute shocks (such as sudden climatic events) as potential crisis points. These discursive logics of crisis are, in turn, placed within a historically contingent setting:

> 'in the last two centuries Glasgow has seen more change than in all its long previous history. It was one of the first cities in the world to experience the *profound shocks of modernity* as the Industrial Revolution led to its rapid expansion and a swelling population […] Glasgow experienced the *twin shocks* of very rapid de-industrialisation and population loss […].

> As a result, Glasgow's people have experienced *chronic levels of stress* which have produced profound disparities in income, health and opportunity. The most recent profile of our population's wellbeing shows the extent of the impact of the chronic stresses. Glasgow continues to have the poorest life expectancy in Scotland for both men and women, rich and poor. These are some of the issues to which our resilience strategy is very much directed. (GCC 2016, 10; italics added by authors).

The above-quoted text historically contextualises Glasgow as characterised by myriad socio-economic, structural and other concerns. This provides justification for the roll-out of smart projects marketed as solutions: the city needs to 'identify new smart solutions that we can use to address specific resilience challenges' (GCC 2016, 36). In the case of the crisis of economic decline, for example, city authorities argue that Glasgow 'will support the delivery of digital skills to not only consume services but to be the producers of new goods and services, harnessing the potential of digital technologies to drive growth, stimulate innovation

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and improve productivity' (GCC 2016, 34). Glasgow is not the only UK city which links an industrial past followed by a history of decline to a need to respond through smart city initiatives. In Sheffield, for example, a 2015 report commissioned by Sheffield First Partnership, under the auspices of the city's Executive Board and the SmartSheffield Advisory Group, highlighted the 'important connections…between Sheffield's industrial past, characterised by socially-progressive, family- or employee-run firms…distributing their goods globally… [W]e once again have similar conditions and opportunities, particularly in the creative and digital sectors… [T]here is an important story to be told about Sheffield's track record of smart initiatives' (SmartSheffield 2015, 22). Thus, smart city-related activities are seen as: a.) a response to geo-historically contingent crises; b.) a potential springboard liberating the city from these historical antecedents; c.) a way of addressing the crisis of urban economic competitiveness. They also function to make sense of smart city projects for a national funding audience, of which the FCD competition was a key example. Building on this, the following discerns three common discursive logics which form key parts of the cultural economy of smart urbanism in the UK city.

*The technological simulacrum*

The first discursive logic found in UK cities is what could be called, following Baudrillard, the *technological simulacrum*. Baudrillard identified three distinct typologies of simulacra: naturalistic, productionist and simulation. The technological simulacrum referred to here is based on the third of these, defined as 'based on information, the model, cybernetic play. Their aim is maximum operationality, hyperreality, total control' (Baudrillard 1991, 309). With regards to the UK smart city, the simulacrum is often centred around a specific *technological place*, coupled with a *technological network*. Baudrillard used the example of the hypermarket: a specific building, but also the centre of networked activity requiring infrastructures (freeways, parking lots, computer systems) (Baudrillard 1994). This is

reflected in urban commentary that has recently highlighted how technology corporations' headquarters and campuses in California are built as simulacra of cities (Tolva 2014).

Technological places functioning as simulacra include examples such as the Glasgow Operations Centre (GOC). Funded by the city's winning bid for the FCD competition, the GOC institutes both a socio-technical assemblage of data, knowledge, technology, capital and governmental practices (Barns 2016; Kitchin *et al.* 2015, 2016; Mattern 2015), and a visual, material anchor for the smart city: a place of visibility (of data and digital flows, certainly, but also of material infrastructure and human and symbolic capital). This visibility is not necessarily architectural, as in the case of Rio de Janeiro's Operations Centre, housed in a cuboid, imposing purpose-built structure. Rather, the GOC is visible online, where its interior, with its 'total of around 1,000 screens' (Crawford 2017), is displayed in images reminiscent of the representation of Apollo space programme control rooms (Mattern 2015). The GOC-as-simulacrum functions not only as a nodal point around which Glasgow's smart city imaginaries are organised (Caprotti 2018), but also as a simulacrum of safety, security and response to crisis. The Future City Glasgow strategy underlines smart city development projects in several areas, among which urban safety is dominant (Future City Glasgow 2017). The GOC is security-focused: it integrates data feeds from CCTV, police intelligence, traffic management systems, and other sources. The GOC's own website describes the centre as providing: 'co-ordinated, real-time, intelligence-led response to incidents large and small across the city, placing Glasgow at the leading edge of smart city management' (GOC 2017). It is a technological simulacrum because it constitutes a 'themed' place attempting to simulate 'perfections of reality' (Oong and Jin 2017, 229) in its underlying aim of governing the city through data.

The GOC is also a *technological network* because of its constructed role as a nodal point in the city's digital data flows. In this sense, the GOC as simulacrum potentially adopts the role of the technological fetish: it masks the socio-economic and other relations that produce data flows (about crime, disorder, traffic, and other 'anomalies' that must be 'managed') in the city. Technological places like the GOC have a masking effect because what can be seen and managed are data, not the deeper structures and inequalities through which measurable data are produced. Perhaps this is clearest in cities in the Global South with smart ambitions: Watson's work on African smart city projects highlights a 'fundamental gap between the vision of these future cities...and the reality of poverty in the actually existing city' (Watson 2015, 37). The cultural economic role of the envisioning of these 'fantasy' (ibid) places not only focuses on *constructing* places and meanings, but also on *masking* urban conditions.

The technological simulacrum also appears in plans and projects to turn Bristol into a smart city. The *technological place* is embodied in the Bristol Data Dome, a repurposing of the city's spherical, metallic planetarium. The Dome is used to visualise data flows, and aims to let citizens see the city 'with new and more informed eyes' (Bristol is Open 2015). The simulacrum as technological network appears in Bristol's smart city plans and strategies, focused on an array of projects including open data, fibre networks underground and on the bottom of the city's canal system, an [IoT] mesh network using the city's lampposts, and other initiatives aimed at 'creating an open programmable city' (Bristol is Open 2016). The simulacrum serves the purpose of making the (digital) city appear 'better than real' (Oong and Jin 2017, 229): networks of data build an urban landscape of 'virtual cities within virtual cities' (Batty and Hudson-Smith 2005, 44). Finally, it can be argued that technological places have a function in the territorialisation of smart urbanism in the spatial context of specific cities: this is part and parcel of the contextual framing and performance of a specific city as smart. An example of this is Newcastle's choice of Mosley Street as the site for a smart street

demonstrator during the 2018 Great Exhibition of the North, a wide-ranging, three-month celebration of the North of England's artistic and innovation activities. The choice of Mosley Street was not random: it is a significant technological place in that it establishes both a material and a historical link between Newcastle and technological urban futures. In 1879, Mosley Street was the first urban street to be lit by electric incandescent bulbs.[1] In 2018, the smart street features embedded sensors deployed by Cisco and other corporations including Connexin, a Hull-based wireless service provider. Furqan Alamgir, Connexi's founder, clearly linked the dawn of urban electrification with the new smart street demonstrator by stating that 'just like all those years ago when electricity began to run through our streets, connecting our cities – making them smart – will open up possibilities that haven't even been imagined yet' (Alamgir, in Cisco 2018, np). The use of a technological place such as Mosley Street helps to ground and perform smart city ambitions in a city-specific context. This highlights a specific urban place and event as a significant moment in the performance of a cultural economy of the smart city at the local scale. The technological simulacrum in the UK smart city, then, functions not only as a place and network of connected control and hyperreality, but as a highly visible (in symbolic *and* material terms) interface between local urban geographies and national-level contexts and strategic priorities.

*Sectoral smart urbanism*

A second logic through which the cultural economy of the UK smart city is performed involves what can be termed *sectoral* smart urbanism. Rather than underpinning the production of a broad vision or strategy, it locates the city's 'smartness' within a contemporary or future strength. These strengths are usually (but not always) economic: their identification underpins the promotion of sector-specific activities aimed at urban transformation. This logic draws on the crisis discourse discussed above: crises or urban

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problems are typically presented as the foundational moments that justify a smart vision, but the latter is given particular form based on a narrated set of sectoral strengths.

Leeds (part of our wider sample) provides a good example of this logic. Leeds City Council's (LCC) smart city strategy is clearly founded on the need to respond to anticipated urban tensions resulting from increasing urbanisation:

> 'In the future a high proportion of the population of the UK will be living in urban areas and a significant proportion of these people will be over the age of 65 […]. [C]ity resources will come under increasing pressure; … putting severe strain on the ability of the city to keep on delivering; and the demand for health services are predicted to overtake supply within 10 years. This is a worldwide problem with no clear solutions' (LCC 2014, 3).

In parallel, city authorities clearly focus on performing Leeds' existing economic strengths in health informatics, technology-enabled care, regenerative medicine, medical devices, diagnostics, and pharmaceuticals. Thus, the city council performs a vision of Leeds as a smart city for 'delivering better health and wellbeing outcomes, enabled through information and technology', and as 'the best place to grow old' (LCC 2014, 6). The notion of the 'need' for Leeds to develop as smart health city is also underlined by a 2015 report (LCC 2015) setting urban development in the context of a need for economic growth and of the challenges posed by an ageing population. which aims to 'shift more health and social care out of hospitals and promote self-help, peer support models in settings closer to home' (LCC 2015, np).

Manchester also provides a fruitful example of smart city discourses that, partially at least, identify smartness with a specific sector. Manchester has a wide-ranging smart city strategy,

much of which is performed and materialised in the Corridor Manchester partnership. This initiative is a geographically-bounded area along a 2 kilometre stretch of the city's Oxford Road corridor, and is led by a range of public and private actors including the city council.[2] The Corridor features several different smart city projects, from the CityVerve IoT demonstrator, to the Triangulum smart city lighthouse project. While the overall context around the use of the Oxford Road corridor for experimenting with smart urban technologies and practices is complex, there is also evidence of a clear focus on specific sectors. A case in point is the focus on health and life sciences, which form a key economic focus for the Corridor Manchester Enterprise Zone. The zone is now coupled with the identity of Corridor Manchester as a smart city hub, but it existed before the Corridor was set up (it was called the Greater Manchester Life Sciences Enterprise Zone) (Corridor Manchester 2018b). A clear discursive effort is made to frame health and life sciences businesses and innovation existing within the zone in the broader remit of the Corridor's smart identity. As stated in the Corridor's 2015-20 strategic vision, 'Corridor Manchester's latent economic potential is considerable. It has a leading role to play in … science-based companies; particularly bio-health' (Corridor Manchester nd, 20). Equally, this emphasis is based on previous economic activity in the area, including the pre-smart city Manchester Science Partnerships' Central Campus, located next to the Oxford Road corridor and home to 120 technology and life sciences businesses (Corridor Manchester 2016).

Like any discursive logic, that of sectoral smart urbanism has persuasive potential. At the same time, the deployment of discourses focused on specific economic sectors also exemplifies the use of 'smart' as an empty signifier, used to justify particular urban trajectories. For example, Leeds's smart city vision might be reinterpreted as a thinly-veiled springboard for a neoliberalised urban system where the state becomes less involved in care while pushing agendas around atomised visions of 'resilience' (Cretney 2014, Kaika 2017).

Overall, a cultural economy lens helps to identify the sectoral focus of smart urbanism as a key mechanism through which the territorialisation of the UK smart city happens: sectoral discourses help to perform the smart city as a market, and in so doing enable individual cities to modulate their understanding of what it means to be economically smart in their specific geographical context.

*Chameleonic discourses*

A third discursive logic is the tendency to fold or rebrand eco-urban strategies into broader urban agendas that are then called 'smart'. This is part of broad discursive trends through which a succession of different concepts gain prominence, in becoming signifiers for sustainable urban development (de Jong *et al.* 2015; Fu and Zhang 2017). A symbolic juxtaposition between smart and green discourses is evident in Bristol, where the Data Dome is faced across Millennium Square by the Energy Tree, a public art installation which, while providing solar-powered, free smartphone charging and wifi, is also an example of bio-mimicry using solar panels manufactured by the Bristol Drugs Project. Thus, the cultural economy of smart urbanism that emerges through chameleonic discourses turns 'smart' urban projects into fantasies, in the sense that smart urbanism offers 'a harmonious urban vision' but keeps 'the political dimension of urban vision at bay' (Gressgård 2015, 112).

An example is Peterborough, which won the £3m second prize in the 2012-13 Future Cities Catapult competition, and was awarded the title of 2015 Smart City of the Year at the World Smart Cities Congress held in Barcelona. Peterborough's initial smart strategy included several projects funded through Peterborough DNA, the organisation set up to develop the city's Future Cities strategic vision. Most of these were clearly sectoral, focused on areas such as smart health and the creative economy (the iDream Academy). Other projects focused on activities such as low-energy lighting (HeatLight project), repurposing coffee

sacks used by cafes (Peterborough Reuse), and solar heating and cooling (the Solar Polar project) (Future Peterborough 2017a). These activities are easily classifiable as 'eco-urban' and, previously, would probably have been described as 'low carbon' projects. By 2016, Peterborough DNA had been replaced by Future Peterborough, a strategic programme with a clear focus on low-carbon activities and circular economy transformations through the Circular Peterborough programme. This is aimed at 'making the most of the resources we have locally, supporting economic resiliences, developing strong communities and increasing environmental sustainability' (Future Peterborough 2017b). It is interesting that this focus loses all reference to concepts and terms (such as data, digital, IoT, and other commonly used words) that lie at the heart of most discussions of the smart city: it indicates an enveloping of city priorities within the 'smart' label so as to render city initiatives legible and attractive at wider scales.

The examples of Peterborough, Manchester and Bristol highlight the use of 'smart' by city authorities as a way of making sense of the shape-shifting nature of urban sustainability discourses. This enables municipal actors to:

a.) Connect with, and speak to, national, corporate and global smart city discourses and strategies. This, in part, reflects current inertias and lock-ins regarding urban development trajectories. Smart city strategies in the UK are characteristically pursued through growth-focused private-public partnerships involving large technology corporations, 'relationships […] often pre-established with 'big players', such as Capita, Serco, Cisco, IBM, Microsoft, or Philips' (Viitanen and Kingston 2014, 814): their economic growth focus resembles that of other cities in similar economic contexts in terms of smart urban development priorities (Alizadeh 2017);

b.) Simultaneously pursue strategic urban development directions that are context- and place-specific. This may occur, at the city level, through the engagement of non-hegemonic corporate actors. For example, using case studies of the roll-out of smart metering technology in Sheffield and Leeds, Viitanen *et al.* (2015) highlight how, rather than focusing on large technology corporations, it is useful to also analyse the universe of Small and Medium-sized Enterprises (SMEs) that can respond to 'local market signals and opportunities' (Viitanen *et al.* 2015, 37). Rather than theorising the private sector as a series of top-down multinationals, the approach proposed by Viitanen *et al.* (2015) underlines the role of community and citizen feedback (mediated via apps and similar technologies) that enable SMEs to respond to local priorities.

**Discussion and conclusions**

The emergence of the complex landscape of smart urbanism in the UK leads to several reflections, premised by acknowledging that our focus does not consider alternative discourses 'at the edges' of smart city policy and practice, or those produced by actors lying outside the policy-corporate dyad that produces many smart city strategies and visions. Nevertheless, our use of a cultural economy conceptual lens highlights how smart city discourse does not simply exist at the level of imaginations or visions, but is closely intertwined with the production of local urban materialities. On this note, four concluding reflections are offered on: the agency of discursive logics based on crisis; the importance of the state in urban development trajectories; the production of geographically-specific smart urbanism; and the need to engage at depth with the role of the private sector.

First, we underline the key role of the state in triggering the emergence of smart city visions and pathways (while acknowledging firms' agency in shaping urban investment markets).

The state was a central actor in the development of visions of the UK smart city, due to the role of the government-funded FCD competition. This functioned as: a discursive 'event' in the envisioning of the UK smart city; a way of performing the smart city in the key of entrepreneurial and competitive urbanism; and as a calculative actor in the ranking and competitive selection of smart city proposals. Through the competition to select and fund smart city projects, the state exerted power in a growing cultural economy of smart urbanism.

Highlighting the state's role leads to questions around the direction of urban futures in an era interested in developing (and moving past) smart urbanism. This may seem at odds with pro-urban rhetoric foregrounding the agency of individual cities in a globalised economy. Indeed,

> 'The state plays a pivotal role in the process of organising urban socio-ecological transformation […]. [I]t helps shape who is exploited, ignored, rewarded and listened to. […] The role of the state needs to be placed more centrally in our understanding of how and what eco-technical systems emerge' (Swyngedouw 2016, 140).

This is expressed in UK government and policy spheres. The FCD competition provided a national-level context within which vision-based experimentation took place, followed by more geographically specific experimentation in individual cities. These visions may (or may not) differ, in part at least, from the smart city 'solutions' and 'packages' offered by large multinationals (Taylor Buck and While 2017). As a report to the UK Parliament's Science and Technology Committee by the Future Technologies Team at the UK Department for Culture, Media and Sport (DCMS) acknowledged, 'the complexity of delivering economic and environmental sustainability, and good quality of life, in cities in the future' means that 'there can be a role for Government in supporting targeted demonstrator projects where these are unlikely to emerge without this action.' (DCMS 2016, 4) This is a space of political

possibility. As long as state-mediated steering is informed by, and responds to, urban imperatives based on local needs (however defined) rather than purely market requirements, then the type of analysis offered here contributes to a mapping of potential zones of engagement with policy discourse at moments when they can still be influenced (Cowley *et al.* 2017; Joss and Cowley 2017).

Second, the construction of smart city plans and strategies as responses to crisis, potentially boxes these visions into neoliberalising and technocratically authoritarian pathways (Cardullo and Kitchin 2017; Ho 2017). As shown above, crisis discourses provide a range of actors with springboards for justifying 'solutions' proffered through smart city investments and projects. In Bristol, for example, notions of crisis are linked to ideals of urban resilience in advocating smart technologies' potential for enabling the city and its residents to 'learn' from crisis events: 'By enabling the capacity and ingenuity of all of their citizens, these cities will use every disaster, crisis or challenge to recover in a stronger, smarter and fairer way' (Bristol City Council 2016, np). As scholars (Derickson 2017) have recently argued, an increasingly popular policy focus on resilience (with its clarion calls for the capability to 'bounce back' from crisis), often regressively masks underlying socio-economic and other vulnerabilities (Kaika 2017). In the UK smart city, resilience is often deployed to promote normative agendas (Thoré and Olsson 2017) focused on economic competitiveness.

Discourses framing the smart city as a response to crisis run the risk of individualising risk and catalysing neoliberal or even authoritarian eco-urban politics (Rosol *et al* 2017; Chang 2017; Ho 2017; Kong and Woods 2018). While Bristol's resilience strategy celebrates the city as a 'leader in…smart city digital innovation' (Bristol City Council 2016, np), it refers to smart city projects which focus exclusively on data, transport, mobility, energy, and air quality. While most of these could also be branded as 'low-carbon' projects, and while some

(for example, energy) clearly relate to current inequalities, they do little to address other, major urban societal challenges faced by Bristol (from housing to homelessness). This opens up an opportunity to a.) question the 'need' to use crisis narratives as justifications of future urban development pathways; b.) advocate for a *purposive* rather than a purely *responsive* notion of urban strategy. Crisis logics are replete with the agency of technology, corporate, consultancy, engineering, design and certain policy actors. Grassroots, activist, voiceless, marginalised, poor, dissenting, and other voices are generally not represented in these discourses, many of which claim to speak *on behalf of* the whole city. As Cardullo and Kitchin (2017) argue in their analysis of Dublin's smart city initiatives, while citizens can play different roles and have different levels of participation, these levels are:

> 'consistent with neoliberal citizenship and its emphasis on personal autonomy, consumer choice, individuals performing certain roles and taking responsibility for their own life chances, the marketization and privatisation of services and infrastructures, and the state facilitating and stewarding neoliberal forms of governmentality and governance and market-led solutions to urban issues' (Cardullo and Kitchin 2017, np).

It is imperative for scholars, policymakers and activists to now identify progressive urban agendas (Greenfield 2017), by taking into account local materialities and existing lock-ins, allowing a broader spectrum of voices to speak *about* the future of the UK city. What might this look like? While a full discussion of this is a useful focus for further work, as a minimum it calls for more consistent citizen engagement, over and above oft-repeated calls for participatory governance and planning, at all levels of governance. It also calls for engagement with technology corporations, and for awareness of the power geometries inherent when 'citizens' and 'experts' enter into conversation. If this political work is not

carried out then, *in extremis*, the UK smart city could be described as undergoing a Frankenstein moment (Cugurullo 2018) whereby an accretion of projects, initiatives, visions and interventions actively militates *against* the development of sustainable cities.

Third, it is clear from the varieties of UK smart urbanism that discourses focused on smart city visions and activities are far from uniform across cities. Rather, globalised smart city logics and discourses are translated into national and local contexts: specific cities engage in a translation of local priorities and strategies back into smart discourses that can make sense to a national and international audience. Translation thus contributes to the socio-spatial variegation of smart urbanism and to its framing and performance at the city scale. The local urban context is key to understanding the cultural economy of the smart city, as seen by the importance of technological places and networks (such as the GOC or the Bristol Data Dome) which both mediate local meanings, and connect to internationally recognisable elements, of smart urbanism. This is important because it highlights the ways in which the cultural economy of smart urbanism is discursively and materially performed *in place* as well as more globally. Thus, understanding the socio-spatial variegation of smart urbanism helps shed light on the mechanisms through which urban economies, cultures and practices (such as those around the smart city) become territorialised. In so doing, territorialisation links to materialisation, whether in specific, built smart urban projects, or in 'failed' strategies that nonetheless have helped perform the urban in material ways through knowledge networks and other mechanisms. This reaffirms the need to focus on specific urban contexts while acknowledging globalised discursive and technological circuits. It is here that alternative and progressive notions of smart urbanism could emerge: at the level of specific projects and *ways of doing* the smart city which involve a multiplicity of actors with a stake in shaping the future of local urban environments (Hult and Bradley 2017).

Finally, there remain questions about the interlinkages between urban policy, city administrations, and technology corporates. The paper has shown how the UK smart city is often built around visions of technological simulacra: these can only be effectively and realistically delivered by the private sector, in partnership with city governments. In parallel, the discussion of chameleonic discourses highlighted how notions of smart urbanism are often layered over existing low-carbon and other strategic policy directions, and existing long-term corporate technology partnerships. Furthermore, most of the smart cities literature currently focuses on technology corporations but has not engaged at depth with 'platform' corporations (Srnicek 2017) (such as Google, Uber, Airbnb and Apple) that work across cities rather than simply providing technology services to specific cities. Thus, smart urbanism in the UK runs the risk of increasing 'the power of those already powerful elites who set the global technological agenda and marginalise opportunities for subversion' (Viitanen and Kingston 2014, 815) while promoting digital lifestyles that 'are not inherently environmentally or socially benign' (Ibid, 806).

If such questions seem pertinent to smart city development generally, our main intention here is not to make grand claims either about their relevance, or about the direct transferability of the discursive logics identified earlier, to non-UK contexts. A more fundamental aim has been to demonstrate the value of a cultural economy lens in making context-specific logics visible, with the UK used as an example. The potential value of applying this analytical approach to smart cultural economies elsewhere lies specifically in its potential to engender context-specific critical questions. The expectation is not that analogous frameworks of actors and institutions, causes and effects, or singular catalytic 'moments' such as the FCD, will be evident in other settings. Rather, that smart cultural economies will display distinctive – though sometimes overlapping – logics which are shaped by their construction and performance through contingent conditions.

In the context of UK smart urbanism at least, the questions which our analysis has raised (around discursive hegemony, the role of the state, local contexts and public-private partnerships) are at the heart of pressing urban debates. Existing digital and other divides (and the possibility that smart city policies will deepen these), cost barriers, and the potential generation of a two-track urban system based on cities that are 'smart', and others that are 'analogue', are real concerns in the UK urban context. Further research focused not only on case study work, but on a thematic approach to the development of smart urbanism in specific sectors, is key (Kong and Woods 2018). These concerns show that the development of a cultural economy of smart urbanism, and the production of smart city strategies and of actually existing smart cities (Shelton *et al.* 2015), are far from value-free and ethically 'flat', but riven with tensions, possibilities and agendas that are political and intertwined with the key question of what it might mean to be a citizen in the urban future.

**Notes**

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[1] It was not the first street lit by electric lighting, however. In 1878 the Avenue de l'Opéra in Paris, and the Place d'Etoile in Paris were lit with electric arc lamps (Luckiesh 1926).

[2] The full list of partners is Manchester Metropolitan University, The University of Manchester, Manchester City Council, Central Manchester University Hospitals NHS Foundation Trust, the Royal Northern College of Music, Manchester Science Partnerships, Bruntwood, a UK-based property corporation, and Arup, a global design and engineering firm (Corridor Manchester 2018a).

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