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# CAN NEIGHBOURHOODS SAVE THE SMART CITY?

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Abstract

*For decades, accounts and speculations on the emergence of digitally-augmented environments have suggested utopian as well as dystopian visions of increased spatial fluidities – doing anything from anywhere – in which the role of specific places could become redundant. The emergence of smart urbanism, through technocratic visions of central, algorithmic control, could materialise such centrifugal detachment from place and local context, as it operates a shift of agency from space and community, to code. Are therefore the hyper-local scale, and neighbourhoods, relevant entities in our increasingly digital urban environments? This paper makes a case for the smart neighbourhood not as a plain, pre-determined, functional sub-unit of a centrally controlled and automated smart metropolis, but as a radically divergent – yet necessarily complementary – dimension of it. The discussion looks at the scales of the locale – and of the hyper-local – as the enablers of a re-combined and re-energised spatial and digital agency. It discusses the importance of local appropriation and contextualisation of technology – as opposed to the ‘off-the-shelf’ adoption of civic infrastructural systems and management software, and of enabling significant social innovation and community involvement and participation. However, once explored the importance of re-combining space, community and technology at the local scale, the paper discusses how the point is not opposing the smart neighbourhood to the smart city through a simplistic bottom-up Vs top-down dualist vision, but rather reflecting on how these dimensions should work together. Design and development strategies that aim to conjugate the very bespoke and pilot with the scalable, and the qualitative with the quantitative, whilst enabling local innovation and experimentation, are needed to envisage a grounded, sustainable and effective smart city.*

## Introduction

Within the long history of the relationships between our way of planning and inhabiting cities, and technological development, the rise of contemporary information and communication technologies, from the dawn of radio and the telephone, to ever more rapid development in digital and computational systems, have further problematized the way cities as physical and social places function, and how they can be conceived, designed and managed. Initial disruptive visions involved electronic communication denying the civic advantages of proximity and spatial concentration (Glaeser 2012), as noted by Graham and Marvin (1996; 115). More recently, smart city evangelists, whilst re-affirming the relevance of the city, have proposed visions of urban environments conceived and built ‘from the internet up’ (Doctoroff, quoted in Mattern, 2017) where spatial planning and design are increasingly irrelevant respect to code and digital networking. So, ICTs can remain somehow ‘centrifugal’ respect to the city, and opposed to the centripetal role that place, with its spatial, cultural and social specificity, can play.

This paper argues that the hyperlocal and neighbourhood scale is being neglected in smart city visions and envisaged developments. It starts by discussing two factors and epistemic stances that have played a role influencing this, and making smart urbanism less interested in place than it could be. The first is the idea of spatial fluidity and, consequently, the perceived increasing irrelevance of physical space within the shaping and influencing of urban futures. This has undermined the idea

that space, from wider city designs to how 'everyday', inhabited locales are shaped, can play a proactive role in addressing urban problems, relegating it to acting in a 'support' role, hosting the new ICT-based agents. The second – connected – idea is that a city managed through expert, digital algorithms and big data collected through sensors and apps, can – and in some ways should – see itself as a seamless, whole system. Such an expert-run smart city appears to technically upgrade ideas proper to top-down, modernist planning, implying that the way the city works can be surveyed, modelled and controlled centrally, and it does not seem to need to deal with specific, and diverse, communities.

Those two concurrent smart city premises, that digitize and centralise agency, seem to have the potential to make the role of place, and specifically locales and neighbourhoods, obsolete. The paper however explores a series of critical, alternative stances towards such vision, stressing the importance of places and communities, and the significant roles these can play in bettering urban environments. It does this by drawing a parallel and dialogue between urban planning and architecture commentators and researchers, and more specific smart city-related literature. These highlight the importance of engaging with factors that elude the optimisation and expert logic of both modernist planning and mainstream 'smart', and re-connecting knowledge and practice with the cultural and social richness of locales and neighbourhoods. They emphasise how local agency has an important role to play, and rather than being designed out by top-down approaches, should be valued and made a key component of smart city shaping, as a source of experimental and innovative projects, strongly grounded in place and more socially sustainable visions of urban living.

### **The non-place fluidity of the smart city**

For decades, and dating to well before the rise of the internet itself, accounts and speculations on the emergence of networked and digitally-augmented environments have often suggested utopian as well as dystopian visions of increased spatial fluidities – doing anything from anywhere – in which the role and meaning of specific places could become redundant. The relatively recent history of urban and architectural design theory's most powerful and disruptive views included the neo-rationalist grand visions of spaces 'liberated' from the limits of the local scale through the dynamism and expanded opportunities of networks, becoming increasingly fluid thanks to telecommunications. Whilst Norwegian theorist Norberg-Schulz warned against the risks of depriving ourselves of a 'stable system of places' (Norberg-Schulz, 1971; 114) in the pursuit of dreams of ever-increased fluidity, British architectural office Archigram was exploring dwellings and entire cities un-anchored from such a place-based experience, and able to fragment, travel – walking or flying – and infinitely re-combine into new configurations (Crompton et al, 1999). Similarly, Italian architectural group Superstudio was imagining, through its 1970 'Supersurface' and 'Continuous Monuments' visions, how the power of (electronic) networking could enable inter-continental, linear mega-structures where 'every point will be the same as every other' (MoMA, 1976). The popularisation of the internet, in the early 1990s, and the emergence of the so-called cyberspace, gave new strength to, and updated, those visions of extreme fluidity, as an actual technological platform facilitating transcendence of the limitation of physical space was now publicly available. Beyond concepts of entirely de-materialised spaces – such as Novak's idea of 'liquid architectures' (1994 [1991]), more everyday notions were up for disruption. Communities of interest, as opposed to those based on physical proximity, although in many ways nothing new, were seen as becoming preponderant through the 'virtual community' idea (Rheingold, 1995), whilst civic life itself could disintegrate and atomise into a system of networked tele-villages (Toffler, 1990), different from any form of urban neighbourhood, as geographically independent, physically disconnected, and impermeable to each other.

Despite the fact that such early views of the potential demise of the civic scale – and of its geographical ‘places’ – seem to not just have failed to materialise, but have in fact been contradicted by seemingly unstoppable global trends toward urbanisation (United Nations, 2018), the shift in emphasis and perceived agency from space to ‘cyber’ has had consequences. Already Michael Sorkin, discussing the process of ‘recombination’ of the city and telecommunication technologies, noted a de-spatialisation of social hierarchies and a de-particularisation of space itself, with a general loss of spatial coherence in the increasingly digital city (Sorkin, 1992; xiii). The contemporary ‘smart’ city movement, also seems to have little interest in dealing with physical space, place and civic scales. Whilst previous brand new visions of urban transformation hinged on giving agency to space – be it the geometric, perspectival redemption of the ideal city of the Renaissance, or the zoned optimisation of functions and neighbourhoods of modernist planning – the contemporary smart city has very little attention towards physical spaces. It is based on a disconnect between an agency-laden set of electronic systems – it plans not by geometry, or zoning, but by code, envisaging building cities ‘from the internet up’ as affirmed by Dan Doctoroff of Sidewalks Labs (Mattern, 2017) – and a ‘spatial platform’ which is fundamentally a passive receptor of the new technologies (Aurigi, 2020). Picon notes how in contemporary ‘smart’ interventions, both as add-ons to existing cities and as brand new settlements, ‘formal inventiveness is not the priority, and references to existing forms proliferate’ (Picon, 2015; 112). Campbell (2011; 67) similarly notes how the brand new smart cities of Masdar or Songdo feel like ‘a more intensive Chandigarh’ and ‘traditional downtown’ [Figure 1]. Such urban forms, often borrowed from the modernist, *Ville Radieuse* repertoire, are a-critically applied almost as clipart, as what really matters seems to be the technology being draped onto them. The smart city then does not really exist as a new, alternative spatial proposition. Smart technology is eminently applied as retrofit, and not just – as it would be obvious – to existing, mature urban spaces, but to new ones too, as these simply passively borrow modernist or science fiction-inspired form and imagery and stick the all-important high tech onto these. However, it could be argued that those spatial ideas are likely to be outdated and inadequate to all-round tackle contemporary challenges of environmental and social sustainability. We know we need to foster more compact and mixed-use environments, conducive of social interaction and promoting diversity, as well as re-think the passive environmental design of urban places as one of the ways to address the climate crisis. Focusing on urban form, scale and the specificities of community and place could therefore help, as the city needs much attention to the agency endowed in its own physicality and inhabitants. Much of that combination of space and community agency exists at the manageable and accessible dimension of the neighbourhood. But this time, as ‘smart’ is invisible and hard to represent (Borruso and Balletto, 2022; Rose, 2018), a tendency to disconnect it from space and place comes natural, and it is assumed that code will be employed alone to fix those key urban issues.



**Figure 1.** Songdo, South Korea: smart city and its modernist urban form. (Source: CC Piotrus)

### **Smart city as a remediation of top-down modernist planning**

If code is the agent, and data – or more punctually the large and dynamic databases of ‘big’ data – is the vehicle through which such agent perceives the city, it is easy to imagine how, once the array of sensors, cameras and geo-located apps has been deployed, all that feedback – and its interpretation – can be concentrated into a single point of fruition. A code-based, smart urbanism, that does not need to engage with space, urban form and specific hyper-local contexts that much, is something that very much approximates an approach of ‘gamifying’ the city, making it fit into one or more screens. Gelernter, in proto-internet times, had envisaged the rise of the ‘mirror worlds’ that would do exactly that: allow analysis and actual control over urban environments ‘without changing out of your pajamas’ (1992; 23). A fairly rich history of ‘mirror’ urban projects followed, initially blending forms of centralised representation and control, with a social sensibility and opportunities for – digital – social interaction, such as the Helsinki Arena 2000 or Digital City Kyoto (Ishida, 2000). These then evolved into the current object of heavy and widespread R&D as ‘digital twins’ (Batty, 2018; Cureton and Dunn, 2021), as well as the parallel, physical manifestation of centralised, top-down surveillance and control of the city through a proliferation of urban control rooms (Luque-Ayala and Marvin, 2016) [Figure 2].





**Figure 2.** Urban control room in Curitiba, Brazil. (Photo: Alessandro Aurigi)

This idea of centralised, expert-driven urban planning and management is not new, but rather taking a new lease of life – and an operational and capacity boost – from the new technologies. Bolter and Grusin (1999; 182-183) had argued that cyberspace, despite being normally associated with an idea of transcendence, disruption and innovation, in fact tended to ‘refashion and extend earlier media’ through a process of ‘remediations’. It could be argued that smart urbanism, in its mainstream, urban science, algorithm-driven format, also remediates top-down, expert planning practices. Discussing the origins of modernist planning, Dear noted how ‘By the beginning of the twentieth century (...) planning discourse had been realigned to emphasise “unity”, “control” and “expert skills”’ (1995; 31). The necessity for modernist planning and urban design of working on generalised assumptions, lead to unitary and totalising visions of how the city works – or should work – and how people should inhabit it, but by doing so it also made it ‘essentially placeless’ (Shane, 2005; 46). The scientific approaches of modern city planning, which have produced much of the thinking and practice on today’s city-regions, by working at the very large scale, and informed by expert-owned logics and frameworks, have been seen to ‘inevitably distort or elide personal and communal knowledge or logic’ (Shane, 2005; 82).

Whilst it could be argued that the nature of ‘big data’ is of being capillary and comprehensive, and that citizen involvement is important to make the smart city mechanisms function, Cardullo (2021; 70-71) has noted how limited this can often be, reducing citizens and communities as passive ‘customers’ or simply feeding, through the use of apps and other information-collecting mechanism, raw data to a central ‘expert’ system that remains off-limits. The origins of the highly successful Sim City videogame provide interesting reflections on expert systems and urban development. Baker (2019) explains how Jay Forrester’s Urban Dynamics theory of 1969 informed the game. This had

framed the functioning of a city through a highly abstracted model of 150 equations, where there were 'no neighbourhoods, no parks, no suburbs, and no racial or ethnic conflicts'. Baker mentions how commentators 'worried that the game's underlying code was an "unreachable black box" which could "seduce" players into accepting its assumptions, like the fact that low taxes promoted growth in this virtual world'. Modelling an urban phenomenon – let alone an entire ecosystem – always simplifies it, and by doing so generates frameworks to understand and manage the reality of place which can be highly, and sometimes rather un-transparently, selective. As in Sim City and its underpinning model, in the smart city of today 'data collection, analysis, communication and decision-making processes are performed by actors that are one or more steps removed from the local context in question' and such distance masks 'the people, methods, questions and rationales that lie behind the claims of seemingly neutral and objective data-driven knowledges' (Cook and Karvonen, 2023; 8). And, beyond the decision-making end of the process, data collection can also be skewed. Anselin and Williams for instance highlight a parallel between more or less intensively 'digital' neighbourhoods in New York, where the latter tend to have a higher proportion of minorities and low-income residents. This, they argue, prompts reflections on how representative and valid some forms of 'big data' and the consequent models can be, when obtained through media analytics tools (Anselin and Williams, 2016). These gaps could be further amplified through the implementation of Artificial Intelligence (AI) algorithms which, within fairly unregulated environments, and driven by private interests, can further push specific neo-liberal models and logics of urban development and management, hidden within its technological black box (Palmini and Cugurullo, 2023).

Dear's description of top-down, control-based urbanism seems to still fit extremely well with current algorithmic approaches to smart urbanism. Cook and Karvonen acknowledge such parallel, noting the 'striking similarities between the instrumental and analytic rationalities of contemporary smart city developments and the expert-led urban planning practices of the early- to mid-20th century' (2023; 2). Referring to Berman's discussion on the limits of modernism to keep up with modernisation (1982), Dear notes how one consequence of this are a 'radical flattening of the perspective' and a 'shrinkage of the imaginative range' (Dear, 1995; 34-35).

The rise of digitally-enhanced urbanity, rather than providing a truly alternative view of urban management and design, has therefore reinforced debates and questions on the 'right to the city' and who can proactively enact change in a digitally-driven environment (see for instance Foth et al, 2015). It could be argued that a renewed attention towards seeking deeper connections with communities and places, and their embedded wisdom and capabilities, puts the neighbourhood – in both the 'analogue' and 'digital' versions of the city, firmly back in the picture.

### **Reconnecting with places and communities**

The approach proposed by mainstream smart urbanism seems to be framing an idea of the city where both physical space and design, and local community and place, surrender relevance over to invisible networks of sensors and geo-located apps, feeding mainly centralised expert systems, displays and control rooms. Does it therefore still make sense to discuss the role of neighbourhoods in the (smart) city, and in what ways? Positions that advocate for the need to engage with the neighbourhood scale, already present within planning and urban design debates, can be translated, and remain relevant, for smart urbanism. There is a case to be made for the importance of reconnecting smart discourses with the hyper-local. This is expressed through space, and the

importance of the small scale – and a consequent multi-scalar, holistic approach to place-making – as well as the power of neighbourhood and community-based agency.

#### *Approaching place in a multi-scalar, holistic way*

Highlighting the tension between orthodox planning knowledge and the positive experience of a relatively informal New York neighbourhood, Jacobs (1992 [1961]; 11) pointed at the trade-offs of top-down models, frameworks and systems. Whilst these can have a role in the already highly schematic planning of regions and large-scale swaths of territory, the risk of missing out the richness of place, and entire key aspects of it, found at the smaller scale, is significant. Burger et al (2014; 836), discussing the planning of Polycentric Urban Regions (PURs) and the Randstad in particular, acknowledge how different functions need considering different scales than the regional one. They also mention how Davoudi (2008) emphasises the need to transcend the simplification of planning frameworks, mainly based on economics and efficiencies, to re-include the social, cultural and environmental aspects of place. Urban designer Jan Gehl (2011) notes that in public space-making ‘the battle for quality is won - or lost - at the small scale’ (131). Referring to mediated communication and improved mobility in cities, he notes that despite these being often portrayed as opportunities for compensating loss of spatial quality in urban environments, ‘the fact that there is still widespread criticism of the neglected public spaces is indeed thought provoking. Something is missing’ (49).

A view from the ground up, based on the local realities and place, its spaces and affordances, and its inhabitation, can be a strongly qualitative and rich complement to any centrally managed and planned civic approach. These comments all point, in their own way to the importance of a multi-scalar, holistic and grounded approach towards knowing the city and intervening on it. The understanding of the city offered by the zoomed-out view of modernist planning – but also of smart control centres – needs the augmentation offered by ‘zooming in’. This is not just more of the same at a different scale. It is not about increasing the amount of information, but about capturing and including entirely different aspects of urban reality.

#### *Neighbourhood-based agency*

Multi-scalar inclusion is not just a matter of what we know and consider about the city, but also a matter of how change can be enacted and by who, and the importance of local appropriation and adaptation. Spatial agency, intervening on one’s space, has been seen as the capability of acting in alternative, lateral or original ways, which are not necessarily dependent on the stable and codified knowledge of professionals or institutions. It has been noted how acts of local appropriation can be particularly important in situation of economic scarcity, to engage with and tap into local space and resources, or prevent exploitative external interventions (Awal et al, 2011; 73-74). The potential for local, bottom-up action can also open up opportunities for original small-scale and more risk-manageable experimentation. Urban neighbourhoods have been seen as the ideal dimension for conceiving new ‘emancipatory initiatives’ and micro-projects of social change and innovation, ‘that may ripple through the city’ (Moulaert, 2010; 5). Describing the tensions and dynamics between top-down planning and local agency in China, in the case of rural communities forcibly relocated to new urban areas, Zhang et al note for instance how successful small-scale, local spatial adaptations mean that ‘the privileged place of action is the neighbourhood, via the practices and customs of everyday life’ (Zhang et al, 2018; 1547). In their examples, locals would introduce alternative, un-planned approaches for using public or residential spaces in their neighbourhood in ways that are better connected with community culture and practices. These ended up being small-scale enough to be



acceptable to political and planning authorities, yet significant enough to enliven the ir new town, socially, culturally and economically.

### *Space, agency, and the digital*

Critical discourses about the digital/smart city, beyond the more mainstream and industry-driven views of centralised control and management, mirror and extend some of the above reflections. They argue in favour of the richness of place and the potential of local and hyper-local agency and, somehow, for a key, qualitatively important role of the neighbourhood scale . In fact, these can further highlight and amplify the need to re-connect – or keep a deep connection – with place, in response or reaction to digitalisation.

In early debates on the relationship of cities and digital technologies, Paul Virilio had argued that the rise of cyberspace and its ability to bring people into a virtual, global dimension, increasingly separated from actual places, would disorientate and disempower them to act in cities. It would facilitate the ‘social quietism’ of a ‘hardened lounge lizards’ (Virilio, 2000; 62), and result in a loss of agency and an inability to intervene on physical environment (Virilio, 1993; 11). Such potential dissociation has been further echoed in more recent commentaries, where the loss of relevance of, and engagement with space, has been seen as being compounded by a more general loss of agency, as this is consigned into the hands of expert algorithms. Mattern (2017) has argued that ‘Instead of more gratuitous parametric modeling, we need to think about urban epistemologies that embrace memory and history’ and ‘appreciate the wisdom of local crowds and communities’. Greenfield has advocated for what he defines as a ‘minimum viable utopia’ approach to the smart city, as opposed to general, all-encompassing systems. This responds to the friction and ‘other’-eliminating epistemic ‘bubbles’ which optimisation and urban management logics are dependent on, with ways to re-imagine networked technologies at the service of urban form and experience compatible with citizens’ needs (Greenfield, 2017; 25). Aurigi and Odendaal (2020) have also discussed how off-the-shelf, techno-centric approaches to making cities smarter ignore or minimise the importance of hyperlocal context and ‘interstices’ – the latter being spaces of resistance to spatial and social homogenisation – fundamentally pushing visions and models which easily end up being simplistic, disempowering, and socially exclusive [Figure 3]. The parallels between wider planning and smart city-related critiques on the importance to re-engage the local, are clear. The experiences – and relative successes in harnessing small but significant portions of local space – of the re-located rural residents in Zhang et al’s case study (2018) were facilitated by, and generated in, those interstices where the limited and negotiable scale of things allowed to act ‘otherwise’ through the affirmation of everyday spatial and social practices.



**Figure 3.** Smart and hyper-local and community realities in Africa. (Photo: Nancy Odendaal)

### **Towards shaping digital neighbourhoods**

This idea of grounding high technology and making it somehow bespoke to and/or appropriated by communities, rather than just being a reaction to the emerging command-and-control logic of 'big-scale' smart, can lead to looking at a digitally-augmented version of the neighbourhood, and what possibilities this opens up. In a way, neighbourhoods – as well as cities in general – are already 'digital' and pervaded by ubiquitous high technologies used both at a personal and social level, and as part of modern infrastructure and services. What can make a difference though is the idea of proactively appropriating and shaping technology locally, to make it work with place. I would argue that this articulates through the dimension of social interactions and participation, and a contextualised hacking, re-invention and experimentation of services and infrastructure. Effective contextualisation and intervention at the neighbourhood scale also implies approaching digital place-making as a process of re-combination of the various layers of place.

#### *Networking communities*

The idea of community – and neighbourhood – digital networking is not particularly new. It was a very powerful stance at the dawn of discourses on the digitally-enhanced city, when somehow a lower emphasis on sensing and automation, and a much lower interest in cities from high tech global conglomerates, allowed the foregrounding of a more human and place-centric way of thinking. Schuler, amongst others, had discussed and advocated for the digital networking of communities as

an instrument to re-invigorate and empower them (Schuler, 1996). High technology was seen as having a strong potential to boost how places could function and improve, with an emphasis on the 'digital' being not just the only game in town, but one added dimension, in need to re-combine with people, and the spaces they inhabit, to generate sustainable results. Early research on the very concept of the 'digital neighbourhood' explored how digital networking or a physical suburb in Toronto could lead to enhanced and extended sociality amongst residents, combining electronic and spatial proximity (Hampton and Wellman, 2000). The neighbourhood dimension was also further involved when looking at initiatives of local digital experimentation to engage and benefit low-income communities, and how technology could be leveraged to enable and boost social capital and collaboration within a deprived urban area, in the MUSIC (Multi-User Sessions In Community) project (Shaw and Shaw, 1999). Again, one of the most interesting aspects of early experiments such as this was their strategic willingness to re-combine space, people and technology. The MUSIC project for example placed devices only in certain 'champion' households, with the specific aim of encouraging residents to visit and connect more with each other. Drewe also acknowledged the importance of engaging the local dimension in envisaging practices for shaping the digital city. He talked about addressing challenges for the 'network city' through 'design studio' exercises – for example considering the application of 'tele-activities in neighbourhood telecenters' 'to improve the living conditions of the elderly' (Drewe, 2005; 117). More recently, studies on digital place-making, invoking the very concept of 'digital neighbourhoods' have been conducted in various European contexts. Willis has discussed the case of rural villages in Cornwall, UK. This involved analysing, similarly to how Hampton and Wellman had done in Toronto, the growth and improvement of personal connections and a sense of community when online social networks and place-based networks are integrated, and supported by specific physical places like village halls and libraries (Willis, 2017). The idea of 'neighbourhood development' and the related use of digital platforming, mainly geared at helping ageing residents to remain socially active, has been analysed through looking at a cross-national digital project involving fourteen neighbourhood in Germany, Austria and Switzerland (Renyi et al, 2022).

#### *Re-inventing infrastructure and services*

Shaping the 'digital' neighbourhood as a proactive arena for change from the small scale up, is not limited to networking communities to enhance socialisation. The potential for the hyper-local scale to host and nurture micro-projects and emancipatory initiatives finds new energy with digital augmentations, addressing in novel ways how resources, infrastructure and services can be re-invented through local appropriation. Whilst digital 'platforms' – think for example of Airbnb – have been critiqued as systems that can be top-down, generalising and exploitative (Sadowski, 2020; 450), alternative views of how these can stem from more locally grounded urban knowledge and practices have also been proposed. Ampatzidou et al (2014) have produced a research manifesto and design toolkit for 'The Hackable City', where platforming is democratised and associated with the notion of the 'commons', and communities harnessing urban digital projects for the public good. The hacking idea is also widely highlighted in discussions on digital transformations in the Global South and urban African contexts. Guma (2021) explores the local, physical hacking of 'smart' urban ATMs for the purchase of clean water in Nairobi. Odendaal describes examples of successful, disruptive appropriations of digital platforming in areas like informal transport and food distribution and street retail, that impacted 'in ways contrary to what was intended' (Odendaal 2023; 4). This, importantly, involves experiences where 'the problem to be solved was locally defined and analysed, and the platforms were refined or developed locally, applied to situated issues' (2023; 108).

#### *Re-combining (digital) place as a process, not a product*

The opportunity for conceiving smart projects deeply cognisant of, and connected with local context, is further amplified by considerations about time and organic development, as opposed to the off-the-shelf application of a smart city constituted of entirely ready-made and portable hardware and software products. Aurigi (2020) has discussed how, by declaring the city as versing in a critical condition, prevalent commercially and technically-driven discourses pushing the need for smart city technology tend to frame place, with its physical space as well as communities, as something that has lost its ability to cope with the problems it faces. This anti-urban stance leads to conceiving, and designing, agency in the smart city through a series of inter-connected products – that can be simply over-imposed onto place. This stance reinforces a differentiation between a modernist – or neo-modernist – approach towards smart as a new frontier where technology is the new side of a good-for-all, instantly applicable ‘international style’, and a more deeply and organically embedded practice. Picon has drawn a parallel between smart urbanism trends and the re-engagement with time and history by some architects and urbanists of the post-war period, like Aldo Rossi who in his *Città Analoga* envisaged a break with *tabula rasa* modernism. He argues that ‘The city appears as a palimpsest of interventions of all kinds. Smart cities cannot be conceived all at once; they must allow for similar processes of accretion’ (2015; 155). This re-affirms again the centrality of place – with its historic and cultural specificities and complexities – rather than the role of add-on products, as a factor facilitating the growth of more viable and sustainable smart urban environments. Odendaal has noted how the alternative approaches she has researched, ‘are enacted and developed over time, and represent a distributed agency’ (Odendaal, 2023; 4), clearly signalling the attractions and social benefits of a smart urbanism that allows not just a more democratised, community-engaged set of interventions, but that stems from a process which is adaptive, organic and often hybrid. Deeply engaged, and recombining with, rather than over-imposing, the physical and social components of place.

### **Beyond the dualism: interplaying metropolitan and neighbourhood scales towards a socially sustainable smart city**

The paper has looked at the hyper-local and neighbourhood scale and its relevance for the shaping of socially sustainable and progressive (smart) cities. It has noted how Davoudi (2008) and other commentators had called for a renewed attention to place and its social and cultural aspects, beyond focusing only on efficiency issues. Referring directly to smart city-shaping, Hollands has also called for a re-balancing of priorities, noting how ‘many of our major urban problems are not technological, but social, like poverty and inequality, and have been exacerbated, not solved, by corporate privatisation and city branding strategies’ (Hollands, 2015; 73). Whilst quantitative, optimisation-based smart urbanism could – to an extent and still depending on many other non-technological factors – help with the all-important climate and energy emergencies, it could be argued that no amount of modelling can easily and thoroughly address some of the parallel and equally urgent social sustainability key challenges that are being faced. It is hard to imagine boosting social capital or combating loneliness exclusively through the deployment of algorithms and big data, whilst smart neighbourhood approaches can do just that. The local scale of course can only be successfully addressed through context-sensitive work. Unlike regional or metropolitan perspectives, it lends itself badly to a birds-eye view of smart, or to be dealt with through purely abstract models. It embeds wisdom and potential for agency that expert systems cannot otherwise utilise, and that might transcend any deterministic assumptions embedded in their algorithms. After all, there are all sorts of differences between having sensors, and Jacob’s ‘eyes’ on the street (1992 [1961]), and the former will not simply be able to replace everything the latter has to offer. The neighbourhood scale is eminently qualitative and can be effectively approached through such methods of analysis and intervention, requiring a place-based and holistic approach, acknowledging the agency of physical

space and community, not just technology. When operating in and through neighbourhoods, it becomes somehow impossible to divorce the immediate social and physical contexts from projects, and successful initiatives will recombine these key aspects. Consequence of this richness is that the way (smarter) neighbourhoods can complement and ‘save’ the smart city is not by just being data collection units, and units of analysis, within wider models – though this will also obviously happen. Even approaches looking at ensuring a degree of public and community awareness or literacy in smart tools and facilities, however useful, fall short of harnessing the power of place. Enabling and fostering proactive local agency, resulting in new, re-combined, ideas and designs seems to be the way to unlocking socially and community-oriented smart. This paper has noted how the early history of ‘digital’ city and community networking projects was characterised by such efforts, and is advocating that such perspectives are – or should be – still strongly relevant.

However, when looking at the potential for positive and inclusive disruption and innovation of local, neighbourhood and place-based initiatives, it is necessary to stress the need of overcoming any apparent, simplistic dualist approach characterised as top-down Vs bottom-up, and acknowledge the relevance of cross-scale, and cross-institutional, interaction. In the previously discussed example described by Zhang et al, the residents forcedly moved to a new urban neighbourhood, were able to introduce changes thanks to an ability to perform an almost tacit dialogue with the authorities, through a ‘process of compromise and accommodation’ (2018; 1557).

A richer and more sustainable approach towards will benefit from an institutional participation aimed at integrating and coordinating the local and metropolitan dimensions. In this sense, the idea of smart neighbourhoods is not severed from the wider smart city, but enriches it. The diagram in Figure 4 outlines the differences in the vision of space and place, agency, and the approach to smart projects, that exist between the current ‘mainstream’ and industry-driven approach to the smart city, and one that stems from developing a proactive ‘digital neighbourhood’ dimension. These different, somehow opposed ways to conceive smart places can however become complementary, and their intersection suggests a series of key strategic points for shaping a more sustainable and inclusive smart.

	Mainstream, metropolitan smart city	Integrating neighbourhoods into socially sustainable smart cities	Smart neighbourhood development
<b>Space and place</b>	<i>Perspective</i>	System view, abstract and diagrammatic	Holistic, multi-scalar approach. Smart place as a palimpsest, tackled through a combined quantitative and qualitative methodology grounded in context
	<i>Scale</i>	Universal, economies of scale	Specific/contextual, diverse
	<i>Role of places</i>	Locales, people and urban objects as units of analysis, data points and sensing organs. Place read quantitatively	Locales as places of physicality, memory, culture, contest and dialogue. Place read qualitatively
<b>Agency</b>	<i>Knowledge and agency</i>	Expert knowledge, sensed and measured data, expert/AI algorithms	Local knowledge/wisdom, community participation and appropriation
	<i>Role of ICTs</i>	ICT-dominated, smart as over-imposed add-on providing ‘solutions’	Place-dominated, ICTs depend on, and dialogically recombine with, physical space and communities
<b>Process and projects</b>	<i>Framework</i>	Rigid, planned and theory-based. Mainly deterministic in nature	Flexibly interpreted, adaptive, experimental, organic
	<i>Mission</i>	Manage, regulate, optimise, cure urban issues	Challenge, disrupt, re-invent, customise

**Figure 4.** Articulating the neighbourhood scale into socially sustainable smart cities. (Source: Alessandro

Aurigi)

Impactful and sustained initiatives will benefit from the connection and collaboration between local communities and central institutional agents, as well as patronage and validation from the latter. According to Moulaert, this dialogue and connection between scales and stakeholders is what can support effective social innovation. He stresses both the nature of cities as open systems, hence seamlessly connected, and the need of leveraging such cross-scale connectivity in order to facilitate local experimentation on the one hand, and the possibility of spreading and scaling up innovative ideas on the other. He notes that, whilst locales are ‘the site of existence of a proactive community’ (2013; 11), these cannot be looked at in isolation, and wider connections are an important part of the picture. This includes governance and decision-making, which need to benefit from an embedment ‘in wider movements and governance structures’ (2013; 13). This can be an important point not just for inter-institutional dialogues, but for industrial involvement too. On the one hand, an economy of scale imperative might make it difficult and somehow commercially unpalatable for large tech corporations to look and invest into hyper-local smart environments and bespoke projects. Yet, these can provide a lower-risk arena for exploring or trialling innovative products and collaborative processes.

Amongst the many examples of projects that aim to digitally enhance place and neighbourhoods, including the ones referred to in this paper, there is a parallel thread, identifying the importance of ‘beyond neighbourhood’ government/governance involvement. This has been discussed both for more city-wide, centralised and overarching initiatives, and for more diffuse families of discrete interventions. The policy and governance opportunities of allowing a degree of permeability between central institutions and agencies, and local community groups, enabled to locally manipulate wide-scale systems such as urban dashboards, have been highlighted (Kitchin et al, 2020). But in the UK-based cases of more fragmented and diverse smart landscapes, as described by Cowley and Caprotti (2019), an equal and opposite need for providing a way to strategically ‘stitch’ and include local or sector-specific projects – for example mobility-related ones – into wider visions has been noted. Valdez et al (2021) after carrying out in-depth research in the smart developments of Milton Keynes, have noted how a more inclusive smart city needs cross-scale collaboration, with the joint participation of communities, institutions and organisations. Townsend also refers to a mature approach to vertical collaboration fostered from the governmental top level, by describing the work of the Office of the New Urban Mechanics in Boston, USA, a municipality-funded agency providing a strategic overview yet fostering bottom-up, local ideas and prototyping in ‘an almost guerrilla approach to smart city building’ (Townsend, 2013; 214-15).

Another more subtle example comes from the effort in revitalising an ailing high street in the Middelland neighbourhood in Rotterdam. This could easily be classified and seen under the ‘bottom-up’ smart lens, with a very local and limited field of action: a single street. Whilst involving the generation of a series of coordinated, hybrid physical and digital new ideas for the street and its shops, it however also reveals the importance of - amongst other factors – facilitation between central and local actors. On the one hand the description of the design process is strongly emphasising local interactions, with the ability of designers to act as embedded, participant facilitators amongst different neighbourhood-based stakeholders such as residents, shopkeepers and property owners. This also resulted in an ability and willingness on part of the local community to participate and leverage specific cultural knowledge as part of the new street ‘offer’ and attraction. On the other hand, however, key to enabling these very local actions towards co-creation, was the openness and devolving approach of the municipal government, encouraging and seeking local governance and voice in the improvement of place (Sakiinah et al, 2021; 126). When



such a relationship is missing, lack of support will often make bottom-up initiatives short-lived. Guma notes, talking about the failure of the M-Maji platform for selling water in Kibera to sustain itself, the fact that whilst its proponents 'were successful in facilitating collective, bottom-up, and grassroots action at its initiation, further work ought to have been done to engage other stakeholders beyond plain reliance on goodwill actors in the community' (2021; 333). It is obvious how these needs for cross-scale and institutional collaboration are political, qualitative in nature, and could hardly be addressed in a technocratic way. They require dialogue, compromise and the subtleties proper to human agency. They are also meaningless when divorced from the realities of local spaces and communities.

The sustainable development of local smart projects, and the ability of some of them to even spread out and scale up, requires a strategic overview and facilitation, devolution and support from the urban institutional 'centres' to local places. Beyond 'control rooms' and management-based approaches, socially sustainable and progressive smart urban development will also require fostering micro-projects and lateral approaches to smart, in a multi-way dialogue amongst the many, diverse physical and community components of a truly and inclusively networked city.

## REFERENCES

- Ampatzidou, C., Bouw, M., van de Klundert, F., de Lange, M., de Waal, M. (2014) *The hackable city: a research manifesto and design toolkit*. Amsterdam: Knowledge Mile
- Anselin, L. and Williams, S. (2016) Digital neighborhoods. *Journal of Urbanism: International Research on Placemaking and Urban Sustainability*. 9:4, 305-328
- Aurigi, A. (2020) Designing the City as Place or Product? How Space is Marginalised in the Smart City in Willis K and Aurigi A (eds) *The Routledge Companion to Smart Cities*. London: Routledge
- Aurigi, A. and Odendaal, N. (2020) From 'Smart in the box' to 'Smart in the city': Rethinking the Socially Sustainable Smart City in Context, *Journal of Urban Technology*, DOI: 10.1080/10630732.2019.1704203
- Awan, N., Schneider, T., Till, J. (2011) *Spatial Agency: Other Ways of Doing Architecture*. London: Routledge
- Baker, K.T. (2019) Model Metropolis, *Logic*, issue 6, <https://logicmag.io/play/model-metropolis/>, last accessed 10/8/23
- Batty, M. (2018) Digital twins. *Environment and Planning B: Urban Analytics and City Science*. 45(5), 817–820.
- Berman, M. (1982) *All That is Solid Melts into Air: the Experience of Modernity*. New York: Penguin
- Bolter, J.D., Grusin, R. (1999) *Remediation: understanding new media*. 6. Nachdr. ed. MIT Press, Cambridge, Mass.
- Burger, M.J., van der Knaap, B., Wall, R.S. (2014) Polycentricity and the Multiplexity of Urban Networks. *European Planning Studies*. 22:4, 816-840, DOI: 10.1080/09654313.2013.771619

- Campbell, K. (2011) *Massive Small: The Operating Programme for Smart Urbanism*. First edition. London: Urban Exchange
- Cardullo, P. (2021) *Citizens in the “smart city”: participation, co-production, governance*. Routledge studies in urbanism and the city. London: Routledge
- Cook, M. and Karvonen, A. (2023) Urban planning and the knowledge politics of the smart city. *Urban Studies* 1–13, DOI: 10.1177/00420980231177688
- Cowley, R. and Caprotti, F. (2019) Smart city as anti-planning in the UK. *Environment and Planning D: Society and Space*. Vol 37(3) 428-448
- Crompton, D., Cook, P., Archigram (Group), Cornerhouse (Gallery : Manchester, England) (Eds.), (1999) *Concerning Archigram*. 3rd ed. London: Archigram Archives
- Cureton, P. and Dunn, N. (2021) Digital twins of cities and evasive futures, in Aurigi, A., Odendaal, N. (eds.) *Shaping smart for better cities: rethinking and shaping relationships between urban space and digital technologies*. Smart cities series. London: Academic Press
- Dear, M. (1995) Prolegomena to a Postmodern Urbanism, in Healey, P., Cameron, S., Davoudi, S., Graham, S., Madani-Pour, A. (eds.) *Managing cities: the new urban context*. Chichester ; New York: Wiley,
- Davoudi, S. (2008) Conceptions of the city-region: A critical review. *Urban Design and Planning*. 16(2), pp. 51–60.
- Drewe, P. (2005) The “Network City”: A New Old Way of Thinking Cities in the ICT Age, in Albrechts, L., Mandelbaum, S.J. (eds.) *The network society: a new context for planning?*, The networked cities series. London ; New York: Routledge
- Foth, M., Brynskov, M., Ojala, T. (eds.) (2015) *Citizen’s right to the digital city: urban interfaces, activism, and placemaking*. Singapore, Heidelberg, New York: Springer
- Gehl, J., (2011) *Life between buildings: using public space*. Washington, DC.: Island Press
- Gelernter, D.H., (1992) *Mirror worlds or the day software puts the universe in a shoebox: how it will happen and what it will mean*, Oxford paperbacks. New York: Oxford Univ. Press
- Glaeser, E.L., (2012) *Triumph of the city*. London: Pan Books
- Graham, S., Marvin, S., (1996) *Telecommunications and the city: electronic spaces, urban places*. London ; New York: Routledge
- Greenfield, A. (2017) Practices of the Minimum Viable Utopia, in Bullivant, L. (ed.) *4D Hyperlocal: a cultural toolkit for the open-source city*. Oxford: John Wiley & Sons
- Guma, P. (2021) Situating urban smartness: ICTs and infrastructure in Nairobi’s informal areas, in Aurigi, A., Odendaal, N. (eds.) *Shaping smart for better cities: rethinking and shaping relationships between urban space and digital technologies*. Smart cities series. London: Academic Press
- Hampton, K.N. and Wellman, B. (2000) Examining Community in the Digital Neighbourhood: Early Results from Canada’s Wired Suburb, in Ishida, T., Isbister, K. (eds.) *Digital cities: technologies, experiences, and future perspectives*. Lecture notes in computer science. Berlin ; New York: Springer

- Hollands, R.G. (2015) Critical interventions into the corporate smart city. *Cambridge Journal of Regions, Economy and Society*. 8, 61–77
- Ishida, T. (2000) Understanding Digital Cities, in Ishida, T., Isbister, K. (eds.) *Digital cities: technologies, experiences, and future perspectives*. Lecture notes in computer science. Berlin ; New York: Springer
- Jacobs, J. (1992) [1961] *The death and life of great American cities*. New York: Vintage Books
- Kitchin, R., Coletta, C., McArdle, G. (2020) Governmentality and urban control, in Willis, K. and Aurigi, A. (eds) *The Routledge Companion to Smart Cities*, London: Routledge
- Luque-Ayala, A. and Marvin, S. (2016) The maintenance of urban circulation: An operational logic of infrastructural control. *Environment and Planning D: Society and Space* 34(2), 191-208
- Mattern S. (2017) A City Is Not a Computer, *Places*, February 2017
- Moulaert, F. (2013) Social innovation and community development: concepts, theories and challenges, in Moulaert, F., Martinelli, F., Swyngedouw, E., González, S. (eds.) *Can neighbourhoods save the city? community development and social innovation*. Regions and cities. London, New York: Routledge
- MoMA, Museum of Modern Art (1976) Italy: The New Domestic Landscape, release no.46, at [https://www.moma.org/momaorg/shared/pdfs/docs/press\\_archives/4824/releases/MOMA\\_1972\\_0053\\_46X.pdf](https://www.moma.org/momaorg/shared/pdfs/docs/press_archives/4824/releases/MOMA_1972_0053_46X.pdf), last accessed 14/9/23
- Norberg-Schulz, C. (1971) *Existence, Space and Architecture*. London: Studio Vista.
- Novak, M. (1994) [1991] Liquid Architectures in Cyberspace, in Benedikt, M. (ed.) *Cyberspace: first steps*, 7th print. Cambridge, Mass: MIT Press
- Odendaal, N. (2023) *Disrupted urbanism: situated smart initiatives in African cities*. Bristol: Bristol University Press
- Palmini, O., Cugurullo, F. (2023) Charting AI urbanism: conceptual sources and spatial implications of urban artificial intelligence, *Discover Artificial Intelligence*, 3:15 DOI: /10.1007/s44163-023-00060-w
- Picon, A., (2015) *Smart cities: a spatialised intelligence*. Ad primers. Chicester: John Wiley
- Renyi, M., Hegedus A., Schmitter, P., Berger, F., Ballmer, T., Maier, E., Kunze, C. (2022) Lessons Learned: The Multifaceted Field of (Digital) Neighborhood Development, *Journal of Community Informatics*, Vol.18 No.1, 1-23
- Rheingold, H. (1995) *The virtual community: finding connection in a computerized world*. London: Minerva
- Sakiinah, U., Mulder, I., van Boeijen, A., Darson, R. (2021) Designing smart to revitalize a multicultural shopping street, in Aurigi, A., Odendaal, N. (eds.) *Shaping smart for better cities: rethinking and shaping relationships between urban space and digital technologies*. Smart cities series. London: Academic Press
- Shane, D.G. (2005) *Recombinant urbanism: conceptual modeling in architecture, urban design, and city theory*. Chichester, England ; Hoboken, NJ: Wiley
- Schuler, D. (1996) *New Community Networks: Wired for Change*. Reading, Mass: Addison Wesley

- Shaw, A. and Shaw, M. (1999) Social Empowerment through Community Networks, in Schön, D.A., Sanyal, B. (eds.), *High technology and low-income communities: prospects for the positive use of advanced information technology*. Cambridge, Mass: MIT Press
- Sorkin, M. (1992) *Variations on a Theme Park*, New York: Hill and Wang
- Toffler, A. (1990) *The third wave*. London: Pan Books
- Townsend, A.M. (2013) *Smart Cities: Big Data, Civic Hackers and the Quest for a New Utopia*. New York: W.W. Norton & Company
- United Nations (2018) *68% of the world population projected to live in urban areas by 2050, says UN*, <https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html>, last accessed 14/9/23
- Valdez, A., Wigley, E., Zanetti, O., Rose, G. (2021) Learning lessons for avoiding the inadvertent exclusion of communities from smart city projects, in Aurigi, A., Odendaal, N. (eds.) *Shaping smart for better cities: rethinking and shaping relationships between urban space and digital technologies*. Smart cities series. London: Academic Press
- Virilio, P. (1993) The Third Interval: A Critical Transition, in Conley V. (ed) *Rethinking Technologies*. Minneapolis: University of Minnesota Press
- Virilio, P. (2000) *A landscape of events*. Cambridge, Mass: MIT Press
- Willis, K. (2017) Digital Neighbourhoods: Hyperlocal Village Hubs in Rural Communities, in Bullivant, L. (ed.), *4D Hyperlocal: a cultural toolkit for the open-source city*. Oxford: John Wiley & Sons
- Zhang, M., Wu, W., Zhong, W. (2018) Agency and social construction of space under top-down planning: Resettled rural residents in China, *Urban Studies*. Vol. 55(7) 1541–1560