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REFRAMING, REIMAGINING AND REMAKING SMART CITIES

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Introduction

A principal aim of this book has been to critically examine the creation of smart cities *and* to try and formulate new visions of smart urbanism that seek to gain the promises of smart cities while minimizing their perils; to explore the various critiques of smart city rhetoric and deployments *and* to suggest social, political and practical interventions that would enable better designed and more equitable and just smart city initiatives. Of course, producing a form of smart urbanism that realizes promises while curtailing perils is no easy task – and is perhaps impossible at a deep ideological level given the many stakeholders and vested interests involved and their differing politics, approaches, aims and ambitions. Nonetheless, trying to negotiate across these interests and ambitions is necessary if critique is to transition, even if in partial and limited ways, into the reframing, reimagining and remaking of smart cities so that they are more emancipatory, empowering and inclusive. It is also required if the present adoption gap for smart city technologies, wherein solutions are not being taken up by city administrations as hoped and expected by the smart city advocacy coalition, is to be overcome (Kitchin et al. 2017). In this concluding chapter, I contend that the reframing, re-imagining and remaking of smart city thinking and implementation needs to occur in at least six broad ways. Three of the transitions concern normative and conceptual thinking with regards to goals, cities and epistemology; and three concern more practical and political thinking and praxes with regards to management/governance, ethics and security, and stakeholders and working relationships.

Recasting normative and conceptual concerns

Goals

At one level, the goals of creating smart cities are already established – to improve quality of life and create more efficient, productive, competitive, sustainable and

resilient cities (see Table 1.2). At a more profound, normative level, however, the goals of smart cities are less well defined and cogently established (Luque-Ayala and Marvin 2015). Beyond addressing instrumental concerns (e.g., optimizing traffic flows, reducing energy consumption, lowering crime rates, making service delivery more efficient), for whom and what purpose are smart cities being developed? Are smart cities primarily about – or should be about: creating new markets and profit, facilitating state control and regulation, addressing their anticipatory logics (demographic shifts, global climate change, fiscal austerity; Merricks White 2016) or improving the quality of life of citizens? Or are they about all of these, but with varying emphases depending on local context? And if they are about all of these goals, then how are these framed conceptually and ideologically?

The fundamental question of 'what kind of cities do we want to create and live in?' is largely reduced to the instrumental level within smart city discourse, in which it is assumed that tackling such issues is inherently of universal benefit. More profound framings with respect to fairness, equity, justice, citizenship, democracy, governance and political economy are either ignored or are understood in a pragmatic way within a neoliberal framing that renders them post-political in nature – that is, commonsensical and beyond challenge and contestation (Swyngedouw 2016; Cardullo and Kitchin 2018). And yet, each of these framings can be understood and practised in a variety of ways – for example, there are many theories of social justice (e.g., egalitarianism, utilitarianism, libertarianism, communitarianism, contractarianism, etc.; Smith 1994) and which one someone subscribes to makes a big difference to whether a particular approach to, or action in, the smart city is seen as being just (Smith 1994). Adopting an approach to smart cities rooted in the notion of 'The Right to the City' (Lefebvre 1996) will produce a very different kind of smart city to one rooted in the ideas and ideals of the free market and entrepreneurial urbanism (Hall and Hubbard 1997).

Rather than start with these kinds of fundamental, normative questions and then formulating a strategy to realize its principles, the impression one gains from encountering many smart city initiatives is that the starting point is the technology. Then there is an attempt to think about what the technology might be applied to (e.g., reducing traffic) and then a move to frame the approach with respect to a core issue (e.g., sustainability, safety, security, economic competitiveness). In other words, the means is post-justified by ends, rather than the ends shaping the means. In so doing, the core issue is framed and understood in a shallow, limited sense. For example, developers might state that a technology can make a system more sustainable, without saying what 'being sustainable' means beyond instrumental targets. Like social justice, there are many conceptions of sustainability, and adopting the principles of different positions might lead to the development of alternative solutions.

Similarly, developers might say that the technology is 'citizen-focused', but as Shelton and Lodato (this volume) have highlighted the citizen is often an empty signifier, reduced to a vacuous notion of a generic figure which is served through stewardship or civic paternalism. This generic figure is presupposed to hold certain

characteristics, such as digital literacy and middle-class sensibilities (Datta, this volume). Even as an archetypal generic smart citizen, Cardullo and Kitchin (2018) show through their unpacking of citizen participation in smart cities that citizens almost exclusively occupy passive positions in smart city initiatives – they are data points, users, recipients, consumers, testers and players; occasionally they provide feedback, but are rarely creators, decision-makers or leaders. In other words, 'citizen-focused' simply means citizens are the target audience or supposed beneficiaries in systems designed and administered by state bodies and companies. Smart citizenship, Cardullo and Kitchin (2018) conclude, is underpinned by a neoliberal ethos that favours consumption choice and individual autonomy within a framework of constraints that prioritize market-led solutions to urban issues; it is not grounded in civil, social and political rights and the common good. A smart city framed by alternative notions of citizenship would then be quite different with respect to how they were implemented, as the recent re-orientation of Barcelona from a neoliberal approach to one underpinned by the concept of technological sovereignty is making clear (Galdon 2017; March and Ribera-Fumaz 2017).

Grappling with more normative questions is important because they set the wider framework within which smart city agendas and initiatives are formulated, deployed and run. At present, few cities or companies can coherently articulate their smart city vision and goals in normative terms beyond technical, aspirational statements (e.g., Dublin will be 'open, connected, engaged'; Cork will be 'innovating, creating, connecting'). Instead, smart cities are somewhat haphazard, uncoordinated and opportunistic – what Dourish (2016: 37) refers to as the accidental smart city, wherein

> the city becomes smart … [in a] piecemeal, gradual, disparate manner … little by little, one piece at a time, under the control of different groups, without a master plan, and with a lot of patching, hacking, jury-rigging and settling.

In cases where a more fully realized strategy has been formulated it can be contradictory with respect to other urban policies. City administrations, in particular, as the core bodies driving and implementing smart city initiatives need to start the process of divining their smart city agenda and strategies by considering these normative questions, not simply by holding workshops to consider which urban problems to prioritize for smart city solutions.

Cities

For the most part, smart city advocates frame the city as a technical entity which consists of a set of knowable and manageable systems (or system of systems) that act in largely rational, mechanical, linear and hierarchical ways and can be steered and controlled through technical levers, and that urban issues can be solved with technical solutions (see Kitchin et al. 2015; Mattern 2017). Moreover, 'the city' is treated as a generic analytical category, meaning a solution developed for one city

can be transferred and replicated elsewhere. While cybernetic approaches recognize
the complexity and emergent qualities of city systems, they are still understood as
being machinic and largely closed and bounded in nature. Such a view of cities is
limited and limiting; not only does this narrow, technical view fail to capture the
full complexity of cities, but it also constrains the potential benefits that smart city
technologies might produce by creating solutions that are not always attuned to the
wider contexts in which urban problems are situated. Indeed, such technical
interventions can often be 'sticking plaster solutions'. For example, technical solu-
tions to traffic congestion usually seek to optimize flow or re-route vehicles; they
do not address the deep-rooted problem that there are too many vehicles using the
road system, or provide a solution that shifts people onto public transport or
encourages more cycling and walking.

Cities are not simply technical systems that can be steered and controlled in the
same way that a car or plane can be. Nor can urban issues be simply solved with
technical solutions. Cities are complex and ever-evolving, jam-packed with a
multitude of inter-dependent, contingent and relational actors, actants, processes
and relationships. Cities have a range of different, often competing, actors and sta-
keholders – government bodies, public sector agencies, companies, nongovern-
mental bodies, community organizations and so on – that have different goals,
resources, practices and structures and are trying to address and manage various
issues. Cities are full of culture, politics, competing interests and wicked problems.
No two cities hold the same qualities, having different histories, populations, cul-
tures, economies, politics, legacy infrastructures and systems, political and adminis-
trative geographies, modes of governance, sense of place, hinterlands,
interconnections and interdependencies with other places, and so on. In other
words, cities are places not simply systems. Consequently, their messiness is not
well captured in computational logic and is difficult to model, predict, and manage
through technocratic governance.

Understanding cities from a relational, place-based perspective, it is clear that
smart city technology will not be a silver bullet to solve urban issues. Yet,
while intrinsically city administrations know that cities are complex, open,
multiscalar, contingent and relational, when they pursue a smart city agenda
they often practise a form of strategic essentialism, seeking to tackle urban issues
through narrow technical fixes that ignore wider interdependencies. Likewise,
companies developing smart city technologies perform the same strategic
essentialism, though they often have less appreciation of the full complexities,
processes, practices and politics of managing and governing a city (I have been
asked several times by companies to explain how cities and city administration
work). For smart city initiatives to work well they need to be conceptualized
and contextualized within a broader and richer understanding of what a city is
and how it works in practice. In other words, smart city advocates need to
recognize and accommodate a more nuanced, relational understanding of cities
and to appreciate and take into account the diversity and complexity of cities
in their formulations. This also requires smart city advocates to recognize that

their technical solutions will not work on their own and need to be positioned
alongside and integrated with other solutions that are more social, political,
legal, fiscal and community-orientated, and they should articulate and promote
what that *suite* of solutions might be.

Epistemology

How can we know the city? To understand and explain it? And then act on this
knowledge? These are epistemological questions. In general, smart city technolo-
gies, and associated rhetoric and science (urban science and urban informatics) are
founded on big data analytics (Kitchin 2014). In short, this means algorithms are
used to process vast quantities of real-time data in order to dynamically manage a
system and to make future predictions. There are two issues with this approach.
The first is that these data are typically quantitative and one-dimensional in nature,
limited in scope (e.g., sensor readings, camera images, clickstreams, admin records),
and do not provide a full, multispectral picture of the city. They provide a very
narrow, selective view of city systems and life, prioritizing data that are machine-
readable and excluding far more information than they include (Mattern 2013).
The second is that the scientific approach adopted for data generation, analysis (e.
g., statistics and modelling) and communication (e.g., data visualizations via urban
dashboards) is reductionist, mechanistic, atomizing, essentialist and deterministic in
how it produces knowledge about cities (Kitchin et al., 2015). It is an approach
that decontextualizes a city and its systems from history, its politics and political
economy, its culture and communities, the wider set of social, economic and
environmental relations that frame its development, and its wider interconnections
and interdependencies that stretch out over space and time. Moreover, with its
claims to objectivity and neutrality, such an approach tends to marginalize and
replace other ways of examining the city (such as through focus groups, interviews,
surveys, etc.) and other forms of knowing such as phronesis (knowledge derived
from practice and deliberation) and metis (knowledge based on experience)
(Kitchin et al., 2015).

This is not to say that this approach does not produce useful or valuable
knowledge. If it did not, I would not have co-developed the Dublin Dashboard
and Cork Dashboard for those respective cities.[1] Rather it is to recognize that such
knowledge is partial, based on a narrow realist epistemology and instrumental
rationality, and that it needs, on the one hand, to reframe its epistemology to
openly acknowledge its situatedness, positionality, contingencies, assumptions and
shortcomings, and on the other hand, to complement such knowledge with other
forms of knowing, such as phronesis and metis (Kitchin et al., 2016). Such an
epistemological move dovetails with the reframing of cities to recognize their
multiple, complex, interdependent nature. Without this change in epistemology,
the underlying scientific rationalities of smart city technologies and approach will
remain anaemic, partial and open to significant underperformance and failure
(Flood 2011).

Recasting practical and political concerns

Management/governance

Smart city technologies enact algorithmic governance and forms of automated management – city systems are measured, analysed, and outcomes assessed and acted upon in an automatic, automated and autonomous fashion (Kitchin and Dodge 2011). Such automated management facilitates and produces instrumental and technocratic forms of governance and government, that is, rote, procedural, rule-driven, top-down, autocratic means of managing how a system functions and how it processes and treats individuals within those systems. Algorithmic governance is a technically-mediated means to manage a city, wherein there is a belief that the city can be steered and controlled through algorithmic levers. For its advocates, such a data-driven, algorithmic approach ensures rational, logical and impartial governance and optimal performance. It is a means to objectively and impartially nudge, steer, discipline and control people to act in certain ways.

Such algorithmic, technocratic forms of governance have been critiqued in a number of ways. The use of algorithmic systems that generate and process streams of big data greatly intensifies the extent and frequency of monitoring people and shifts forms of governance from regimes of discipline towards social control (Kitchin and Dodge 2011; Gabrys 2014; Sadowski and Pasquale 2015). In control regimes, people become subject to constant modulation through software-mediated systems in which their behaviour is directed explicitly or implicitly reshaped, rather than being (self)disciplined. Governance is modified so it is no longer solely about moulding subjects and restricting action, but about modulating affects, desires and opinions, and inducing action within prescribed comportments (Braun 2014; Krivy 2018). Calculative regimes of control are more distributed, interlinked, overlapping and continuous, enabling institutional power to creep across technologies and pervade the social landscape (Martinez 2011). At the same time, the technological systems underpinning them are narrow in scope and reductionist and functionalist in approach; that is, they ignore wider cultural, social and political contexts and processes and simplify complex phenomena into code rather than taking a more holistic or negotiated approach to managing an issue (Kitchin 2014). The smart city thus produces a particular form of governmentality, what Vanolo (2014) terms 'smartmentality'. Relatedly, the exhaustive and indexical nature of data generation converts every city system adopting such technologies into a surveillance machine, with the interlinking of such systems and the processing and analysing of such data raising a number of ethical concerns (Kitchin 2016). As such, far from being impartial and objective, smart city technologies have built-in normative values and judgements about how systems should perform, and how they assess and manage outcomes, with these hardcoded into the underlying software. And they have normative effects in terms of how they are deployed to shape and modify systems, citizens, and institutional behaviour.

Far from creating a more democratizing landscape of governance, smart city
systems are mostly top-down, centrally-controlled and managerialist in orienta-
tion, and are produced and deployed for government by companies. For many
critics this raises a number of concerns about the process of introduction within
cities and the corporatization of urban governance. Within city administrations
smart city initiatives are often introduced by bureaucrats rather than elected
officials or being developed in conjunction with local communities. Indeed,
local communities (and depending on location, politicians) are often little con-
sulted in decision-making processes concerning smart city technologies and
their form, implementation and operation (and certainly not as they would be
with respect to planning and development plans). In terms of the corporatiza-
tion of city governance there are three concerns. First, it actively promotes a
neoliberal political economy and the marketization of public services wherein
city functions are administered for private profit (Hollands 2008). Second, it
creates a technological lock-in that leaves cities beholden to particular techno-
logical platforms and vendors (Hill 2013) and creates a corporate path depen-
dency that cannot easily be undone or diverted (Bates 2012). Third, it leads to
'one size fits all smart city in a box' solutions that take little account of the
uniqueness of places, peoples and cultures and thus works sub-optimally
(Townsend et al. n.d.).

Just as cities need to be conceptualized in a broader and more synoptic way by
smart city advocates, so does city management and governance. While it is
undoubtedly the case that many smart city technologies do enable more efficient
and effective management of city systems, and provide convenience and improve
services, they are not sufficient solutions on their own to the diverse range of issues
facing cities and themselves cause some concerns. Instead, they need to be intro-
duced and implemented through processes of co-creation and co-production
between city administrations, companies and citizens; be open and transparent in
their formulation and operation, including using open platforms and standards
where possible; and be used in conjunction with a suite of aligned interventions,
policies and investments that seek to tackle issues in complementary ways, blending
technical, social, political and policy responses. Not enough work has been done to
consider how best to achieve such a blended, open, and co-produced form of
urban management and governance, though the approaches being undertaken by
cities such as Amsterdam (The Netherlands), Barcelona (Spain), Bristol (UK), and
Medellín (Colombia) provide some examples.

Ethics and security concerns

Smart city technologies generate huge quantities of data about systems and people,
much of them in real-time and at a highly granular scale. These data can be put to
many good uses; however, generating, processing, analysing, sharing and storing
large amounts of actionable data also raise a number of concerns and challenges.
Key amongst these are privacy, predictive profiling, social sorting, anticipatory

governance, behavioural nudging, control creep, data protection and data security. Indeed, many smart city technologies capture personally identifiable information and household level data about citizens – their characteristics, their location and movements, and their activities – link these data together to produce new derived data, and use them to create profiles of people and places and to make decisions about them. As such, there are concerns about what a smart city means for people's privacy and what privacy and predictive privacy harms might arise from the sharing, analysis and misuse of urban big data (Kitchin and Dodge 2011; Baracos and Nissenbaum 2014; Edwards 2016; Kitchin 2016; Taylor et al. 2016; Leszczynski 2017; Murphy, this volume, Evans, this volume). In addition, there are questions as to how secure smart city technologies and the data they generate are from hacking and theft and what the implications of a data breach are for citizens (Cerrudo 2015; Dodge and Kitchin, this volume).

To date, the approach to these issues has been haphazard, uncoordinated and partial. As suggested with respect to city management and governance in general, addressing privacy and security issues requires a multi-pronged set of interventions that ideally are coherently aligned and implemented in conjunction with one another. In a recent report for the Irish Government's Data Forum I outlined such an approach, suggesting four types of intervention, each consisting of a number of mediations (Kitchin 2016). First, market-driven solutions: including the development of industry standards, stronger self-regulation, and the reframing of privacy and security as a competitive advantage. Second, technological solutions: including end-to-end encryption, access controls, security controls, audit trails, backups, up-to-date patching, and privacy enhancement tools. Third, policy, regulatory and legal solutions: including revised fair information practice principles, privacy by design, security by design, and education and training. Fourth, governance and management solution at three levels: vision and strategy – smart city advisory boards and published strategies; oversight of delivery and compliance – smart city governance, ethics and security oversight committees; and day-to-day delivery – core privacy/security teams, smart city privacy/security assessments, and computer emergency response teams.

Using these solutions together would provide a balanced, pragmatic approach that enables the rollout of smart city technologies and initiatives, but in a way that is not prejudicial to people's privacy, actively work to minimize privacy and predictive privacy harms, curtail data breaches, and tackle cybersecurity issues. They also work across the entire life-cycle (from procurement to decommissioning) and span the whole system ecology (all its stakeholders and components). Collectively they promote fairness and equity, protect citizens and cities from harms, and enable improved governance and economic development. Moreover, they do so using an approach that is not heavy handed in nature and is relatively inexpensive to implement. They are by no means definitive, but would enable a more ethical, principle-led approach to the design and implementation of smart cities. Failing to tackle these issues will undermine and curtail smart city initiatives and public support for them.

Stakeholders and working relationships

As detailed in Chapter 1, smart city protagonists are often divided into those who develop, implement and promote smart city technologies and initiatives, and those who critique such endeavours. While the former have been starting to respond to critique, albeit in rather limited ways, and the latter have started to make more active interventions, there is still much more work to be done to bring different stakeholders into dialogue and working relationships. There is certainly a lot of learning that needs to be done: by city administrations with respect to developing smart city strategies and procuring and deploying smart city technologies; by companies with respect to how cities are managed and function and balancing private gain with public good; by communities involved in or living with smart city initiatives; and by researchers and consultants who are seeking to understand what is unfolding in different cities and contexts. This learning will progress most effectively through co-creation and co-production, with stakeholders working together.

This requires all stakeholders to be open to working and learning from one another for the common purpose of improving the quality of lives for citizens and how cities are managed and governed. With respect to academia, this means critical scholars have to become more applied in orientation: to give constructive feedback and guidance and to set out alternatives and to help develop strategies, not just provide critique. This does not mean that critique is not valuable in and of itself. Nor does it mean dumbing down or abandoning a critical position or emancipatory politics or 'getting into bed with the enemy'. It means putting principles into action – to translate them into practical and political outcomes. Our own endeavours on The Programmable City project have demonstrated that smart city stakeholders are open to robust exchanges and are prepared to rework initiatives and change direction, especially if we are willing to work with them and others to realize any reframing, reimagining and remaking involved. That said, not all city administrations or companies want such collaborations, or it might be very difficult to align differing ideological beliefs, in which case external critique might be the only option. However, in my view, such critique ideally also needs to suggest alternatives – whether ideological or practical – and to support the work of other oppositional groups (such as local communities or NGOs).

Conclusion

The purpose of this chapter has been to set out some of the key shortcomings, challenges and risks associated with smart city technologies and initiatives and to suggest how smart city thinking and implementation might be productively reframed, reimagined and remade in six ways. The aim has not been to be definitive or comprehensive, but rather to provide some initial ideas and contentions – some more conceptual and philosophical, some more practical and political – that act as provocations for discussion and debate. As such, while the six interventions detailed offer a set of initial entry points, my hope is that they are creatively reworked and extended by those working in smart city endeavours.

How likely such a recasting of smart cities is is an open question. The smart
cities epistemic community and advocacy coalition remains strong, with a reason-
ably coherent and stable narrative, and many city administrations are deploying
smart city solutions in a largely pragmatic, instrumental way rather than it being
underpinned by a strategy rooted in normative concerns and principles. That said,
there is a persistent adoption gap in the take up of smart city technologies, with
many deployments remaining at the experimental stage or being confined to 'smart
districts' or city centres rather than being rolled out across entire urban areas. As
outlined in Kitchin et al. (2017) there are good reasons for this gap including:

- a lack of *momentum*, with government being somewhat like an oil-tanker and
  difficult to shift direction;
- an aversion to *risk*, with city administrations charged with providing stability,
  certainty and reliability in delivery of city services not unproven disruption
  with solutions that are not mature;
- a lack of *trust* that new initiatives will work, with city administrations cognisant
  of previous investments that failed;
- a lack of clarity on *value for money*, return on investment, finance models and
  when to enter the market;
- a set of *competing demands* that all require investment, so if a proposed solution
  is not aimed at a critical problem it will find it difficult to compete for atten-
  tion and resources;
- a set of *procedural issues* concerning regulations regarding procuring services and
  technologies and working with other bodies;
- a body of *inertia and resistance* within city administrations, with already existing
  practices and legacy systems and internal politics, fiefdoms, competing interests,
  and siloed departments and systems;
- *weak staffing* and *skills capacity* with respect to implementing smart city tech-
  nologies; and,
- a fragmented local administration landscape, with cities divided up into
  autonomous municipalities causing *coordination* and *economy of scale* issues.

Overcoming these issues requires flexibility in approach and a more convincing
argument – one that addresses the kinds of criticism detailed in this chapter and
across the entire volume – that a smart cities approach is the answer to urban issues.
Corporations and cities did change their narrative in relation to critique concerning
citizen participation and focus. However, while the rhetoric shifted in tone to
declare the focus was now to create citizen-orientated smart cities, the underlying
logic, ethos and position of citizens was little changed (Kitchin 2015). In other
cases, cities have moved beyond lip-service to take a more proactive approach to
reimaging, reframing and remaking smart cities, actively engaging with deeper,
more normative notions of what kind of smart city they want to create and the
principles underpinning this: for example, Barcelona's 'technological sovereignty'
(Galdon, 2017) and Medellín's 'social urbanism' (Talvard, this volume; McLaren

and Agyeman, this volume). The chapters in this book collectively illuminate the many issues that still plague the drive towards smart cities, but also suggest ways to address them and alternative visions. The challenge is to realize these alternative visions to create ethical and principled smart cities that serve all citizens.

Note

1 http://www.dublindashboard.ie and http://www.corkdashboard.ie.

Acknowledgements

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