

## Title

### Designing Smart Places: towards a holistic, recombinant approach

## Authors

Alessandro Aurigi, University of Plymouth, UK

## Abstract

The shaping of smart cities is being widely debated from either technological viewpoints – normally associated with the research and development of systems and devices – and from socio-economic and political perspectives. This chapter looks instead at the design of smart places as whole combinations – and re-combinations – of physical, digital and social aspects. It makes an attempt to evolve the discussion on smart design from a simple add-on logic of digital over physical to what it means in terms of challenges and opportunities for the design process and the thinking behind it. This stems from a re-engagement with and re-discussion of two fundamental spatial design notions: context and affordance. As ‘smart’ re-combines these in potentially new ways, architects and urban designers need to be aware and able to embed these new possibilities as part of an extended toolbox.

## Keywords

Smart place, place-making, spatial design, urban design, context, affordance, design process

## 1. Introduction

Much is being discussed and written about smart cities and places. Fairly recently, extensive surveys of smart city-related literature have been carried out (Mora et al, 2017) giving a much-needed overview of the field. Yet, the pervasiveness of technology makes this a vast and diverse landscape. Two very different foci, both contributing towards city shaping, seem to prevail. One, mainly stemming from the disciplines of human geography, planning and economics, looks at how at an urban or metropolitan level, high technologies are becoming part of the planning and organising of the city, its services, and its economic and social and community relationships. Another, generated within the wide domain of the ‘design’ disciplines to include industrial/product but also system, interface and interaction design, emphasises the role of high tech in conceiving smart urban elements such as screens, interactive urban furniture, robots and systems. These augment the built environment and facilitate various degrees of ‘located’ public information and participation – from surveying the public to new ways of appropriating the public sphere through collaborative appropriation of the city (de Lange and de Waal, 2019).

Reflecting on the ‘design’ of smart places means first of all acknowledging how the field is extremely vast, diverse, and subject to competing interpretations, as can be the notion itself of ‘design’ if – beyond the specificities of established disciplines – we look at it as a proactive and planned act of modifying place with the intent of improving it. So, diverse areas of smart-city thinking – it could be argued – can all naturally contribute.

Smart urbanism perspectives on metropolitan and regional scale focused on productivity and innovation (Mora et al, 2018; Yigitcanlar et al, 2018); political and social discourse, equality and participation (Kitchin et al, 2015; Söderström et al, 2014; Vanolo, 2014; Hollands, 2008; 2015; Foth et al, 2015); urban ecologies (Caprotti, 2014); the role and politics of digital infrastructure (Luque-Ayala, and Marvin, 2020); urban large-scale visions (Melhish et al, 2017; Rose and Willis, 2019) and more comprehensive reviews of the field (Willis and Aurigi, 2017), all inform the shaping of place. Almost inevitably discourses focusing on the planning aspects of the city and its socio, political and economic implications, embrace a metropolitan or regional scale. Smart urbanism and political economy looks at the influence of policy over the development of civic technological ecosystems. This of course implies studying and understanding how relationships amongst communities, institutions, industry and capital unfold, how technologies are socially shaped within such arena, and how they can affect civic shape and functioning. Their contribution towards moderating otherwise easily pushed technological deterministic views and the hype of smart urbanism as the new panacea for sustainable development is invaluable. However, whilst they are ‘spatial’ as they can inform city shaping through large-scale infrastructural intervention and improvements in governance mechanisms, they operate less at the local scale, and have less of a direct bearing on the specific design of places as inhabitable parts of it.

At the other end of the spectrum, there are approaches to both critically discuss and practice the design of those systems and (smart) objects and artefacts that constitute the key building bricks, and practical ideas, on which the smart city vision can be materialised. See for instance the Carlo Ratti Associati-designed prototype for a ‘dynamic street’ modular intelligent paving proposed to the now defunct Waterfront Toronto scheme led by Sidewalk Labs (Walsh 2018); or the work of the Media Architecture Institute (<http://www.mediaarchitecture.org/>) or the Urban Informatics research group (<https://research.qut.edu.au/designlab/groups/urban-informatics/>); or international networks and festivals of urban interactive installations, such as Bristol-born The Playable City (<https://www.playablecity.com/>). There are of course differences between built-environment and art-type projects, with the former focusing more closely on fulfilling a functional programme and a higher degree of permanency. Yet much of the smart installation-related debates tend to be focused on an extremely hyper-local scale often centred on the technological artefact and its positioning in its immediate surroundings, very often in a similar guise as what can be seen in the design of urban furniture. Practical smart design often focuses on the product-like shaping of ‘located’ yet highly portable interactive objects and systems. Within such logic, the prevailing perspectives tend to concentrate on the micro-scale of the citizen-user and their interaction with the new technological ‘intelligence’ being added on the urban scenery, buildings and services. What is designed are mainly systems and objects which will be ‘located’ in an urban scene. Much attention goes towards the creative configuration of new functions and possibilities experienced through technology, and the all-crucial interfacing of such systems with their human users.

Both these prevailing approaches are not geared for looking at the dimension of the urban place – squares, streets, neighbourhoods – or more generally ‘transactional zones’ (Smith, 1977; 180) as local environments that are inhabited and experienced, and ideally designed, as a spatial whole. The large and the hyper-local scale views can look at civic space as a ‘territory’ for metropolitan phenomena and networked systems, or as a physical scene or

support for the location and functioning of smart objects and installations. Geographers have acknowledged the advantages of connecting the social and functional aspects of these two dimensions and enriching socio-political analysis by building bridges with the world of practice (Kitchin, 2015; 134-135). It remains equally relevant to try and fill the spatial scale ‘gap’ of the design of that intermediate dimension that more strongly and fully can relate to the notions of place and public space. This means looking at the design of urban habitats not as the steering of institutional and social relationship or the configuration of intelligent products, but as a strongly multi-dimensional task of dealing with place relationships existing in a physical/digital re-combined world. This chapter tries to adopt this perspective, and look at:

Firstly, how smart place-making has been characterised by approaches that focus either on the technological artefact and its design, or on the social implications of installations, in terms of use, co-design and participation. This is only apparently opposite mainstream architecture’s emphasis on the pre-eminence of physical space and place, but it shares with it an inability to look at and design place as a whole. The prevalent narratives – and projects – of digital place-making seem to be based on linear trajectories where an aspect of place, normally technology, is the change agent.

Consequently, how overcoming partial interpretations of smart place design towards a more holistic and re-combined view of it requires a critical re-engagement with important design notions. Re-thinking context-based relationships and multi-dimensional aspects of agency and affordance re-connects us with a wider field of spatial and urban design knowledge and practice, and challenges and extends our ‘smart’ design approach and process.

## **2. The making of place as a non-linear endeavour**

When architects design ‘spaces’ they tend to orchestrate a two-way relationship between context and proposal, often focusing on a linear process and trajectory, privileging the role of designers in determining the object/building that the client wants. This is often embedded in professional guidelines. For instance, the UK’s RIBA Plan of Work (2020) is strongly informed by transactional views, where design is rather sharply separated from the social aspect of ‘use’ – to which stage n.7 of the Plan is dedicated, and that is nevertheless still concerned with expert-owned actions such as post-occupancy evaluation and facilities management. A societal and community dimension of spatial design is mentioned in the Sustainability Strategy part of the document, with some generic reference to place-making and consultation, yet still mainly framing people as end-users of the final build.

Many valuable contributions have emerged on the need to move away from simplistic one-way, one-dimensional, and often one-agent, perspectives on how our inhabited and social environments can be designed. For instance, the idea that the shaping of space could not be simplistically framed as something exclusive to a restricted group of experts owes much to Henri Lefevbre’s work (1991), discussing how space is socially produced. More specifically, architectural culture assuming that buildings and spaces are completed by design (and by a designer), and will then become immutable agents that influence their occupants’ behaviour, has been challenged by Stewart Brand’s much-celebrated critique in *How Buildings Learn* (1997).

Widening these perspectives however does not imply a ‘swap’ or replacement of agency, where the designed space’s role moves from dominance to irrelevance. Awan et al highlight a mutual relationship and influence where ‘Spatial agents are neither impotent nor all powerful: they are negotiators of existing conditions in order to partially reform them’ (Awan et al, 2011; 31). Urbanist Jan Gehl, and before him Jane Jacobs (1992, original 1961) who strongly informed his work, has also aimed to shift the focus in urban design away from a built form-led perspective on civic renewal and the need to integrate everyday ‘life’ not as an afterthought, but as a generator of place design and quality (Gehl, 2006; 75). These ideas affirming a holistic and community-involved approach towards the shaping of our spaces have fuelled the theorization and practice of ‘placemaking’, advocating the need to discuss and tackle how we can ‘create a place, not a design’ (Project for Public Spaces, 2018; 13). .

This shift from a transactional to a combined and complex view of place-making and design marks an understanding of and converging towards mutual, non-deterministic trajectories and relationships between the various dimensions of place. By doing this it introduces the need to re-balance and enrich our approach, rather than replace it altogether. Within this logic, the rise of high technologies does not and should not make redundant the knowledge we have accumulated on good civic and spatial design (Aurigi, 2013). This remains relevant within debates involving the participation and potential disruption of high tech in the making of place, something that we can call ‘smart’ place-making, or even smart place design, assuming this embraces the progressive views just discussed. Gehl for example argues that whilst communication and interaction technologies can offer ‘Abundant possibilities (...) precisely for this reason, the fact that there is still widespread criticism of the neglected public spaces is indeed thought provoking’ (Gehl, 2011; 49). It would therefore be a mistake to accept technology as the new replacing, determining factor, and somehow an independent variable that gets ‘added on’ to induce change. Has the way we design ‘smart’ benefited from these more ‘circular’ and intertwined ways of framing the making of place? Only in part, the next section argues.

### **3. Smart place design: determinism, partial approaches and recombination**

Early debates on the implications of the emergence of ‘cyberspace’ for architectural and urban environments saw on the one hand an obvious emphasis on the replacement power of ICTs and the fact that these could revolutionise lifestyles as well as conceptions of space and ecologies leading to a prevalence of the digital over the physical dimension of place (see for instance the various contributions in Benedikt, 1991). On the other hand some less one-way deterministic positions on how space, technology and people would mutually influence and challenge each other were formulated, particularly by William Mitchell with the idea of ‘recombinant architecture’ (Mitchell, 1995; 47-105) and through a follow-up volume by Thomas Horan (2000). The core merit of Mitchell’s and Horan’s insight was looking at ICT-rich spaces as the product of two main phenomena. The first saw physical agency at play, where elements of the built environment could exploit ICTs to fragment and re-configure into new typologies and spatial combinations. The second complemented the former with ‘soft’ agency where digital elements would take part in the re-combination process to generate smart elements – spaces or objects – where increasingly ‘function follows code’ (Mitchell, 1999; 50). These two main dynamics would of course work concurrently and frame smart spatial design as a complex and circular challenge involving the mutual interaction of space and software. Horan (2000) further expanded on this approach through discussing the ideas of

‘fluid locations’, extending the discourse on new typologies to look at how spaces could be proactively programmed, and of ‘meaningful places’ as ‘the need to design digital places in a manner that respects the functional and symbolic associations that places often contain’ (Horan, 2000; 15-16). He would also more punctually raise the need to combine the social dimension in the making of digital’ city, through the construct of ‘democratic designs’ (Horan, 2000; 20-21), calling for a process of co-design of smart places, and closing the loop between physical space, ICTs and community.

In the following years however, particularly when it comes to the actual design of smart places, often associated with the prototyping of new system and devices, sometimes through practices of art installation, a deterministic prioritisation of the linear effects of technology has re-emerged. Only some more advanced cases have tackled issues of public participation and co-creation, on the lines of democratising design. Yet often a deeper and more complete intertwining of spatial and digital design has been overlooked. Picon (2015) for instance notes a disconnection between spatial and smart city design as ‘formal inventiveness is not the priority, and references to existing forms proliferate. For example, the promoters of Songdo set out to borrow boulevards from Paris, the Central Park principle from New York and canals from Venice’ (112), fundamentally ignoring any mutual influence and opportunities between technology and space.

It is interesting to notice how the concept of a ‘responsive’ environment has also evolved as a consequence of the emergence of digital technologies, with its new interpretation replacing, rather than actually including, complementing and directly challenging, its previous incarnation. Exemplar of this is the existence of two popular volumes in the architecture and urban design arena, both titled *Responsive Environments*, and representative of these two different perspectives. The first, by Bentley identifies the designed space as embedding choices and politics (Bentley, 1985; 9). The designer therefore reacts to an existing physical context in sensitive and proactive ways to give it positive embedded agency. The second volume, published about twenty years later by Lucy Bullivant, looks at how both high and low technologies, once applied to spaces, make these more ‘responsive’ and interactive towards their users by engaging ‘with our wishes and bodily sensations on an existential level’ (Bullivant, 2006; 7). The agency of responding is in this case shifting from space to technology – and the design of the latter. This polarised approach on ‘responsiveness’ also suggests the need to look at digital spaces as recombined landscapes. However, the vast majority of projects presented in Bullivant’s seminal book are art installations displayed in museums, art galleries and laboratories, that is, highly controlled environments, purposefully adapted to the exhibit to the point of becoming a-spatial or at least a-contextual. Even pieces of architecture – as in the case of Diller and Scofidio’s *Blur* (p.41) – tend to focus more on generating their own environment – a disorienting one in the case of *Blur* – and encouraging visitors to interact with it, much more than having a close dialogue with the many aspects of the existent one. There are a few more ‘localised’ exceptions, but those examples are mainly there to communicate either environmental information or specific atmospheres, often to enrich corporate showrooms and receptions.

A successive volume, also edited by Bullivant – *4D Hyperlocal* – promises a departure from the controlled, a-contextual situations of the previous cases, to add a much stronger emphasis on the social and participative dimension of the making of digital spaces. The editor herself comments that ‘Rather than being a generic "tech kit", the hyperlocal's emerging, alternative

toolsets respond to specific commons' (Bullivant, 2017; 8). A similar locally applied approach permeates many of the contributions in the area of 'Media Architecture', where a focus on making urban spaces – sometimes deprived or interstitial ones – content and interaction-rich through the deployment of both soft and hard infrastructure – large displays for instance – is dominant (Hespanhol et al, 2017). In a European context, the public space-centred work of the Cyberparks network, though within a wider scope of approaches and methods, also tackles the relationship between high technology and place from the prevailing viewpoints of accommodating digital media in public space, increasing people-tech interactions, and enhancing participation and planning processes through digital means (Zammit and Kenna, 2017).

The British Design Council's Framework for Innovation, and its associated 'Double Diamond' methodology (<https://www.designcouncil.org.uk/news-opinion/what-framework-innovation-design-councils-evolved-double-diamond>) are also widely adopted to guide collaborative and socially-involved design processes. These strongly resonate in product and service design communities, as well as in interaction design and Human-Computer Interface (HCI) arenas, where much of the smart design for urban environments practice originates. For instance, recent work on 'Designing urban robots for hybrid placemaking experiences' by Hoggenmueller et al (2020), describes the deployment of a robot drawing on urban ground with chalk 'to affect people's engagement with public visualisations and to foster social interaction'. Passers-by interviewed by the researchers note how the device made the lane where it was positioned 'a graffiti place', making it feel more inclusive and participated. It is much less clear however the way the robot creates – if at all – a more precise relationship and bespoke engagement with the spatial context itself – apart from using it as a canvas. In other words, nothing in the project implies that the robot's design – rather than its behaviour – intertwines with the actual place. What it does, is adding a degree of performance to it.

These approaches align well with Horan's concept of democratic designs. Yet, their ultimate focus on the 'product', more than on the place as a whole, makes them less engaged with recombining all its different components, and above all space. Often, even when the design of urban digital/physical hybrid interventions makes sure space is not overlooked, this is driven by principles for adapting and complementing hardware and software with the built environment. It emphasises user interfaces, consistency and meaning of experience, the need for prototyping and enabling interaction, with an added sensitivity towards space, but still mainly focusing on the design of technology (Tomitsch, 2018; 126-127). This is in line with a legacy of research discourses related to the design and integration of screens within the urban environment, and calls for such installations to 'be integrated into existing physical surroundings' (Dalsgaard and Halskov, 2010; 2280). Whilst there is an awareness of the importance of context and of designing city apps 'as part of the urban environment (...) rather than taking over' (Tomitsch, 2018; 148) these accounts do not yet go as far as seeing the shaping of place as a strategic activity combining equally and mutually active dimensions.

#### **4. Towards a holistic design of recombinant places**

Approaches to smart place-making stemming from visions and processes of co-design and public participation are of extreme importance, and parallel the evolution of views on architectural and urban design mentioned earlier. However, in the process of focusing on new

technological possibilities and how to make them inclusive, the need to involve all dimensions of place is often overlooked. Scholars such as Shepard (Shepard, 2001; 20) have legitimately asked whether ‘software’ infrastructures deserve an attention shift from the ‘hardware’ of urban spaces. Whilst questioning this has been pertinent, especially when faced with the conservatism of much of the architecture discipline, the risk is for the pendulum to swing too far away from the spatial dimension. Relph had already warned against new notions of digitally-based communities as ‘an overly extreme denial of the importance of physical setting in place experience’ (Relph, 1998; 33). The complex, relational nature of place risks not being fully engaged as space is taken for granted and somehow marginalised by a general view of the city having become a ‘computer’ (Mattern, 2017). We could paraphrase Gehl’s concluding comments on the emergence of mediated urbanity, arguing that despite all new possibilities offered by it, ‘Something is missing’ (Gehl, 2001; 49).

A tentative framework to inform the shaping and design of smart places in a more holistic way could therefore consider the relationships amongst, and the mutual agency of, the three dimensions of space, people and technology. These of course are in themselves complex concepts and can be easily individually expanded, multi-layered and problematized. ‘Space’ could be seen as articulating physical and virtual aspects. ‘People’ is clearly a coarse generalisation which will include a galaxy of distinctions embracing the social and institutional spectrum. And similarly, ‘technology’ is in many ways a complex field and indeed a socially constructed one (MacKenzie and Wajcman, 1985; Bijker and Law, 1994) so it is somehow inextricable from the other dimensions. Smart place-making is therefore a complex activity that cannot be tackled with over-simplistic formulas. A first contribution to this is envisaging an approach that combines mutual agency and the active role of space, people and technology. This engages place more than partial processes, and in doing so multiplies possibilities and combinations in the range of place-making actions and designs that can be conceived, particularly by re-activating space as a full actant in the overall equation. (see Table 1).

	Add-on smart Digital machine-city	Socially shaped smart Digital community	Smart place (holistic approach)
Space	Passive – physical support / location	Passive – physical support / location	Active – relational, affording
People	Passive – end- user/data source	Active – participant/shaper	Active – participant/shaper
Technology	Active – change agent	Active – participant agent/actant	Active – participant agent/actant

Table 1 – Typologising approaches to designing smart places

If we assume that a more holistic and comprehensive approach to smart place and its shaping involves including all three dimensions in a process of analysis and design of place, we can also argue that neither technological add-on or digital community approaches can fulfil it. These will suggest visions and actions, but more can be brought into the debate to suggest an evolution of the design approach and process. Given the discussion so far, looking at two

important notions for spatial design seems a good way to start discussing smart place design challenges and possibilities. The first is context, the place that already exists and participates – willingly or not – in any new scheme. The second is affordance, and how this plays out in the relationships amongst the various dimensions of smart place design through agency and functions. What extended narratives can we engage with, in dealing with context and affordances, and what can they mean for design?

## **5. Re-combined context**

Despite the growing fascination of city officials towards often self-absorbed sculptural buildings used as global landmarks, most architectural and spatial design theory will point at the need to think in terms of relationships. Nothing happens in a void, and the act of design implies not just adding to a blank (or irrelevant) canvas, but above all changing and tweaking. Any design intervention changes, shifts, challenges or complies with an already complex, pre-existing set of relationships. High technology does not operate outside of this framework. Context and the notion of material place are undoubtedly disrupted by it, yet this does not mean that context becomes irrelevant and can be ignored. In fact, without knowing and understanding what already exists, or how it could change, it becomes impossible to proactively, and positively, try to influence relationships within it.

### ***5.1. Grasping the richness and potential of context***

The first challenge therefore is related to grasping and interpreting context, in both its spatial and social aspects. Existing place embeds existing relationships. It suggests spatial and cultural clues, opportunities and threats that can be harnessed in a process of place-tweaking - rather than making anew. Greenfield (2006; 22) for instance refers to the importance for hi-tech designers to engage with the ‘many different “everydays”’ of local cultures that already manifest themselves through buildings and artefacts. And understanding what a place stands for, why it is there, can also be key. Technology might be able to boost the ways we use place, but place is or should also be able to boost or orientate the ways we use technology. Yet, with the exception of initiatives aiming at using ICTs *for* new ways of analysing urban spaces through sensors and big data (see for instance Shepard, 2020), the majority of media/screen and IoT-based installations, urban apps and other similar interventions do not stem from a design process based on a deep understanding and interpretation of any specific place. This strongly contrasts with virtually any live or educational urban design or architectural exercise, where the absence of deep site-based considerations that significantly contribute to the genesis of a scheme, would be normally regarded as a major deficiency in the process. As Vande Moere and Wouters (2012; 4) have noted ‘While the official approval for architectural or urban interventions always involves some sort of site analysis, the same might be made applicable for media architecture, which holds the potential to have a similar, if not greater, impact on the environment than the physical building itself’. Understanding the context, or indeed the different hyper-local contexts a city can embed, and the constraints and possibilities they offer, is the first requisite for looking at how space and place can re-combine.

### ***5.2. One place becoming many***



Katharine Willis (2016; 2) provocatively questions whether when sitting in a café whilst accessing their Wi-Fi we are in the actual physical place or indeed somewhere else, in a 'network space'. The notions and feelings of being 'there' or somewhere else – and maybe in multiple places at once – are one of the fundamental conundrums that electronic communication poses to a sense of space and place, as well as our behaviours in them. This problematizes context and place, making traditional analysis necessary but probably not sufficient. If already the notion of 'place' has always been a highly subjective one – being our sense of place related to our own existential condition and personal memories and culture – technology disrupts this further by making one place become many not just at an existential level, but at a practical and functional one too.

This multi-layering of place, where potentially a very large range of 'sub-places' can appear or disappear thanks to networked connections, and the individual digital customisation of activities and atmospheres, seems to present a novel set of tensions. On a positive note, it has been discussed how this can challenge and contest accepted assumptions of what a place is or is for, and afford alternative and bottom-up ways of appropriating it. Shepard refers to Fujimoto's account on how Japanese young women create more protective spaces by 'transforming the paternalistic communities of city streets and subway cars into private territories for women and children' (Fujimoto, 2006, quoted in Shepard, 2011; 24). Willis (2016; 43) has adopted similar examples and commentaries to discuss the 'in-between' inhabited through these digital practices as an additional form of 'third place' (Oldenburg, 1999). Odendaal (2018; 2019) and Rekow (2013) amongst others have discussed local and alternative appropriations of technology and place by low-income communities and migrants in the Global South. Such possibilities, which normally arise in spontaneous ways, can certainly be facilitated by design.

Notwithstanding these, place-makers looking to proactively tweak spatial relationships to encourage a socially diverse but collectively engaged use of public urban areas, also face an opposite consideration. Should this possibility of enhanced multiplicity hamper any efforts to design a place suggesting possible collective uses and meanings? McCullough (2013; 102) notes how 'as architecture arranges interpersonal distances in space, configures everyday processes, represents organizations, and shapes everyday habits within them, it also inobtrusively supports sensemaking (...) It tacitly cues what to say where, how to act in groups, and toward what goal these arrangements have been institutionalized'. To what extent can a wide provision of information and functions oblivious to their physical context create the risk of producing a generalised and individualistic platform, a 'click here and choose your experience' type of place, irrespective of other human and non-human actors present, history, character? As debates on cyberspace emerged, Shapiro (1995; 10) distinguished the potential for digital meeting places to become homogenised mono-cultural suburbia-like communities, or to be purposefully shaped into virtual sidewalks where 'people may be inconvenienced by views they don't want to hear. (...) places where bothersome, in-your-face expression flourishes and is heard'. This way, he emphasised the importance of diversity coupled with maintaining a collective and open – albeit not always comfortable – experience of place. Should therefore spatial designers proactively intervene on this hybrid context keeping in mind how important it is to design framing and supporting social experience, through what Norberg-Schulz called a needed 'stable system of places' (Norberg-Schulz, 1971; 114)? Therefore, the fact that a place can become many introduces the need for a balancing act

between facilitating open-source and democratised appropriations of place, and over-fragmented, individualised and ‘neutralised’ visions of it. The multi-layering of smart place might therefore benefit from a proactive look at socio-spatial relationships – existing and to-be-designed to avoid a disconnection of people – acting as detached individuals – and place itself, as some socially and existentially useful form of shared meaning and use could be lost.

### ***5.3. Different places becoming one***

Urban planners in the US West Coast area started reflecting in the second half of the 1990s on what the new possibilities offered by technologies to network places could mean for – and how could help reframe – urban sprawl. This was conceptualised as Network Oriented Development (NOD), seen as a strategy to ‘retrofit’ sprawl and enhance places ‘by using digital networks to import from elsewhere in the city, county, and region many of the activities or functions needed in that neighbourhood’ (Page et al, 2003; 69).

The networking of places can therefore give a different meaning to their fragmentation. In truly recombinant logics fragmented cities can re-compose in socially purposeful and planned/designed ways, and different places become one. This can be envisaged in an additive way, where places lacking certain features or services can digitally ‘borrow’ those from elsewhere. But it can also be imagined in an amplifying way, as an equal, two-way enhancement, where the same event, gathering, performance or even serendipitous encounters happen synchronously or asynchronously in different physical places, but combine them together into a joint one. And it can be harnessed by design. Pawley (1998; 202) had for this very reason critiqued much of ‘futuristic’ architecture as failing to grasp these new opportunities and challenges by never questioning its ‘commitment to real time and unchanging space’.

Amongst various possible implications, the challenge of generating an enhanced or extended context as the sum of re-combined non-contiguous fragments seems key. Working with such principle and its possibilities in mind involves a logic where urban smart technology does not act or is designed on its own. It requires understanding different, re-combining contexts and purposefully connecting them through an act of strategic design, with places – extended places – in mind. For example, it can mean enlivening peripheral neighbourhood by connecting them together and with the cultural centre of a city, mitigating the effects of modernist physical zoning and urban edges and barriers. It can mean enhancing connections, innovation potential, encounters and social ties amongst otherwise isolated small rural centres (Willis, 2017). And it can be done not by ignoring context, but by making real place, its character and people central to such interventions.

Positively playing with hyper-visibility and connectivity at an urban level, with those re-combination aims in mind, goes well beyond sticking a large screen on a building façade. It requires going back to an understanding of a place’s townscape (Cullen, 1961) and a purposeful articulation of its ‘heres’ and ‘theres’, be them physical or virtual. It can mean understanding and challenging the nature of ‘nodes’, ‘landmarks’ and other elements of legibility and meaning in the city (Lynch, 1960) in order to work with or against them proposing re-combined enhancements to public space. How can two non-contiguous urban ‘nodes’ change when they combine? How can they combine, and through which hybrid (physical and digital) gateways? These are all questions and themes that aim at tackling the

design of smart places as ‘wholes’ involving the existence of an actively participating context. As such they require re-connecting spatial and digital practice.

## **6. Programming place through extended affordances**

Maier et al (2009; 395) discuss the idea of affordance as originally stemming from the field of perceptual psychology (Gibson, 1979) where it is centred on the complementarity of an environment offering potential and facilitation for actions or conditions, and a generic ‘animal’ able to take advantage of those. They explain how the idea has become central in discourses and practice of design of Human Computer Interaction (HCI) and in Artificial Intelligence. Rietveld and Kiverstein (2014) further extend this noting that ‘in our account “context” is interpreted as the rich landscape of affordances in which skillful action unfolds’ (p.346). So, in a complementary way to dealing with context, smart place design can benefit by looking at the concept of affordance. When it comes to the shaping and functioning of smart environments, conventional views of agency and roles in what makes place can be challenged by a new, more complex landscape.

In architecture, the idea of affordance has probably had its main, widespread merit in relativizing the relationship between designed space and its users, away from strong deterministic views of cause and effect between form and behaviour. Betsky (2015) argues that ‘A theory of affordance lets us understand buildings not as objects, but as environments that afford us possibilities, that open and enclose, that respond and give us clues’. However, whilst designers are expected to adopt a less demiurgic stance towards the spatial experience, this is still framed within a view of space providing affordances to people. Maier et al (2009; 397) propose a more complex view of mutual affordances when they explain that ‘Examples exist of course between artifacts and users (e.g., turnability of a door-knob, readability of a sign) between multiple users (e.g., conversations, mating, fighting, etc.), and finally between multiple artifacts (e.g., walls affording support to roofs, sprinklers affording suppression of fires). We call the latter relationships “artifact-artifact affordances” (AAA)’. The already intertwining nature of the relationships and affordances that happen in the built environment can be further amplified by digital-rich lifestyles and smart designs. These however do not simply mean that agency transfers to technology. It requires envisaging a landscape where its dimensions are mutually responsive in non-linear ways. Questioning then what responds to what – or whom – introduces some interesting issues and opportunities.

Smart places are such because within them smart elements exist that afford on the one hand the re-combination of contexts and spaces, and on the other the extension of agency. Smart elements extend and augment place by on the one hand affording new ways – sometimes unachievable without high technology – of perceiving and using the environment. The range of uses, functions and even atmospheres of a place is augmented and multiplied through digital and technological means. On the other hand, they rather importantly blur and challenge any expected distinction between supporting/passive and sentient/active actors in place. Smart elements in public spaces and in our homes and offices, from large-scale intelligent facades to smart speakers, are not just objects providing a tentative environmental affordance, or supporting their users’ actions. They proactively participate in and further augment the place-based ‘ballet’ (Jacobs, 1992 – original 1961; 50). In doing so, they embed – in the form of code and AI-based learning – active intentions, rules and behaviours. In that respect, they can

provide affordance but also require it, from other parts of the environment and indeed from human actions generating the base of data they can feed on, and function and evolve by.

So, place making in a smart world is not a matter of designing spaces as a sequence of moves providing affordances to people, but the strategic shaping of a more complex set of multi-agent mutual relationships, facilitations and constraints. We have discussed how, when looking at smart design through the lens of context, ‘recombination’ is a function of how different environments can articulate in novel ways, as a consequence of technology providing a series of affordances to spaces, allowing them to connect, and ‘be’ more. When looking at smart design through the lens of affordance and agency, this involves a need to consider the implications of an extended and intertwined perspective on the programming of place. Mainstream architectural practice programmes spaces – buildings as well as other environments – by articulating what the space affords. Probably the most elementary yet disturbing example is the ‘defensive architecture’ application of spikes on buildings’ surfaces to prevent homeless people sleeping on them, denying the otherwise natural affordance of those elements. Things statically embed decisions, agency and politics through form, materiality and low technology. Humans dynamically interact with them.

Smart design however blurs distinctions between objects and humans further, and recombines their relationships. Sentient things can become proactive actors, not just offering a static embedded set of values or possibilities, but able to challenge, change and act within place. Whilst a person in a space can connect with and inhabit it by negotiating its affordances, a smart place plays an active role. It might want to connect or not with you, allow uses and selectively and dynamically adapt, changing what is allowed and even how other elements of the place behave. It is self-evident then how non-trivial this can be. Any discourse suggesting a future of flexible intelligent environments has to be at the very least counter-balanced by considerations of how smart place can proactively become controlling, and how hi-tech responsive automation should be part of a wider set of strategic choices on the overall programme and experience of space. A paradox is one of places endowed with technologies potentially augmenting possibilities, yet able to block any alternative use or interpretation, in an even worse way than the most inflexible physical setup.

### ***6.1. Articulating affordances: Contrast, coherence, compliance, and overload***

Another key tension is ending up with places where physical and digital affordances are in contradiction or contrast. Generally, the challenge for designers is again one of understanding and coordinating a complex and less linear way of seeing affordances and spatial programmes, where built, digital and human factors converge and present (or deny) affordances to each other. Fatah et al (2006) note how ‘In these locations the social behaviours and the interaction spaces appear to take a shape which provides the person with more privacy (...) This seems to be supported by the properties and affordance of the physical environment encouraging a certain type of behaviour’. As mentioned, when looking at context, this also suggests a need for a recombinant approach to design. Here place and what it ‘does’ – its programme – is not the result of a linear technological disruption and replacement, but of a concerted or sometimes spontaneous convergence of its different built/physical, digital and human aspects.

In the case of combining spaces – the concept of a place becoming many – we have looked at the tension between diverse appropriations and the lack of coherent meaning stemming from

an overlapping of different contexts. We can also look at it through the lens of combining affordances multiplying a diversity of functions and uses within the same space. Facilitating appropriations can make a smart place design ‘democratic’, yet the ability of digital technologies to over-ride form and character, and the cognitive coherence these offer to our experience of place, needs to be taken into account. McCullough notes how ‘To the skilled tool-using mind, a set of external circumstances becomes “about” something. A floor may invite dancing, just as a rake may invite gardening. As people learn from their settings, they come to associate them with particular states of intent (...) Intent shapes perception and, with it, discovery of affordances - possibilities for action afforded by objects or environments; conversely, intent is shaped by the presence of affordances’ (McCullough, 2013; 72-73). Similarly, Rietveld and Kiverstein note how ecological the idea of affordance is, and how it ideally requires a degree of coherence between possibilities and environment: ‘If the material environment did not offer the opportunities for action it does, our form of life would not include the practices it does’ (Rietveld and Kiverstein, 2014; 339). All of this points again at the fundamental principle that we do not design in a void, and places and their physical artefacts hold memories, character and cultural meanings that should not be ignored, whether we intend to comply with them or generate a contrast or alternative. There is a difference between overriding or ignoring place – which is what happens in technological add-on or replacement approaches where new things happen just because they can – and changing or re-interpreting it. The author has commented previously that ‘We can let people hunt for Pokémons anywhere, including for example in a religious building or a cemetery, but do we really want to, and why? What does it mean for that place, for how and why it was designed, and for its character, cultural and practical functioning, and its *raison d’être*?’ (Aurigi, 2017; 15).

An extreme way to look at this is through a perspective of affordance overload, which a proliferation of functions and possibilities, within the same place, can also lead to. Whilst providing more reasons to be somewhere and use a space can be a positive way of revitalising it, the importance of strategically and purposefully managing and limiting this through design cannot be understated. Exercising digital technologies’ ability to boost in potentially unlimited ways what objects and spaces can do by code is an idea celebrated through the concept of ‘ubiquitous city’ (Lee, 2009) and often un-critically practiced. This liberation of agency from form or location is however not without its pitfalls. In the cybernetics-inspired Superstudio’s *Supersurface* utopian vision ‘all edifices cease to exist’ (Superstudio, 1972; 242-51) and a global grid provides everything needed wherever ones moves to. This comes as the price – desirable in such a utopia but debatable at least in urban design and place-making practice – of the annihilation of cities and the establishment of a nomadic society where place design is fundamentally redundant. If the promise of ‘anything, anytime, anywhere’ (Graham and Marvin, 1996; 88) is embraced un-critically, we risk challenging the very nature of designed place as a grounded – hence somehow specialised – one. Smart design therefore faces the challenge of programming place in a balanced way between diversity, appropriation, and the coherence proper to any established sense of place.

## **7. Conclusions: Ideas for a recombinant, holistic approach to smart place design**

This chapter has challenged the view of the shaping of smart places as an exclusively technology-based add-on operation, where disruption is seen as so strong to dwarf any other factors playing a role in place-making. The range of opportunities and threats introduced by

the added fluidity and possibilities of the design of digitally-enhanced spaces, point at the need for clarity and direction, rather than any deterministic and simplistic assumption that high technologies are somehow an inevitable force for making better places. Designers can indeed rely on new tricks in articulating spaces and affordances, but how these are understood and used within a shaping process of our urban spaces is what makes the difference. Specifically, this chapter has argued that a good starting point to frame and enhance our smart place design processes can be:

***Design smart places, not smart technologies.***

This might feel like a semantic distinction, but it implies a significant shift. A strategic and holistic approach, able to define appropriate challenges and aims, and reflect upon and coordinate how the various components of place re-combine towards addressing these in a successful way, is key to the shaping of smart places. This above all means shifting the focus from the ‘adoption’ of technology – as warned already thirty years ago by Guthrie and Dutton (1992) – and the configuration of it, to rather a deep look at how places – and ‘good’ places – work, through what relationships. This in turn cannot be generalised. There is no such thing as the absolute good place, and any vision needs to be formulated for a specific context. This is something that most smart urbanism advocacy - focused on ‘smart’ as a product – or a series of products – and generic concepts like ‘tech solutions’, ‘users’ and looking at ‘the city’ in a universal way – very often fails to do. Having a vision which is properly contextualised will call for answering questions like ‘why does this place matter’ or indeed ‘how could it matter more’. This will work out answers through a strategy of actions that willingly and specifically address contextual opportunities, and re-think and define affordances and relationships with a deep awareness of scenarios ahead. It will use all means, materials and tools – not just hi-tech ones – available. This is different from ‘adopting’ and asking ourselves ‘how can I introduce technology here?’

***Know your context, and how it can be re-combined.***

If designers start from place, a good understanding of the existing situation, the spatial, temporal and social relationships at play, and how these can be harnessed as well as modified is essential. A deep analysis of place and its spatial, social and cultural dimension, normal in good spatial design practice yet seldom relied upon in allegedly ‘disruptive’ smart, is a good basis to build upon. Yet, Rietveld and Kiverstein note how ‘the determination of affordances directly requires the expertise of designers who have knowledge of the context in which the artefact or building will be used’ (Rietveld and Kiverstein 2014, 406). Armed with that awareness, proper and useful re-combinations of places or elements of them can become part of a design strategy.

***Programme place, not devices.***

The re-combination of place implies and relies upon extended affordances. These are not about what technology can do, but about what can be done and by whom in the place itself. New or extended affordances offer the possibility of expanding and complexifying programmes, potentially in edgeless ways. But design intentions will embed specific meanings for place, and these can imply the opportunity of modulating, prioritising or even limiting what the place is about. This balancing act between freedom and constraint, openness and collective meanings is as delicate as important. And it is most definitely not

happening on its own. Designing affordances, a place and its elements facilitate, suggest or resist, is political and strategic. But it is essential as far as place-making is concerned, and results cannot be left to any naïve technological utopianism.

Designing smart space cannot therefore be seen as an add-on activity, or any easier than or divorced from, the rather wicked issue of tackling good architecture or urban design. This means that shaping smart places is more than simply a visual, material, or technological exercise, but a re-combined one that needs to rely on strategic clarity. We have the tech, but we are just beginning to understand how to make it part of our place-making toolbox.

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