

“Instead of simply calling for more research in specific areas, how can we view the city as a system and feed the information it generates back into it so that it constantly learns and adapts to new situations?”

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Cities in a changing world

How will cities of the future adapt to the environmental, economic and social challenges facing them?

At a glance

The concept of resilience and the capacity to learn and adapt to new situations lies at the heart of creating and maintaining sustainable future cities. It is not possible to predict all future challenges so cities must strike a balance between long-term investments to protect against expected future damage and preserving resources and flexibility to deal with unexpected future damage. Long-term investment on its own runs the risk of ‘maladaptation’ (a good response under one future scenario turns out to be a poor response under another). Resilience is likely to flow from diversity, monitoring and experimentation, rather than from planning solely on the basis of predictions. This approach allows for adaptive management and robust decision-making that will prove useful regardless of the possible futures which emerge.

This raises a key question: Are there therefore limits to the effectiveness of planning in cities? Is more research really needed into specific solutions under all potential future scenarios? Or could we create room for innovation in city governance so cities can learn and adapt to new situations in real time as these emerge? Could policy mechanisms be created or engineered so that city governance becomes a learning machine based on experience, as much as on models – essentially creating a ‘thinking city’ that can automatically respond to our environmental and social needs?

Limits to planning

Rapidly expanding cities in Latin America, Africa and Asia are raising questions about the way in which we traditionally see cities as being planned and controlled, and about the role of citizens in the way they are governed. New phenomena such as informal governance and informal economies coupled with rapid urban growth are beginning to

challenge our underlying assumptions about the way cities are governed and the role that top-down planning plays in that.

Are there limits to the effectiveness of planning in cities? Is ‘over-planning’ required to achieve sustainability or can an organic approach – where the city develops from the ground up without being planned – do just as well or, even, better?

Patterns in the way cities develop depend on a large range of diverse factors such as climate change or depletion of local resources and migration, many of which are highly unpredictable. Against this background, how do we make

Key questions

Can governance systems be designed so that they are more flexible and responsive to long-term changes and sudden shocks, or is there a risk that this will encourage short-term thinking? These issues led to three more specific sets of questions:

- Are we in danger of ‘over planning’ cities so they are only resilient and sustainable under selective futures? Is it possible to legislate for a less planned approach?
- Can governance systems be designed so that they are more flexible and responsive to changes and sudden shocks?
- Could room be built in for natural experimentation, and what are the implications for governors if an experiment fails?

robust decisions? We can include formal uncertainty analysis in planning, combined with a decision framework to make use of this uncertainty. The uncertainty is then 'built into' or at least reflected in investment decisions that will be in place far into the future. Alternatively, we can deal with uncertainty by stepping back from long-term planning and allowing room for change as the future emerges.

Instead of trying to predict all social and environmental conditions at a future date and designing and optimising hyper-planned cities, we can ask ourselves further questions. Is it possible to plan a city to recognise and make use of self-organising social networks and changing resource networks to deal with environmental, social and economic changes? When we think about sustainability, are we in danger of 'over planning' cities? Is it possible to legislate for a less planned approach to sustainability? What evidence do we have that a 'looser' approach to planning would work? If hyper-planning leads to the danger of mal-adaptation, could a less planned approach lead to chaotic investments that are ineffective because they are uncoordinated?

“The nature of life, the nature of economic activities, the nature of cities is that when the unexpected happens, innovations occur. A lot of the evolution of a city is therefore driven by the unexpected, it’s driven by experimentation and trial and error, not planning in advance.”

Stephen Aldridge,
Department for Communities and Local Government

The city as a living laboratory

There is great diversity between cities and between communities within a city. This opens the possibility of using this diversity as a laboratory for conducting 'natural experiments' of different potential responses to the future. Could an experimental approach complement or stimulate a city's evolution or might it push a city towards instability by threatening sustainability and the attraction of investments?

An experimental approach is already being taken by some cities. Singapore is running randomised controlled trials to improve their underground system. In various places, such as the London Underground, the effectiveness of interventions aimed at reducing levels of crime is being tested. An initiative funded by the UK government, the 'Future Cities Catapult' project is asking whether future cities can think for themselves. It aims to make four areas of London into 'living laboratories' and collect data, build evidence and experiment with new ideas, making the city itself into a test bed for innovation in the built environment.

Could a similar approach be taken to designing policy mechanisms themselves so that city governance becomes a learning machine based on experimentation? There are two general ways of designing systems. The first involves building slack and redundancy into a system from the beginning so that it is possible to experiment freely without disrupting more stable and long-term parts of the system. The second is to optimise a system to such a degree that if any one part of it fails, there are not negative consequences throughout the system. This second approach only leaves room for 'just-in-time experimentalism' which tends to result in very short-term or small-scale interventions, rather than grander experiments that explore whether an entire system (or system of systems) needs adjusting. Are there ways to

design city governance systems so that self-learning can be incorporated into them?

Some experiments will succeed, but inevitably, others will fail. Is it possible to create 'safe places' to experiment and to innovate within cities without compromising citizens' rights to essential services? How would such spaces be created and governed? How can the impacts of experimental failure in one part of the system be prevented from flowing back into other parts of the system? A city's size and diversity means that there are always pieces that can be isolated from overall interdependence to conduct the necessary experiments and some experiments may only be practical in a confined area. How can we allow failure in the political environment, even if that failure leads to improved understanding for the future?

The great diversity between cities can also be harnessed for conducting 'natural experiments' of potential responses to the future. City leaders are increasingly making direct links and forming networks with similar, like-minded cities, even in other parts of the world. Such collaborative networks include the C40 Cities Climate Leadership Group, "a global network of large cities taking action to address climate change by developing and implementing policies and programs that generate measurable reductions in both greenhouse gas emissions and climate risks". It was founded in 2005 by Ken Livingstone, then Mayor of London, and now includes 69 affiliated cities ranging from Addis Ababa and Lagos to San Francisco, Copenhagen and Bangkok. It believes that "cities have the power to change the world." What kinds of networks would be most effective at sharing information like this so that the strengths and weaknesses of alternative strategies can be tested and assessed?

Keeping pace with change

National, regional and city governance tends to be slow to change. How can governance systems be designed so that they are more flexible and responsive within time scales that match those of changing physical and social circumstances? These could include disparate challenges such as the unpredictable effects of climate change or greater demand for local autonomy in planning decisions. An inherent tension is that sustainability is a long-term goal, whereas political agendas tie in with election cycles, and market investments are often based on short-term return. How could cities build opportunities to revisit decisions and to regularly look at the effectiveness of governance and interventions?

The research challenge on the horizon

The uncertainties regarding how the future will change are so profound that highly centralised, long-term planning cannot be the only way forward. There is a need to treat cities as places of experimentation. However, experiments require laboratory equipment – the city analogues of which are sensors that measure key resilience and sustainability metrics. They require parts of the city where experiments can be conducted and spaces within the city that are left 'fallow' so new ideas can be tested as innovators develop them. Additionally we need the ability to understand the differences between the different settings of the experiment, to measure the outcome of policies and measures, to assess the reasons for these results and to design even more refined experiments to better understand the reasons for success or failure. The challenge for the future is to create this capacity to use cities as living laboratories for sustainability and then to back this up with governance structures and planning rules that allow for such experimentation without putting decision makers and service providers at risk when some experiments succeed and some fail.