City visions: toward smart and sustainable urban futures

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City Visions: Toward Smart and Sustainable Urban Futures

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Definitions

Today the world is heavily urbanized, and this is set to grow by 2050. The climate crisis and the recent COVID pandemic are providing opportunities and threats to urban living. This has meant that decision-makers need to develop long-term visions for cities. Urban futures thinking (based on city foresight methods) offers us the opportunity to imagine what cities and urban areas will be like in the long term, how they will operate, what infrastructure and governance systems will underpin and coordinate them, and how they can be best shaped and influenced by their primary stakeholders. This chapter therefore begins by examining urbanization and the main urban challenges that cities face today. A discussion of what is meant by "urban futures" then follows, before reviewing the emergence of "smart" and "sustainable" thinking in cities. The chapter also examines city visioning as a futures-based technique and the emergence of city visions. An example of a UK city vision (Reading 2050) is then reviewed, before the chapter examines what future lies beyond COVID-19 for cities. Finally, a summary and conclusions are presented to help the reader see the wider implications of urban futures thinking for cities.

Introduction

The recent COVID-19 crisis has reminded us all about the vital role that cities play in our local, regional, national, and global economies. Without fully functioning city ecosystems, it is clear that reduced economic growth, financial hardship, social unrest, and socioeconomic disruptions are major risks in our urban areas. Yet the COVID crisis has also taught us some important lessons about how we could change the way in which we live, work, and play in our cities in order to tackle climate change, improve the urban environment, and benefit the health and quality of life of people in our cities. After all, there is strong evidence to suggest that in many cities across the world, carbon emissions fell, and air quality improved, at least in the short term, as people travelled less and workplaces closed because of the pandemic crisis (OECD 2020a). Today, as city leaders begin to consider how best to emerge from the crisis, it is crucial to think about how we might do things differently beyond the short term, into a long-term future (beyond 20 years), and reimagine our urban futures in the context of climate change and resource depletion and environmental impact.

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Although cities present us with huge environmental challenges and are at the heart of the COVID crisis simply because the majority of people live in cities, there are also many inherent opportunities for transformation related to a city's unique characteristics: for example, it is not only the close proximity of people that provides economies of scale and capacity for social learning and could transform the way in which we work and live in our cities, but cities are also the main source of innovation, R & D, and experimentation which could potentially tackle urban environment issues. This duality of problems and solutions is often referred to as the "urban paradox" (Iossifova et al. 2018).

To think about the long-term future, however, requires us to go beyond short-term political perspectives and to also overcome the disconnection which is inbuilt into many urban planning systems and their separation for the longer-term environmental challenges. In other words, we need an analytical framework of structured thinking to get us beyond the "here and now" and to think explicitly about the long-term future of our cities. This is where "urban futures" thinking and "city visioning" come into play.

This chapter therefore begins by examining urbanization and the main urban challenges that cities face today. A discussion of what is meant by "urban futures" then follows, before reviewing the emergence of "smart" and "sustainable" thinking in cities. The chapter also examines city visioning as a futures-based technique and the emergence of city visions. An example of a city vision (Reading 2050) is then reviewed, before the chapter examines what lies beyond COVID-19 for cities. Finally, a summary and conclusions are presented to help the reader see the wider implications of urban futures thinking for cities.

Urbanization and Urban Challenges

Cities are not a recent invention of humankind. The world's first great cities are known to have been built 4000 years ago, and they brought together people to make markets and create trading opportunities (Knox 2014). Foundational cities such as Athens and Rome followed later, before the emergence of more "modern" cities from medieval times through to the industrial revolution and later to the present day (Clark 2016). The unique feature of the twentieth- and twenty-first-century city has been its rapid growth however, and hence the level of global urbanization has increased commensurately. Today, according to UN statistics, some 55% of the world's population lives in cities, and this is set to grow to 68% by 2050 (UN 2018). All of the world's population growth between 2016 and 2050 was expected to be in urban areas, as a result of natural increase, migration, and some degree of reclassification as to what is really meant by the term "city" (UN 2018). This is expected to result not only in the growth of smaller medium-sized cities (of fewer than 1 million people) but also the number of megacities (cities of more than 10 million people) to 43 by 2030.

Historically this surge in urbanization has been caused and is likely to continue to be caused, by economic development, because cities attract people who seek out education and employment opportunities (i.e., the "pull factor"). Yet the "urban paradox" remains: although cities are hubs of economic growth and innovation, they face a wide range of challenges ranging from climate change through to environmental degradation, traffic congestion, health risks from poor air quality, and socioeconomic inequalities (EU 2016). To put this in context, if global warming is to be limited to 1.5 °C, then emissions from global urban consumption must halve by 2030, and all cities will need to be net zero by 2050 at the very latest (C40 Cities 2019).

Urban challenges are examples of "wicked" problems or ones that are complex and interrelated (Rittel and Weber 1973). For example, many of the global sustainability challenges that we face, such as biodiversity decline, climate change, energy supply, and environmental justice, are persistent, complex, and "wicked," and they are also "urban scale" problems (Wolfram et al. 2019). The COVID-19 pandemic, which has had substantial impacts in our cities, is another example of a wicked problem. Tackling, managing, and resolving such problems therefore require not

only an integrated understanding of their interrelationships but also urban planning responses that recognize their mutual and interconnected complexity.

Urban Futures, City Foresight and City Visioning

It has been argued by some authors that the inherent complexity and unpredictability of cities means that although we can develop models of cities as complex systems (which can help us understand how cities have evolved and how they behave in what is termed a "science of cities"), we cannot predict their future with any degree of certainty because we, as inhabitants of a city, are all part of that future (see, e.g., Batty 2018). On the other hand, it can be argued that although the future may not be "predictable," it is crucial to find other ways of developing desirable and shared visions for our future cities in the light of the many complex and "wicked" problems that we face (Dixon and Tewdwr-Jones 2021).

Therefore, to overcome the disconnection between relatively short-term planning horizons of 5–10 years and longer-term environmental changes (20 years or more), it is vital for cities to develop specific longer-term "visions" that open up a possibility space to explore multiple futures and also provide a roadmap of how to achieve a shared and desirable future. This does not negate the importance of recognizing the inherent complexity of cities, the continued desire for immediate and short-term political decision-making, or the important role that the "science of cities" plays in our understanding of cities. But it does require us to develop new ways of seeing and planning for a transition to a sustainable urban future.

This is what can be termed "urban futures," which is a term used to "imagine what cities and urban areas will be like in the long-term, how they will operate, what infrastructure and governance systems will underpin and co-ordinate them, and how they are best shaped and influenced by their primary stakeholders (civil society, governments, businesses and investors, academia and others)" (Dixon and Tewdwr-Jones 2021).

Urban futures thinking requires city stakeholders to work together in terms of co-creating a city vision in a highly participatory way. This means that four main groups need to work together to build and develop city visions: namely, civil society, local government, academia, and business in what is known a "quadruple helix" partnership (Goddard and Tewdwr-Jones 2016). As part of "urban futures" thinking, city visioning is the formal process of creating a "city vision," or a shared and desirable future for a particular city or urban area. However, in practice the city vision either can relate to a single preferred urban future or can explore a variety of different and alternative urban futures. City foresight, which includes city, is therefore the "science of thinking about the future of cities" (GOfS 2016) and includes a range of futures-based methods and tools to help build and develop a city vision: for example, "backcasting" which starts with defining a desirable future and then works backward to identify policies and programs and pathways that will connect the present with the specified future, and "three horizons" (3H) thinking, which is designed to help visioning participants think about three overlapping waves (e.g., short (now)-, medium (near future)-, and long-term (far future)) into the future.

City Visions and City Visioning

Visionary thinking has been part of human culture, religion, and politics for many thousands of years. Visions are fundamental to thinking about the future and often related to preferred or desirable futures and to a shared sense of change and transformation. Early examples of what might be termed humanistic visionary thinking emerge in the writings of Plato (fourth century BC) and, later on, Thomas More's city-based Utopia (sixteenth century). This sense of "futurism" is also seen in the writings of Patrick Geddes and Ebenezer Howard, two of the early visionary planners in the late nineteenth/early twentieth centuries, who developed particular generic visions of what an ideal city should be.

In the context of urban planning, the idea of "city visioning" (or having a clear and formal sense of where a particular city wants to be in the long-term future) emerged during the 1980s and 1990s, particularly in the USA, not only as a way of understanding the future but also to plan for a desirable, or preferred, set of sustainable outcomes (see, e.g., Atlanta and Portland) (Dixon et al. 2018). Newman and Jennings (2008) also highlight "successful" examples of city visions in Perth, Vancouver, and Chicago during this period. This emergence of thinking about the future of cities also reflected a growing body of literature focusing on "visioning sustainability" in a range of other contexts, such as energy futures (Wiek and Iwaniec 2014). Since the early 2000s, we have also seen the development of more "formal" visioning processes (or what might be termed "city foresight" methods) in many cities and urban areas which have been used to develop city visions (see, e.g., Phoenix, Johannesburg, and Vancouver or, in the UK, Reading (Dixon et al. 2018) and Newcastle) (Tewdwr-Jones et al. 2015; Dixon and Tewdwr-Jones 2021).

The UK Government Office for Science (GOfS) Future Cities Programme (2013–2016) also highlighted the importance of "city foresight," which was founded on the science of thinking about the future of cities and which can be used to enable city stakeholders to explore urban futures not only in a local and regional context but as part of a wider connected network of cities (GOfS 2016). A number of UK city visions were created as part of this program, resulting from partnerships based on the "quadruple helix" model of innovation (Arnkil et al. 2011; Goddard and Tewdwr-Jones 2016). Some of these visions have also linked with and underpinned the existing statutory local plans in cities (see, e.g., Dixon et al. 2018).

Discourses About the Future: Smart Cities and Sustainable Cities

Throughout the history of urban studies, we have seen shifts and changes in the way in which the city is viewed. This has also paralleled thinking about makes an "ideal city," which has been typified by visions of the future which revolve around how new cities could be built or how cities might be redesigned or reconfigured to represent new or reimagined futures. Two dominant city futures discourses have been (i) "the sustainable city" and (ii) the "smart city." The origins of the term "sustainable city" (or "eco city") can be found in previous "organic" city visions such as Patrick Geddes' biopolis and Ebenezer Howard's garden city. It was not until the 1960s and 1970s, however, that the concept of what a "sustainable city" might be started to permeate the world of urban studies. Whitehead (2003, 2011) suggests that this increasing focus was the result of the interweaving of an "ecological crisis" and the "urban crisis," and Richard Register (1987) is credited with first using the term "eco city" in which he outlined the eco city as one built according to the principles of living within environmental limits (set within the ecological capacity of the city's bioregion).

Although the sustainable city concept continues to run strongly through policy and practice discourses, over the last decade, the "smart city" leitmotif has gained traction as a major "signifier" and "global discourse network" in urban development (Joss et al. 2019). Essentially, the smart city discourse relates to a normative view of the future founded on a technology-led ecological modernization (Trencher and Karvonen 2017). There are a very large number of definitions for smart city which not only reflect the differing origins of the term but also the varying disciplinary and institutional lenses through which a city can be viewed (Kitchin 2015). For example, some highlight the smart city as an urban environment that is idealistic, alluring, and more liveable than the complex, messy environments that we inhabit today. For others, the smart city provides a new market for urban management systems and an opportunity to sell technology-led solutions to city authorities facing environmental, economic, and social challenges (Dixon and Tewdwr-Jones 2021). This lack of consensus, as in the case of sustainable cities, has led to a growing critical literature on smart cities, particularly as issues over the role of citizens, privacy and security are raised.

However, from the mid-2010s onward, we have also seen the emergence of a new term, the "smart and sustainable city," as a result of growing sustainability awareness, continued urban growth, and the development of new technologies (Bibri and Krogstie 2018; Dixon 2018). This rebranding is intended to highlight the fact that not every smart city is necessarily a sustainable city – for example, smart transport technologies may continue to promote car use at the expense of more sustainable modes of transport such as bus, walking and cycling (Dixon 2018).

Case Study Example: Smart and Sustainable Reading 2050 City Vision

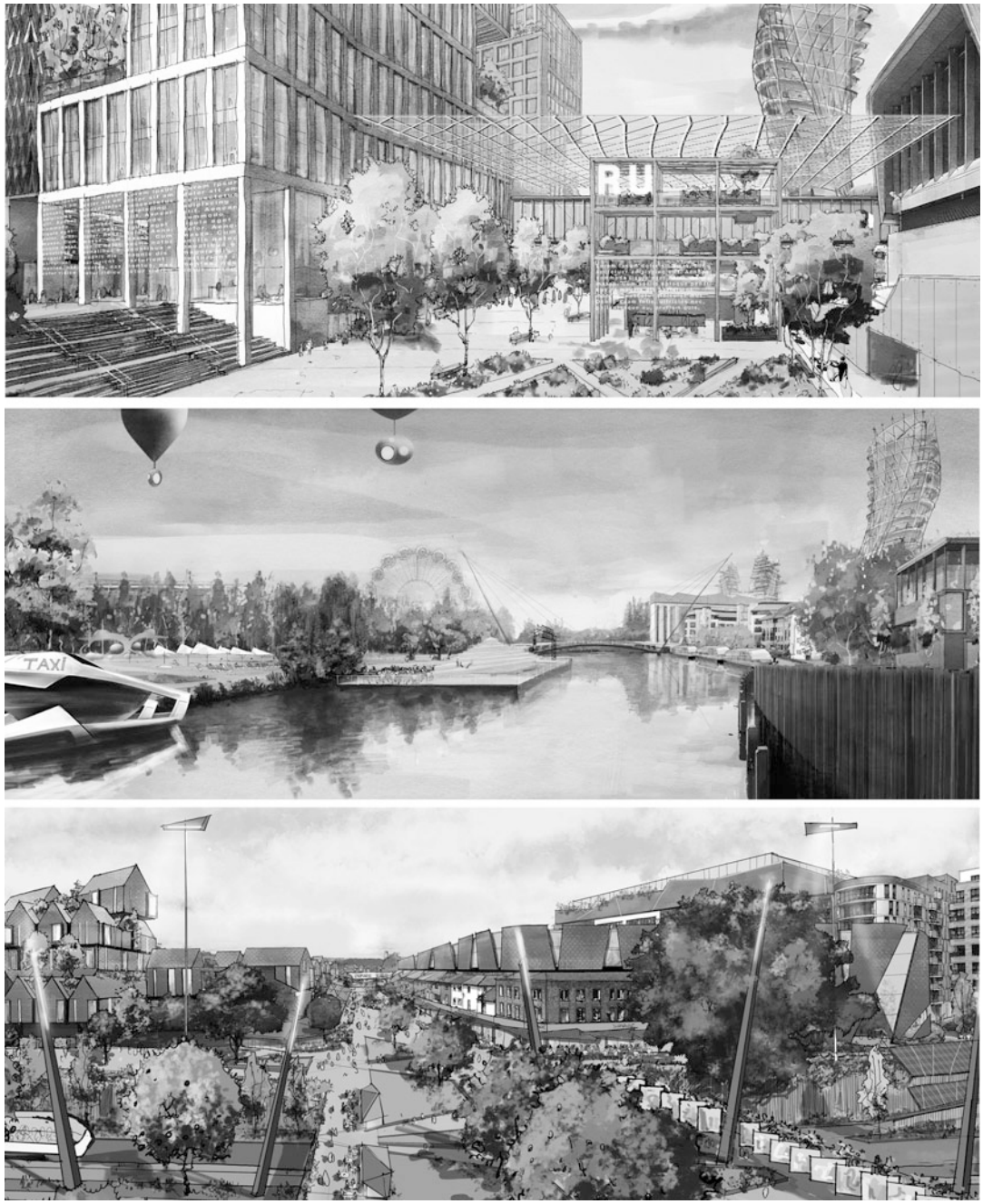
One example of a city vision which combines smart and sustainable thinking is the Reading 2050 vision in the UK (Dixon et al. 2018). Although Reading is not yet officially a "city," it forms part of one of the most economically vibrant and connected urban areas in the UK: Reading, as part of a wider Reading/Wokingham urban area (including Arborfield, Woodley, Theale (West Berkshire), Crowthorne, Earley), has a population of 318,000 (based on 2011 ONS data), and this is set to grow to 362,000 by 2037 (Dixon and Cohen 2015; Dixon and Farrelly 2020). This presents big challenges in maintaining its competitive edge and dealing with the important environmental and socioeconomic issues arising from its continued economic growth. Developing a Reading 2050 vision which was both "smart" (making the best use of technology) and "sustainable" (creating a truly sustainable city) was seen an important step in supporting longer-term planning and development in Reading. The starting point for this vision was provided through a formal definition of a smart and sustainable city as one (ITU 2014, pp. 12–13):

> that leverages the ICT infrastructure to:
>
> - Improve the quality of life of its citizens.
> - Ensure tangible economic growth for its citizens.
> - Improve the well-being of its citizens.
> - Establish an environmentally responsible and sustainable approach to development.
> - Streamline and improve physical infrastructure.
> - Reinforce resilience to natural and man-made disasters.
> - Underpin effective and well-balanced regulatory, compliance and governance mechanisms.

In 2013 the Reading 2050 project brought together the University of Reading (School of the Built Environment), Barton Willmore (a major planning and design consultancy), and Reading UK (the economic development unit for Reading) to lead the development of the vision. Drawing on previous research which had scoped out retrofit visions for Cardiff and Manchester (Dixon et al. 2014), the Reading 2050 project combined elements of a smart city with those of a sustainable city. This was because Reading already has a long-term aspiration to be "low-carbon" by 2050 but also has a strong technology and green technology focus in its existing economy. Moreover, a 2050 time horizon provides space to think beyond today's immediate problems and facilitates a greater sense of strategic thinking by identifying desirable as well as undesirable outcomes.

The visioning process which ran from 2013 to 2017 (and is ongoing) adopted a "quadruple helix" approach which brought together business, local government, civil society, and higher education (Arnkil et al. 2011) and was based on workshops and the adoption of a backcasting approach. This is where a desirable future is co-created with stakeholders through a participatory-based foresight approach, and then look stakeholders work together to look backward from that future to the present in order to strategize and to plan how it could be achieved. During the course of its work, to date, the Reading 2050 program has engaged with 21,000 people and more than 400 businesses with some 15 linked events (Dixon and Farrelly 2020).

As a result, three interrelated urban futures were developed for the Reading 2050 vision (Fig. 1):



City Visions: Toward Smart and Sustainable Urban Futures, Fig. 1 Three main elements from the Reading 2050 vision (top to bottom: "green tech city"; "city of rivers and parks"; "city of diversity and culture"). (Source: Reading 2050 website (www.reading2050.co.uk). Image courtesy of Reading 2050 – a collaborative initiative, jointly led by Barton Willmore, Reading UK and the University of Reading)

- *Green Tech City*: A city that builds upon its established technology focus. It celebrates and encourages diversity through business incubation units, "idea factories" and a city center university campus through which to exhibit and test cutting edge ideas and approaches, no matter what discipline they are emerging from.
- *City of Diversity and Culture:* A city that builds on the success of the iconic Reading Festival to deliver arts and culture to people of all ages and ethnicities. Reading would facilitate community interaction and opportunity. The city would integrate, enhance, and celebrate our heritage, bringing it to life through modern interpretations and uses of space as well as preservation.
- *City of Rivers and Parks*: A city that recognizes how water has shaped much of Reading would celebrate its waterways, opening them up to offer recreational spaces such as animated parks, a lido, food production opportunities, and city center waterside living.

The vision is strongly linked with the development of the new Reading Borough Council Local Plan (which looks ahead to 2036) and is directly referenced within it as an important longer-term framework for Reading. A similar synergy is highlighted in the corporate plan where the council describes its endorsement of the vision and its commitment to integrating the 2050 ambitions into its priorities. Finally, the vision also links with the Reading Climate Emergency Strategy (2025–2030) which targets net zero emissions by 2030.

Futures Thinking for Cities: What Lies Beyond COVID-19?

Like many other cities in the UK and around the world, city leaders in Reading are currently developing plans and strategies that look to boost economic recovery in the aftermath of COVID-19 (or what is still currently *life with COVID*). The COVID crisis has been very much an urban crisis which has particularly affected the urban poor – for example, over 95% of total cases are in our urban areas (UN Habitat 2020), and it is clear that city economies which are less diversified have been harder hit. During the pandemic we saw that many cities in the UK and elsewhere took steps to increase active mobility (walking and cycling) through the provision of additional pedestrianized areas and cycleways. In Paris, for example, the equivalent of 30 miles of roads were made available for cycling, and the city's mayor decided to formally promote the concept of the 15-minute city (developed by Sorbonne Professor Carlos Moreno). This means developing and promoting services and everything a neighborhood needs within 15 min travel time (OECD 2020a).

As people returned to work, however, we saw things returning to "normal," so many city authorities are trying to look longer term to see how the hard won environmental gains for cities under COVID-19 could be integrated with an economic recovery based on green jobs and clean growth (UN 2020). We have also seen how new technologies have been used to help people work from home more easily and so travel to work less but how smart technologies can manage social distancing and monitor the spread of the virus in cities (OECD 2020a).

Finally, besides the continued importance of "smart" and "sustainable" thinking, we are also seeing an increasing emphasis on the "resilience" of cities which focuses on their ability to bounce back from environmental, socioeconomic shocks, and natural disasters (Wray 2020). Quite how cities will change in the future, however, is open to debate: will there be de-urbanization, re-urbanization or the development of enclaves? (OECD 2020b). Much will depend on if or when a vaccine is found, but what is clear, however, is that city stakeholders need to think clearly about the long-term futures of our cities.

Summary/Conclusions

Creating a coherent vision for a city is a challenging process. It requires resources, a clear plan, and

leadership. Thinking at city scale also requires thinking across boundaries and across interest groups and using imaginative and innovative ways of engaging with communities (Dixon and Cohen 2015). The experiences of cities (including Reading) which have developed long-term visions also have important lessons for interdisciplinary research and the way in which city visions are co-created through a city foresight approach. These include (Dixon et al. 2018; Dixon and Farrelly 2020):

- Framings of the problem for transformation: how is the problem framed from the outset? What is the overall ambition or goal of the vision?
- Urban foresight activities – how can these be best developed to include a truly participatory element and a balance between structured activities and "blue sky" thinking?
- Ownership and leadership – who is responsible for the leadership of the vision? Who "owns" the city vision?
- Vision and implementation – how does the city vision link with existing local city plans and the aspirations of the city authorities, the public, and other stakeholders? To what extent do the city authorities support the vision and its implementation?
- Contrasting partnership ambitions – related to leadership, can the differing ambitions of those creating and leading the vision be reconciled and balanced?
- Structural change and reform (vis-à-vis environment and design) – what are the wider implications of the vision, for example, in relation to governance structures and city status?
- Interdisciplinary challenges – how can different disciplines and different professionals work with each other, other stakeholders, and the public to help develop the vision? Can built environment professionals really think "longer term" beyond the constraints of the present?

Ultimately, city foresight techniques (which underpin urban futures thinking) can provide a powerful addition to longer-term planning and the more detailed master plan approach adopted in many cities in continental Europe. If we are to develop the longer-term, unconstrained thinking that is required to move to a more sustainable future, futures-based studies offer us a potentially powerful set of tools to help achieve this and mobilize resources in the best possible way (Dixon and Tewdwr-Jones 2021). Cities will almost certainly survive just as they have done before, but in living with COVID and the climate crisis, we need to fast forward the development long-term visions for our cities so that we can plan for smart, sustainable (and resilient) futures.

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