



# Science and the Future of Cities

Report on the global state of the  
urban science-policy interface

by the International Expert Panel on  
'Science and the Future of Cities'  
endorsed by *Nature Sustainability*

This report is the result of an expert panel by the Authors and Nature Sustainability. The information and material contained in this publication is for educational, research and information purposes only and is made available under a Creative Commons license (Attribution-Non-Commercial 4.0 International).

The authors, the authors' institutions and Springer Nature will not be liable for any loss or damage incurred through the use of this report. This report has not been peer reviewed, copy-edited or produced according to the Nature Research policy standards (all available at <http://www.nature.com/authors/policies/index.html>)

To cite: *Science and the Future of Cities*, Report of the International Expert Panel on Science and the Future of Cities; London and Melbourne, 2018.



**FOREWORD:****FOR A GLOBAL URBAN SCIENCE****MICHELE ACUTO, SUSAN PARNELL, KAREN C. SETO AND MONICA CONTESTABILE**

Cities are central to life on our planet. Urban areas generate more than 75% of global GDP, contribute to about 75% of carbon emissions from global final energy use, and are home to the majority of the world population, including over 863 million urban dwellers living in slums and informal settlements. Understanding how cities work, what opportunities and challenges they afford humanity, and how we can harness these for a sustainable continuation of our societies is key. Knowledge about our planet from an urban perspective has become central in understanding the present and possible future of our living conditions.

Cities are gaining momentum in world affairs. The importance of thinking about the urban dimension of our shared global challenges is now enshrined in the 2030 United Nations Sustainable Development Agenda, adopted by more than 150 world leaders in 2015, which includes a Sustainable Development Goal (SDG) that focuses explicitly on urban areas, as much as in other key multilateral frameworks like the UN New Urban Agenda or the Paris Agreement on climate change and the Sendai Framework in disaster Risk Reduction. Since then, discussions about the importance of generating more effective knowledge about the urban condition of our planet have been repeatedly acknowledged by key multilateral venues like the Group of 20, the Intergovernmental Panel on Climate Change, the World Economic Forum or the World Data Forum, to name but a few. At the same time, cities are waking up to leading on global challenges. Mayors and other local leaders are now regularly partaking in major international efforts and vocal advocates for a more sustainable future.

Cities need to be more effectively understood, and this knowledge needs to become action. Scholars have repeatedly advocated for this formalised multilateral attention and for a greater connection between scientific ways of understanding cities and practical modes of setting policies to govern cities the world over. Yet, for a long time, academia has been lagging behind in this momentum. After all, both on the eve as much as after the establishment of the SDGs and the New Urban Agenda, many commentators pointed at the pressing science and policy gaps affecting our capacity to ensure that urbanisation is a force of positive transformation in global development.

Cities need better science-policy connections. To harness the global efforts around these agendas, we urgently need to address two key matters: forge new knowledge that responds to complex urban challenges, and accelerate uptake of scientific urban information by practitioners. Achieving the first goal will require bringing together scholars from across disparate fields and reorganizing existing knowledge domains which are currently compartmentalised and professionalised. Achieving the second will require transformation of current science-policy interfaces. We need a more effective and more global, both in analytical reach as much as cosmopolitan ethos, urban science. Urban science has deep roots, dating back to the early 20<sup>th</sup> century, and needs not to overshadow the vast variety of scientific traditions and modes of knowing the ‘urban’ that have emerged from the natural, social and engineering sciences, via law, politics and management, to the arts and humanities. The urban science we advocate here for is a cross-cutting field of engagement across different urban disciplines.

Cities need different, more collaborative, pluralist and institutionalised, ways of producing urban knowledge. Small pockets of well-funded research domains are often aligned to opportunistic themes driven by industry, policy and market drivers beyond academia, like climate change, resilient cities or smart cities. Collectively, urban scholarship remains ill-informed in the ways it can convey the full spectrum of major global urban change, ranging from freshwater loss to the shifting burden of disease, all the way across social and cultural challenges. Today’s urban research, far from being a coherent ‘urban science’, remains trapped in the twentieth century tradition of

the systematic study of individual cities and the rise of specialised academic disciplines. Across academia, urban knowledge is outdated and underfunded. Current research also tends to rely on selective samples, so we still know very little about the majority of urban settlements and challenges around the world. Importantly, this unbalance is replicated both geographically, between North and South and small and big cities, as much as thematically. Leading research is clustered around topical domains such as climate change or smart innovation, rather than offering the wider coverage necessary for balanced intervention from practitioners.

Contemporary city challenges require a step change in both scientific capacity and science-policy collaboration. This is a pivotal shift because urban systems are increasingly complex and multi-dimensional, and without a more synthetic and holistic enquiry, we run the risk of creating incomplete solutions. In order for 'urban science' to be collectively greater than the sum of its parts it needs to draw from all the sciences —natural, engineering, and social, as well as the arts and humanities — whilst linking directly into practice, and offering effective global assessments of the state of our planet's urban condition.

This ethos was at the heart of the establishment, in April 2017, of an independent and international Expert Panel on "Science and the future of cities" endorsed by *Nature Sustainability*. The Panel gathered twenty-nine amongst the major voices in contemporary urban scholarship from across the academic spectrum, without prejudices as to where urban science might come from geographically and disciplinarily. The Panellists were tasked to survey the challenge of science-policy interactions, and the issue of developing a 'global urban science' that has reach across academia, meets pressing urban sustainability challenges, and enables more effective science-policy interfaces.

Cities, this report of the Panel argues, can be provided with a more effective 'global urban science'. Against the backdrop of rising urban challenges and their complexities, a renewed urban research agenda will be based on a stronger connection between all the traditional sciences, humanities, politics and practice. It must embrace diversity of urban disciplines, and recognise effective interdisciplinary combinations that equally allow for a global outlook, insights onto issues of inequality and justice, and for a prioritisation of effective advice to urban policymakers. Building effective science-policy interfaces for urban challenges will require different modes of operating from traditional fields like engineering or artificial

intelligence, where there are recognised ontologies and epistemologies and professional certification clearly defines the community of experts. Rather than simply professionalising urban science to better manage cities, this will require an even more fundamental upskilling of scientists to speak to politics, and of policymakers to read science. Building a global urban science also requires, just like research on ecosystems, a much clearer recognition and explicit inclusion of the variation in urban conditions. Equally, this required global scientific work will need not to be blind to 'critical' social science currents, questioning issues of power, politics and justice. It will also have to develop a much better sense of the complex local, national and global governance structures underpinning our urban era, whilst striving to offer far more regular and interdisciplinary versions of the all too rare global urban assessments.

What follows here is the Panel's call for a global urban science. This call takes the three elements of this phrase in a different light from the often popular and at times unnuanced use of the terms. It is 'global' in a cosmopolitan sense as pertaining to and reaching out worldwide, irrespective of socio-economic status to the variety of urban conditions, calling greater attention to all forms of urban processes in the global North and South, aiming to promote an appreciation of urban phenomena beyond specific sites and ad hoc comparative assessments, seeking to leave no city behind in this effort. It is 'urban' in that it calls for attention to the processes, qualities and contextual specificity of urbanisation the world over, recognising the increasing importance, in both positive and negative senses, of cities. It is a field of 'science' in that it recognises the importance of scientific knowledge, produced from sound theoretical and methodological foundations, validated through debated, disagreement and collaboration, and open to improvement and scrutiny.

# EXECUTIVE SUMMARY

Cities are central to life on our planet. Urban areas generate more than 75% of global GDP, contribute to about 75% of carbon emissions from global final energy use, and are home to the majority of the world population, including over 863 million urban dwellers living in slums and informal settlements. Understanding the opportunities and challenges of an urbanizing society is central to sustainability. Knowledge about our planet from an urban perspective is central to the integrity of present and future living conditions. Responding effectively to contemporary city challenges requires a step change in both scientific capacity and science-policy collaboration.

## THE EXPERT PANEL

This ethos was at the heart of the establishment, in April 2017, of an independent and international Expert Panel on “Science and the future of cities” endorsed by *Nature Sustainability*. The Panel gathered twenty-nine experts in contemporary urban scholarship from across disciplines and perspectives. Panellists were tasked to survey the challenge of science-policy interactions, and the issue of developing a ‘global urban science’ that has reach across academia and enables more effective science-policy interfaces.

The Expert Panel provided a set of five key recommendations, each including a series of practical actions that could be taken both in academia and policy circles to encourage a more effective role for science in the future of cities.

## KEY MESSAGE 1:

### A NEW GLOBAL SCIENCE IS NEEDED FOR THE URBAN ERA.

There is a need to develop an ‘urban science’, not as a single science, but as a cross-cutting field of engagement across multiple disciplines.

We have limited and partial information about cities and urbanisation: this means that global urban analyses remain limited in scope and rarely comparative or comprehensive in reach. However, more data points do not necessarily lead to better decision making: the ‘global’ in global urban science needs to be articulated in an aggregate sense, identifying common patterns, trends and dynamics - and their future directions.

## KEY MESSAGE 2:

### URBAN SCIENCE NEEDS A BROAD RANGE OF EXPERTS AND INFORMATION.

The urban science community will need to include a wide range of experts, including non-academic actors such as NGOs, residents, consultancies, industry, international organizations, and city networks.

There are mounting data asymmetries between the private sector and the scholarly edifice of academic research. The expansion of private sector, consultancy and philanthropy activity in charting a ‘global’ cities agenda is shifting the locus of urban knowledge and underscores the imperative for partnerships and ethical and accountable knowledge generation processes.

## KEY MESSAGE 3:

### AN URBANIZING PLANET CALLS UPON THE SCIENCES AND POLICYMAKING TO RETHINK AND ENHANCE THEIR RELATIONSHIP ACROSS COMPLEX SYSTEMS.

The pathways to reform and improvement of the role of science in the future of cities goes, inevitably, through multiple sectors and scales of governance.

## PANEL RECOMMENDATIONS

**1 Contemporary urban challenges need a global urban science that reaches out across disciplines, is geared towards impact, and is accountable to its role in shaping cities.** Suggested practical actions include:

- » Disagreement and divergence of opinions on urban issues should be encouraged and cultivated.
- » The management of science at national, regional, international and private scales should allow for more open interdisciplinary peer reviewing and adjudication of funding schemes, whilst also encouraging foresight and long-term thinking.
- » A global assessment of urbanization needs to be sanctioned at the UN level and given the capacity to act in bringing together what we currently know of urban trends, dynamics and key challenges beyond selective studies, comparative rankings and national datasets.

**2 Reviews and reforms of the role of cities within the multilateral system are long overdue, and need to go hand-in-hand with the implementation of the 2030 Agenda.** Suggested practical actions include:

- » Relevant elements of the UN system need to be rapidly reformed to consider the pivotal role of cities in advocating, exchanging information and acting on today's most pressing global challenges.
- » Following the Secretary General's 2017 High-Level Panel on UN-Habitat and the New Urban Agenda, a working group on the future of 'global urban governance' should be established.
- » The global assessment of urbanization for the UN can be undertaken by a purpose-built international panel of experts, gathering academia and other key sources of urban research, with a clear intent at community building.

**3 The role of the private sector needs to be rebalanced towards capacity building and accountable input focused on where the most pressing challenges are.** Suggested practical actions include:

- » Akin to the Good Humanitarian Donorship in aid, major urban philanthropies can sign up and implement a 'Good Urban Donorship' code of conduct geared towards ethical developmental practices and against unnecessary earmarking.
- » A systematic review of the publishing sector's role in charting how and which sciences influence urban processes is urgently needed: a cross-company working group on urban data with the major academic outlets should be established in parallel with scholarly and policy efforts detailed in this report.

A global task force on the role of consultants in urban agenda-setting and implementation of major international frameworks is needed. The influence of these entities need to be considered carefully as part of the bigger picture of global urban governance.

**4 National governments and regional actors need to become pro-active advocates of urban innovation for sustainability.** Suggested practical actions include:

- » Develop national-level exercises to understand the trends, pressures and futures of a country's cities, with the explicit intent of considering national-level tactical areas of investment but also mobilizing domestic expertise in universities and research institutes into national conversations.
- » Establish a cross-regional advisory panels that link major regional bodies (e.g. ASEAN, Caricom, African Union, EU etc.) on urban issues and encourages the cross-fertilization of urban action.
- » Encourage the adjustment of national science advisory schemes towards a more explicit urban capacity, linking local reforms to national efforts.

**5 Experiments in science-policy collaboration at the local level are fundamental. Academia and local governments should take tangible steps towards joint investments for science-policy collaboration.** This includes suggested practical actions such as:

- » City-regional and metropolitan science-policy mechanisms, such as 'urban observatories', need to be taken seriously by both universities and local governments, but with the support of national governments and the UN system.
- » Appoint academically-grounded 'chief scientific advisors' to local government to advise on evidence use in city policymaking.
- » Include peer review processes within the production of major private sector and city network datasets, engaging in scholarly outputs as much as reports from these analyses, including clear outlines of methodologies

# THE PANEL MEMBERS

## PANEL CO-CHAIRS



**Michele Acuto** is Professor of Global Urban Politics and Director of the Connected Cities Lab at the University of Melbourne.



**Susan Parnell** is Chair in Human Geography at the University of Bristol and Professor in the Department of Environmental and Geographical Sciences at the University of Cape Town.



**Karen C. Seto** is Frederick C. Hixon Professor of Geography and Urbanization Science at the School of Forestry and Environmental Studies at Yale University.

## NATURE RESEARCH



**Monica Contestabile** is Chief Editor of *Nature Sustainability*.

## PANEL MEMBERS



**Adriana Allen** is Professor of Development Planning and Urban Sustainability in the Development Planning Unit at University College London.



**Sahar Attia** is Professor at the Faculty of Engineering at Cairo University.



**Xuemei Bai** is Professor of Urban Environment and Human Ecology at the Fenner School of Environment and Society of the Australian National University.



**Michael Batty** is Bartlett Professor of Planning in the Centre for Advanced Spatial Analysis (CASA) at University College London.



**Luis M A. Bettencourt** is the Pritzker Director of the Mansueto Institute for Urban Innovation and Professor of Ecology and Evolution at the University of Chicago.



**Eugenie Birch** is the Lawrence C. Nussdorf Chair of Urban Research and Education and co-director, Penn Institute for Urban Research at the University of Pennsylvania



**Harriet Bulkeley** is Professor in the Department of Geography at Durham University.



**Maruxa Cardama** is Secretary General at SLoCaT Partnership on Sustainable, Low Carbon Transport



**Charles Ebikeme** is Science Officer at the International Council for Science and Policy Fellow at Centre for Science and Policy at the University of Cambridge



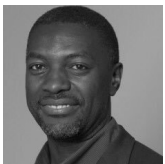
**Thomas Elmqvist** is a professor in Natural Resource Management at Stockholm Resilience Centre, Stockholm University.



**Yasser Elsheshtawy** is an independent writer and researcher and an Adjunct Professor of Architecture in the Graduate School of Architecture, Planning and Preservation (GSAPP) at Columbia University.



**Ilona Kickbusch** Director of the Global Health Centre and adjunct professor at the Graduate Institute of International and Development Studies in Geneva.



**Shuaib Lwasa** is Professor in the Department of Geography at Makerere University.



**Julie McCann** is Professor of Computer Systems and Director for Imperial Centre for Smart Connected Futures at Imperial College London.



**Patricia McCarney** is President and CEO of the World Council on City Data (WCCD) and is a professor of Political Science and the Director of the Global Cities Institute at the University of Toronto.



**Timon McPhearson** is Associate Professor of Urban Ecology and Director of the Urban Systems Lab at The New School.



**Sheila Patel** is the founding director of the Society for the Promotion of Area Resource Centers (SPARC).



**Mark Pelling** is Professor in the Department of Geography at King's College London



**Edgar A. Pieterse** is Director of African Centre for Cities and South African Research Chair in Urban Policy at the University of Cape Town.



**Carlo Ratti** is Professor of Urban Technologies and Planning and Director of the SENSEable City Lab at the Massachusetts Institute of Technology (MIT)





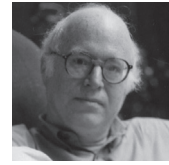
**Aromar Revi** is the founding Director of the Indian Institute for Human Settlements (IIHS).



**Robert J. Sampson** is Henry Ford II Professor of the Social Sciences at Harvard University and founding director of the Boston Area Research Initiative.



**David Satterthwaite** is Senior Fellow at the International Institute of Environment and Development (IIED).



**Richard Sennett** is Professor of Sociology at the London School of Economics and Chair of the trustees of Theatrum Mundi.



**Nick Tyler** is Chadwick Professor of Civil Engineering and director of the Pedestrian Accessibility Movement Environment Laboratory (PAMELA) at University College London.



**Yongguan Zhu** is Professor of Biogeochemistry and Environmental Biology, and Director General of the Institute of Urban Environment at the Chinese Academy of Sciences (CAS).

#### **Panel support**

Research and production support for this report has been provided by Enora Robin, Samuel Lane, Clementine Chazal, Ebba Engstrom and James Paskins at University College London, Michele Burder, Studio Binocular and the Connected Cities Lab team at the University of Melbourne, David Edwards and Katie Flanagan at the Prince's Charitable Trust, Jean Paul Addie at Georgia State University, as well as Aiora Zabala and Ryan Scarrow at Nature Research.

## TABLE OF CONTENTS

FOREWORD	3
EXECUTIVE SUMMARY	5
THE PANEL	7
TABLE OF CONTENTS	10
LIST OF FIGURES	11
<b>INTRODUCTION: A TURNING POINT</b>	<b>12</b>
<b>1 – SCIENCE FOR THE AGE OF THE CITY</b>	<b>14</b>
<b>2 – WHAT KIND OF ‘URBAN SCIENCE’</b>	<b>23</b>
<b>3 – URBAN SCIENCE AND ITS EXPERTS</b>	<b>33</b>
<b>4 – ENHANCING SCIENCE-POLICY LINKS</b>	<b>46</b>
<b>5 – PANEL RECOMMENDATIONS</b>	<b>54</b>
REFERENCES	57
FUNDING AND ACKNOWLEDGEMENTS	59

**LIST OF FIGURES**

FIGURE 1 – RISE OF URBAN VS RURAL POPULATION	15
FIGURE 2 – % OF POPULATION LIVING IN URBAN AREAS	16
FIGURE 3 – KEY GLOBAL AGREEMENTS AND INITIATIVES 1992-2018	21
FIGURE 4 – PERCENTAGE OF DATABASES COVERING EACH TYPE OF DATA	26
FIGURE 5 – TYPE OF DATA PRODUCED BY POLICY SECTOR	26
FIGURE 6 – DIVISION OF KNOWLEDGE	29
FIGURE 7 – RISE OF CITY NETWORKS	36
FIGURE 8 – URBAN POPULATION PER REGION AND AVAILABLE DATA	42

**FIGURE ACKNOWLEDGMENTS/CAPTIONS**

Figure 1 and Figure 2 source: United Nations Population Division, *2018 Revision of World Urbanization Prospects*, available at <https://population.un.org/wup/>

Figure 3 source: authors.

Figure 4, Figure 5 and Figure 8 source: adapted from Robin, E., & Acuto, M. (2018). Global urban policy and the geopolitics of urban data. *Political Geography* 66: 76-87.

Figure 6 source: adapted from E. Pieterse, opening address, ACC International Urban Conference (1 February 2018, University of Cape Town) and Boyer, B., Cook, J.W. and M. Steinberg, *In Studio: Recipes for Systemic Change*. Sitra, The Finnish Innovation Fund, 2011, ISBN 978-951-563-786-4, available at [www.helsinki.designlab.org/instudio](http://www.helsinki.designlab.org/instudio).

Figure 7 source: adapted from Acuto, M. (2016). Give cities a seat at the top table. *Nature*, 537(7622), 611.

## INTRODUCTION:

# A TURNING POINT

While it remains arguable whether cities are the ultimate sources or solutions for global sustainability problems, there is little doubt of their centrality in the 21st century. In just over a decade, by 2030, there will be 41 megacities of 10 million inhabitants or more, up from today's 28. Urban areas already generate more than 75% of global GDP, contribute to about 75% of carbon emissions from global final energy use, and are home to the majority of the world population, including over 863 million slums dwellers. City dwellers, just going about their lives, will generate more than 2 billion tonnes of waste each year, much of it landing up in the oceans and in terrestrial sites outside of the urban edge. While urban areas are hubs of opportunities and innovation, it is difficult to deny the sustainability challenges raised by a rapidly expanding population living in a predominantly urban world.

Since 2015, a series of international agreements have highlighted the importance of harnessing cities' capacity for innovation to tackle urbanisation challenges necessary to achieving the 2030 global agenda for sustainable development. A key turning point occurred in October 2016, when policymakers, scientists and civil society delegates gathered for a once-in-twenty-years opportunity of the Habitat III summit in Quito, launching the UN's New Urban Agenda (NUA). The Agenda solidified the international recognition by nation states for the centrality of cities through their endorsement of not only a dedicated Sustainable Development Goal (#11) but also the acknowledgement of the importance of localising all global sustainable development agreements. This political endorsement emphasizes the critical need for **improving our fundamental knowledge of cities and urbanization in ways that can generate tangible improvements to present and future living conditions**. Yet this political momentum comes amidst serious challenges to the operational realities of generating, gathering and mobilising urban knowledge, especially given the magnitude and speed of the challenges ahead.

In the lead up and immediate aftermath of the 2030 Agenda approval in New York and then the New Urban Agenda in Quito, experts reiterated how a poor urban science-policy interface and the lack of clarity on how cities contribute to the post-2015 agenda would impede progress. Since then, numerous voices have expressed concerns as to how the set of urban development objectives associated with the SDGs might be achieved in practice, referring particularly to the lack of supporting science-policy links to inform the design and monitoring of national and local urban strategies. In September 2017, in the context of a report to the UN General Assembly by a purpose-built High-Level Panel established by the UN Secretary

General to review the effective implementation of the New Urban Agenda, diplomats, academics, private sector and civil actor representatives stressed the current shortcomings in mobilising effective urban knowledge in support of global sustainability goals – a concern taken up at the 2018 High Level Panel, which focused on SDG 11 and the global commitments to the urban question. **Science-policy interactions between urban scholars and urban practitioners have, in the wake of the SDGs and the NUA, undergone important steps towards greater integration**. As this report notes further on, climate as well as disaster and risk reduction have spearheaded this from the Sendai and Paris agreements on to, in 2018, the recent 'CitiesIPCC' conference (in Edmonton), clear consideration during the High-Level Political Forum on the SDGs (in New York), and the kick off of an 'Urban20' track within the Group of 20 Buenos Aires summit. Arguments and evidence as to importance of forging better science-policy links, then, are a mounting not just in cities-specific fora and events, but more and more across the multilateral policymaking world.

In particular, there is a rising concern to identify what type of urban science, or sciences, can address the needs of actors shaping sustainable development in very different contexts and at different scales of governance. There are known limits to the current science-policy mechanisms that provide tangible evidence and can guide international efforts towards addressing some of today's major urban challenges, from climate, to health, inequality and resilience. As UN Deputy Secretary General Amina Mohammed reported, we must now recognise that **"the global response to the promise of urbanisation has been inadequate"**.

In response to the now well-acknowledged science-policy limitation flagged both in the lead up and follow up to the 2030 commitments and

to Quito, this Expert Panel was established in collaboration with *Nature Sustainability* to assess, encourage reform and offer independent advice on the global state of the urban science-policy interface for global sustainability. The Panel's remit was supported by the launch of *Nature Sustainability*, the new interdisciplinary journal by Nature Research. The journal's mission is to facilitate a cross-disciplinary dialogue around sustainability challenges and narrow the gap between research and policy making.

Support for the Panel's set-up was provided, along with *Nature Sustainability*, by University College London (UCL) and the University of Melbourne, as well as the Prince of Wales's Charitable Foundation International Sustainability Unit (ISU) and the International Science Council (ISC). Three scholars, Professors Acuto, Parnell and Seto, were tasked with gathering key figures in the international academic community with expertise in global urban policy challenges. The international Panel is composed of 29 leading scholars on urban issues from across a wide variety of disciplines, spanning natural sciences, social sciences and humanities, architecture and planning, engineering as well as computer and environmental science. Along with a series of in-depth individual interviews with each expert, the Panel met in London from 3-4th July 2017, with roundtables at the *Nature* campus in London, the African Centre for Cities in Cape Town, and the World Urban Forum in Kuala Lumpur in 2017 and 2018. This engagement process allowed for an extended reflection on how the urban research community might affect urban policy through evidence-based policymaking and appropriate science-policy interfaces. This report presents the Panel's work and insight on the current challenges of the urban science-policy interface and introduces a series of **recommendations to strengthen the use of scientific urban research in policy**.

Mindful of the vast scale and diversity of the international research community that work on cities, the Panel was not intended to be all-encompassing and no claims to international authority are made here. The 29 experts were drawn from a list of over one hundred eminent voices in urban research to provide a broad platform to kick off a conversation on the centrality of science in the future of cities as much as to foster a reflective moment for academia (broadly understood) to think through its positioning in global urban affairs and the global governance of sustainability. Experts were selected by the editorial team and collaborating institutions to reflect different disciplinary and geographical perspectives, self-evidently, the views expressed are not fully reflective of the breadth and depth of urban thinking in academic circles worldwide.

This Report is a first step, intended to spark broader conversations and actions about the role

academic urban research can play in informing the design, implementation and evaluation of sustainable urban strategies at the global scale. In doing so, it reiterates the urgency of harnessing the current "urban momentum" in multi-lateral conversations, and especially the 2030 Agenda for Sustainable Development to adapt and better link academic research to pressing urban challenges (Chapter 1). However, we note that existing institutional barriers hinder the development of a holistic urban science for policy (Chapter 2). In addition, the active involvement of various non-academic actors in the production of urban knowledge for policy, as well as the multitude of actors involved in urban affairs (beyond government) requires the scholarly community to look beyond academia and forge new collaborations to enhance research use into urban strategies (Chapter 3).

Taking a proactive stance and bearing these constraints in mind, the Panel explored avenues to better link urban science to action at different scales of governance, building on existing examples of 'science-policy' interface in other knowledge domains (Chapter 4). Finally, with the goal of inspiring further action rather than offering all-encompassing 'conclusions', the Panel Report offers five sets of recommendations to enhance science-policy interfaces and strengthen the role of science in shaping, responsibly, the future of cities.

Each chapter of the report presents the summary of Panel discussions and individual interviews with the experts, as well as roundtables and public commentaries by the experts and editors that sought to raise the international attention to these challenges between Habitat III in Quito in October 2016 and the 9<sup>th</sup> World Urban Forum in Kuala Lumpur in February 2018.

It is important to note that there was no consensus in views across the Panel. The chapters make use of a discursive and quotation-based approach to underline differences of view, points of debates, and issues of exception. As such, the input of science in the future of cities comes more, as one of the Panellist put it, as a 'concerto' of different voices and stances, than a single chorus with the same opinions. No individual positions are attributed but all quotes in the Report come from the Panel directly.

## 1

## SCIENCE FOR THE AGE OF THE CITY

## CHAPTER 1: KEY MESSAGES

An ‘urbanizing planet’ calls upon the sciences and policymaking to rethink their relationship. In this chapter we reflect on the global positioning of cities and the ‘urban question’, highlighting the problems that emerge in the gap between science-policy aspirations and implementation, knowledge and action, as well as on the calls for interdisciplinarity and effective collaboration across what are often inherently conflicting rationalities and methods of analysis.

- ✚ The size, scale and pace of urbanisation make knowledge about all cities fundamental to today’s global challenges
- ✚ Cities have themselves made important moves to illustrate their international presence and capacity to act on a global scale
- ✚ The global relevance of cities is at the forefront of international processes and multilateral frameworks, from the SDGs to the Paris Agreement, Sendai Framework, and the New Urban Agenda.
- ✚ Global commitments demand that scientists and policymakers understand the shared nature of urban challenges and thus establish the imperative for a global view onto the function of urban science(s)
- ✚ There exists a clear implementation and funding gap between global urban aspirations, in both policy and science, and the plans for making them tangible: this tension is amplified when ideas and evidence are applied to urban experiences in very different geographical contexts
- ✚ Substantial global gaps exist in the capacity to produce transformative knowledge: the mismatch between science and urban action is not confined to the ‘Global South’
- ✚ However, globally, capacity building challenges in developing contexts present a critical threat to a sustainable global urban change: this presents a triple human resources, knowledge and institutional scientific gap on a global scale.
- ✚ Greater science-based foresight is needed when planning for the implementation of sustainable urban development: we need to change our frame of reference toward 50, even 100 years, and have the data with global coverage to do so in an evidence-based manner
- ✚ Substantive interdisciplinary encounters are urgently needed: there is a pressing need, especially in the wake of measuring progress on the SDGs, for synthesis at a minimum around quantities and outcomes that are measurable, but ideally beyond the quant-qual divide.
- ✚ This does not mean to ‘merge’ urban sciences but to offer a pluralistic assessment of complex urban processes – there is no one urban science.

## CITIES IN THE GLOBAL SPOTLIGHT

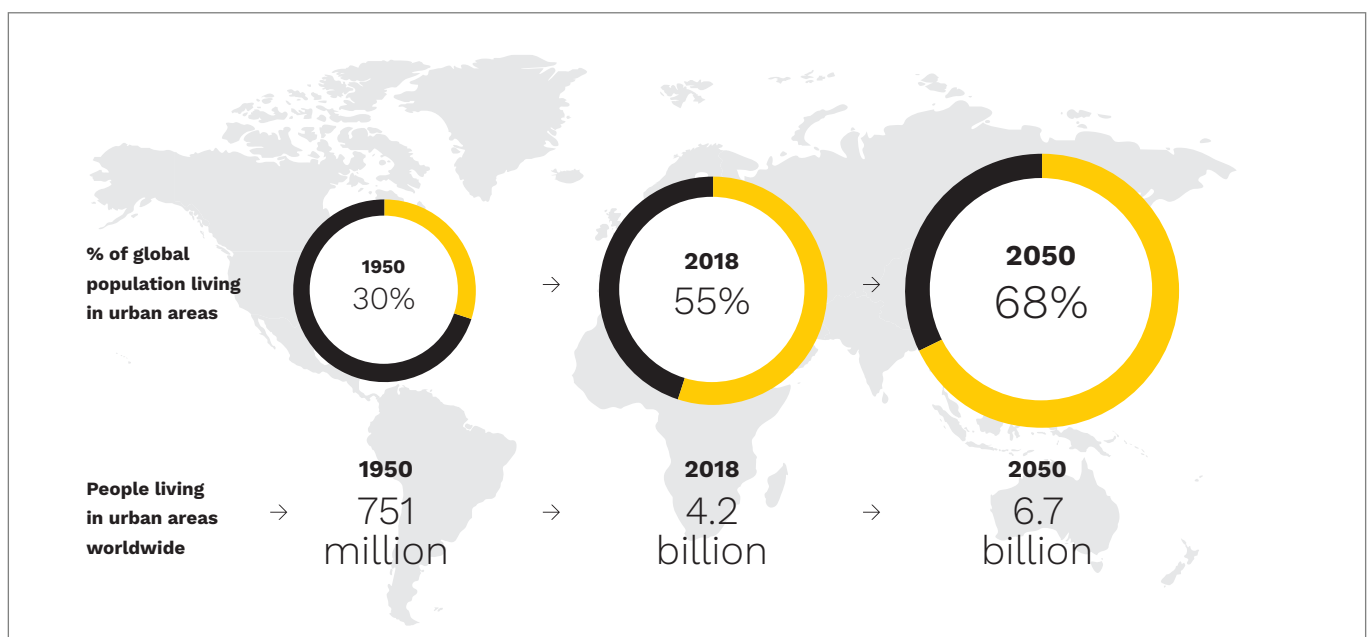
Our planet is fundamentally affected by cities. As of 2016, 4 billion people lived in urban areas globally and urbanisation is steadily increasing in scope with an expected global urban population of 6.4 billion by 2050, signalling an increasing confirmation of humanity's trust in how cities might be a way to a better future across all socio-economic strata.

**Cities are the drivers of a likely better future.** Numerous academic studies and public commentaries have already reminded us that the agglomeration of people, energy and resources makes cities hotspots for innovation and collaborative action for a better world. City governments themselves have been actively seeking a greater involvement in global affairs and in the realisation of more sustainable futures. Today we can account for at least two hundred, if not more, organised coalitions of cities (or 'city networks') geared to tackling all sorts of global and local issues, from climate to resilience, health, cultural tolerance and race and gender inequality.

Yet despite much of what right and attractive about cities, they are also epicentres for ever-growing social, environmental and economic challenges. Gathering increasing proportions of the world's population is as much a process of opportunity-generation, giving access to many to unprecedented social, economic and mobility opportunities, as a fundamental structural challenge. For instance, this might heighten vulnerability to disasters. Because 90% of the world's urban areas are coastal cities are especially vulnerable to rising sea levels, flooding and storms. Cities are more than sites of global change as they are responsible for two-thirds of global carbon emissions and they drive global economic

growth. Cities are also key nodes in international migration flows. Migration, population growth and urbanisation are interrelated in forging a global system that is increasingly urban. The absorption of growing populations into urban areas, whilst potentially fostering urban economic growth and human development, also put pressure on local governments and other stakeholders on the frontline of responding to issues of job, housing, infrastructure provision, and access to social and health services. The rapidly expanding urban centres of Africa and Asia face particular challenges in responding to these challenges.

The impact of local effort to effect wider change is becoming more and more tangible. For instance, the C40 Cities Climate Leadership Group includes 96 of the world's largest, most politically active human settlements, account for 25% of global gross domestic product, and has been a strong advocate in the promotion of urban leadership to tackle climate change. C40 is a platform for cities to exchange experiences while also promoting the voices of city governments in global conversations around climate change and low carbon transitions. C40 efforts aim to reduce carbon dioxide emissions by 645 mega tonnes by 2020, with financing of more than US\$2.8 billion. Yet these international urban efforts are more than just advocacy: C40 Cities, with 9,831 climate and sustainability initiatives launched since 2011, affect 1 in 12 people worldwide. If we think that C40 is but one of more than two-hundred such international efforts launched by cities, the power of cities in global affairs becomes hard to dismiss. In fact, networks like ICLEI Local Governments for Sustainability have been on the scene even longer than C40 and have been pivotal in shaping the initial 'urban' orientation of major multilateral processes, as with ICLEI's pivotal role in including a 'Local Agenda 21' in the 1992 Rio Earth Summit that kick-started many of today's sustainable



development efforts. Equally, the United Cities and Local Governments (UCLG) network, emerged roughly at the same time of C40, has since been a central gateway and advocacy voice for local governments to participate to UN processes and be recognised as central in some of today's pivotal agreements in the 2030 Agenda. At the same time of this 'networked' boom, many local governments have acted to implement policies, often more progressive than their national governments, in a variety of sustainability domains. In the US, for instance, those have included the fight against climate change (e.g. Chicago Climate Charter after President Donald

“

Communities often build themselves around crisis. So the crisis we faced was whether there would be an urban SDG at all, and a lot of people united around that cause to fight for it.

”

the local-scale action as a driver of transformation.

The importance, challenges and opportunities of rapid urbanisation and local action have been recognised by a series of UN-led, international agreements, which highlight the importance of

J. Trump decided to pull out of the Paris Agreements) or the refusal to support the federal governments' implementation of stricter immigration laws (e.g. Sanctuary Cities). More generally, the emergence of a "fluid alliance of (local) interests and organizations that generated a coherent pro-urban discourse" has contributed to propel the 'urban question' into global policy conversations and to garner global acknowledgement of

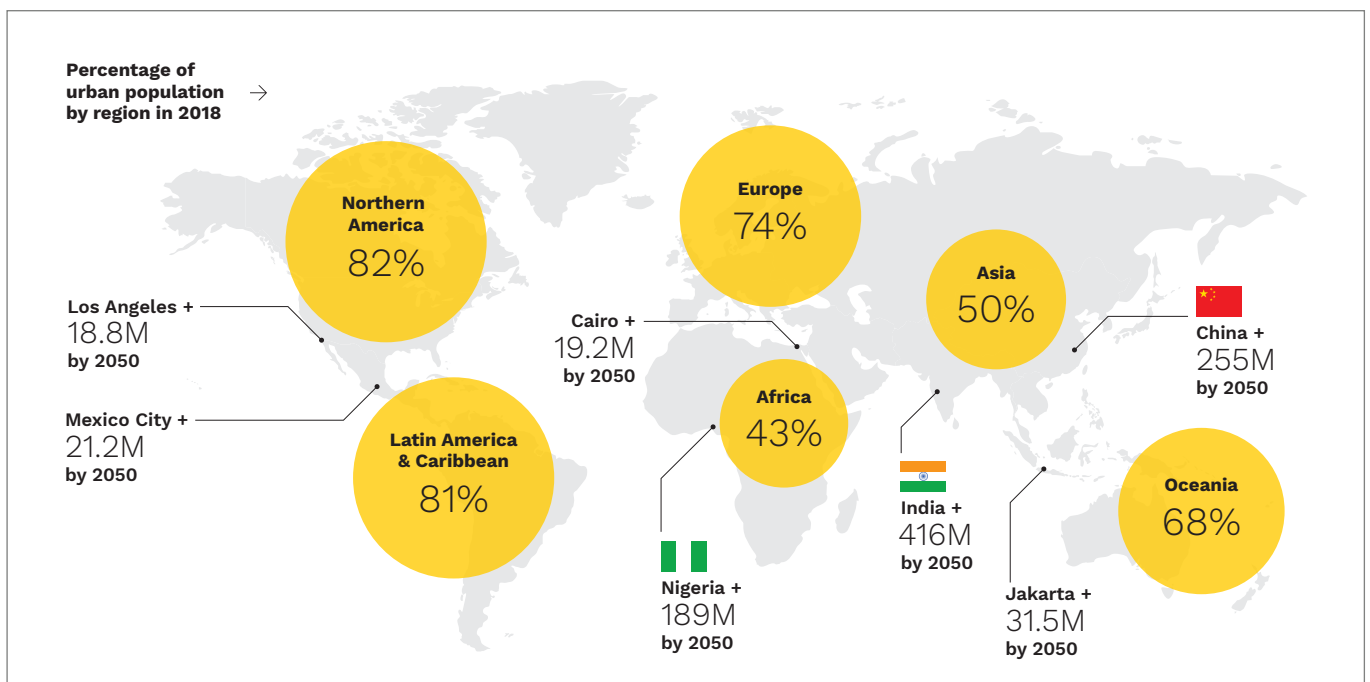
local or 'urban' dynamics for achieving the 2030 global agenda for sustainable development. While nations remain the formal signatories of UN agreements, the 'urban question' now has prominence across a multitude of global processes from the Paris Agreement on climate change (2015) to the Sendai framework on disaster risk reduction (2015) and the Addis Ababa Action Agenda on financing for development (2015).

“

The fact of the SDGs is itself worth nothing. The puzzle for ultra-realists and cynics is that national governments agreed to what can easily be seen as audacious and unattainable goals, including that of sustainable cities.

”

Most prominent recognition is found the establishment of a Sustainable Development Goal focusing on cities (SDG 11 - to "make cities and human settlements inclusive, safe, resilient and sustainable"). The urban dimension of Agenda 2030 goes well beyond the urban orientated SDG 11 with estimates by Misselwitz and Villanueva that "up to 65% of the SDGs targets are at risk should local urban stakeholders not be assigned a clear mandate and role in the implementation process". The SDGs, together with the non-binding agreement on the New Urban Agenda secured at the Habitat III Conference in 2016 make explicit the centrality of urban interventions in the overall multi-lateral agenda for 2030.





## THE IMPLEMENTATION GAP

SDG 11 and the New Urban Agenda confirm the development of a more explicitly **internationally-recognised global urban agenda**. These international agreements are directed at all levels of governance and emphasise the importance of localised and urban strategies to tackle global challenges. SDGs provide aim at informing the design and implementation of national, regional, and local policies towards shared goals. The NUA and the SDGs have been extensively criticised, including by Panel members, for their emphasis on broad, sometimes unrealistic commitments and lack of specificity.

In assessing NUA and SDGs as overarching concepts driving development, it is pivotal to recognise both their strengths and weaknesses. The NUA is too ‘general’, providing inadequate detail on smaller steps or local priorities but also quite exclusionary in defining what counts as “urban”, potentially marginalising key smaller or new settlements, especially those where local government is weak or non-existent. Scholars point out that it is critical to ask what ‘the urban’, however vaguely it is defined, does for places that “do not readily ‘fit’ into today’s urbanised global policy agendas”. In that regard, whilst the ‘cities’ agenda is an opportunity to put urbanisation at the centre of sustainable developments strategies design and actions, there are very limited decision-making opportunities in national and international arenas to include the local perspective.

Several Panel experts criticised, quite harshly, the lack of ability to implement international aspirations such as those of the SDGs and NUA. Criticisms focussed less on the principles of the goals of the SDGs, Paris, NUA, Sendai and more on the lack of clarity around the **questions of “what next” and of “how to” putting international aspirations into practice.**

Crucially the Panel identified the issue of the limited time available and the imperative of better understanding the issues of

sequencing, prioritisation and catalytic effect across multiple sites of action.

While urbanisation is unfolding at a rapid pace and unprecedented scale, harnessing the political ‘urban momentum’ through adequate policies and urban strategies clearly requires moving building on as well as beyond existing agreements that put the local scale at the core of the sustainability journey. For example, in 1992 at the Rio Conference, governments across the world began developing and implementing multi-scalar interventions to achieve sustainability objectives. Notably, this was done through the implementation of Agenda 21, which was aimed at various scales of governance. Panel experts recognised this as underplayed precursor to SDG11 and the NUA and that better attention to earlier lessons of localisation in international efforts would be valuable.

The “what next” question as to implementation becomes key here and yet, as experts noted, two years out of the NUA approval there is still little indication as to how the NUA and other agreement will work in tandem with SDGs. In part, experts noted the lack of active alignment between

“

From an action viewpoint the question might actually be ‘who is really driving global urban governance today? Not states certainly...

”

scales of action is the product of nation-states lagging behind and leaving urban sustainability initiatives in the domain of cities, city networks, and a constellation of non-state actors (business, civil society, philanthropy etc.), thereby propelling what some of the experts in the Panel tagged as de facto “global urban governance”.

“ The challenge is the New Urban Agenda fails to prioritize among over 150 clauses. It fails to define a clear set of goals, targets and follow-up actions to link with the time-bound SDGs that UN member states have committed to at the highest levels of government. And the agenda presents few tangible instruments, no financing mechanisms and no responsibilities for implementation.

”

While many on the Panel welcome the current focus on urbanisation as a challenge and opportunity for sustainability objectives, there is also a strong cautionary tone. There remain significant questions about how, and in what form, devolution should be pursued. In addition, in order to advance sustainability, many local actors and not just local governments need to be brought into stakeholder and local governance deliberations. Some key actors include but are not limited to community groups, citizens, built environment, finance, law, management and other professions such as education and health practitioners, along with formal and informal banking, retail and other private sector players. The imperative is to ensure both multi-sector representation and local legitimacy without creating rigid participatory regimes that are merely formulaic. The current silence on any institutional

arrangements that will see comprehensive levels of local engagement in the delivery of the 2030 vision is helpful only in that it does no harm – but it also fails to provide leadership on the mechanisms that might ensure local knowledge uptake and harmonise efforts at urban innovation across scales and actors

Centrally, then, the Panel highlighted the need to recognise explicitly that various knowledge stakeholders are (and should be) involved in urban matters at scales ranging from the local to the global. The complexity of urban issues and the impacts of urbanisation require sophisticated, responsive and flexible political and technical engagement.

Looking beyond the existing spontaneous take up of individual cities and their efforts to harness wider actions via city networks, the questions as to who should frame the remit and format of urban governance and the knowledge platforms on which such leadership would draw to ensure greater take up of the 2030 Urban Agenda, including into regions that have hitherto been excluded from global policy momentum, emerges as a key challenge for a truly global plan of urban action.

“

It is not the first time we witness momentum. We had the Agenda 21 in 1992. We had moments where the interface and commitments were there and much more bang on. Perhaps we could say ‘here we are again, and what can we do differently?’

”

state and the multi-lateral system. Implicitly then urban sustainability reporting becomes part of the wider mandate of nations’ reporting

“

A framework — perhaps more than one — is clearly needed. Sustainable urbanization could do with a clearer, flexible and integrated paradigm that can deliver across dimensions from peace and security to climate change.

”

One logical option for better and more robust diffusion of sustainable development commitments to the urban scale is to use nation states more and better as vehicles. This is the focus of much of the UN’s own statistical and reporting reforms. There a number of examples of National Urban Plans (NUPs), led by the OECD and UN Habitat, where urban sustainability is embedded within the casing of the nation

through the multiple channels of the follow up and review processes of the UN. There is some merit in this strategy, not least is that in highly centralised contexts many urban interventions are controlled by and even managed through national ministries. Yet the politics of states and international diplomacy have proven, as several Panel experts noted quite vocally, limiting and backwards in a context of international urban action that is often well ahead of the pace of domestic politics.

“

Will the state ever catch up with the pace of the city? I don’t think so.

”

## URBAN SCIENCE FOR POLICY

Agenda setting sustainability frameworks demand accurate and commensurable knowledge across cities, nations, regions and globally. Problematically, of course, the time horizon of global commitments is rarely aligned with both the speed at which urbanisation processes unfold and the longer-term impacts and consequences of current actions (or lack thereof) in a number of interrelated domains. There are known problems tracking progress and action as they take place on the ground in relation and in response to the new sustainability frameworks. The SDGs, for instance, have a built-in mechanism to assess country and overall performance against a detailed set of predefined indicators that are being then reported to a regular UN High Level Political Forum. This means deploying a fairly static scientific assessment across hugely diverse contexts in a wider global context that is physically, economically, socially and politically complex and changeable.

“

We perhaps are not quite yet grasping the incredible complexity of reporting on urban targets at a global level. It’s a jump from 195 countries to more than 5000 cities.

”

As the Panel noted, while it is important that the assessment of progress is recorded and required improvements are made to ensure the goals’

implementation, there is also an imperative to assess the dynamism and variability of urbanisations' challenges – and to adjust accordingly.

The 2030 Agenda must be seen simply as a short-term staging post on a journey toward sustainable urbanisation, with the introduction of **continuous planning and review over much longer time-scales** to enhance collective preparedness and response to the challenges that lie ahead. Indeed, according to various Panel experts, for urban issues and development, timescales should be looked at rather fifty to a hundred years into the future. In the same way, a deeper dive into past urban trajectories and developments can inform long-term dynamics associated with the urbanisation processes. This is a type of urban knowledge, and science more specifically, that is both historically-minded and foresight equipped – as Panel discussions nearly unanimously agreed upon. It is also an approach to urban research that demands sustained primary scholarship that can be sustained over the long term, beyond typical grant short cycles.

While the kind of urban knowledge that will inform effective sustainable development rests on specialist expertise and secure longitudinal research, old fashioned individual or narrow disciplinary pursuits are inadequate to deal with the complexity of the urban nexus. Disruptive technologies, environmental risks, economic shocks, geopolitical conflicts and mass migration, are all factors that affect urban (and arguably global) trajectories, making emphasis on preparedness and adaptation and on the interplay of forces are greater than ever. In that context, the production of knowledge about cities that would allow actors involved in urban developments to make sense of what instruments (e.g. fiscal reform) can be used to shift multiple current challenges and also provide positive impetus to generate longer term urban sustainability solutions was highlighted.

Despite numerous calls for the value of accurate knowledge, discussions within the Panel recognised that a hurdle to the implementation of both short-term and long-term sustainable urban development resides in science itself. Clear in both the literature already available as

much as in the debates between the experts is the **fragmentary and incomplete nature of existing urban knowledge**, and urban knowledge useful for policy, practice or urban development more broadly. The ease with which the academe and the broader urban research community produces readily-usable urban knowledge that is not geographically, thematically or temporally piecemeal is severely limited. Indeed, local actors, especially local governments, often lack usable scientific knowledge about urbanisation processes and their impacts on a range of policy issues, even when they have close proximity to university institutions. This particularly applies to parts of the world which are undergoing more rapid urbanisation but find themselves with little capacity to generate urban knowledge for action and for the monitoring of those action because they lack established or well-resourced higher education facilities. For these places, as numerous of the expert panellists from the South noted, where the demands for reporting on the realisation of SDG targets and broader NUA commitments can be a burden

What is at stake at the interface of urban knowledge and practical action towards sustainable and just urban futures is the ability to develop policies and developmental plans that are useful, evidence based, context sensitive and that can be monitored. Of course, this is no easy task – whether we think of Northern and Southern cities. Panel discussions pointed clearly to how this imperative is centred on the need to mobilise different methodological approaches to a wide range of interrelated urban phenomena, but often with distinct characteristics. Hardly any urban phenomenon can be studied from a single methodological, disciplinary, or geographical viewpoint. If capacities for forecasting and applied real-time information are needed, there is also need to incorporate information produced from the analysis of the past and from back-casting, especially to understand why some urban scenarios change very quickly and some do not. As an example, infrastructure provision, especially water and sanitation, remain key urban challenges of our times and have been so for decades. In this case “knowledge for policy” may have more to do with the politics and processes

“

The intersection between global challenges and sustainable urban development in an increasingly urbanising world [requires] functional knowledge-policy-practice interface that responds to this reality with integrated and interconnected approaches.

”

“

Whether or not the convergent implementation of global sustainability agendas has a positive impact on people and the planet, depends on enabling knowledge, institutional, policy and financial frameworks anchored on integration.

”

of urban finance and city administration and less to do with engineering.

Within the context of the UN's Agenda 2030 frameworks, global conversations have focused on the need to produce more 'urban data' to inform practical action, especially in relation to the monitoring of the implementation of SDGs at the local level. For instance, the 2017 Cape Town Global Action plan, deriving from the first UN World Data Forum, emphasised on the importance of "city data as a universal language", yet observers have highlighted the dangers of developing an urban science that, by being data-driven only, would be exclusionary of other types of knowledge and downgrade the explanatory emphasis of politics in general and elite capture in particular. It is true that legible public information can ensure political accountability but the data itself has to be credible, robust and publicly accessible. The 2017 Cape Town Global Action plan stressed that "quality and timely data are vital for enabling governments" to make "informed decisions" as today's global sustainable development agendas "require the collection, processing, analysis and dissemination of an unprecedented amount of data and statistics at local, national, regional and global levels and by multiple stakeholders."

In a data-rich era issues related to what type of knowledge is constitutive of an urban science for sustainable urbanisation become crucial. Acknowledgement of the inherent challenges in creating data that will feed, not drive actionable and global urban science is a fundamental next step.

Whilst the 2030 Agenda for Sustainable Development has put the urban question at its centre, the various commitments acknowledging the pivotal importance of urbanisation processes (positive and negative) in achieving sustainable futures provide little insights as to how global commitments should be achieved in practice. This leaves many opportunities to explore innovative and context sensitive avenues for designing inclusive and sustainable urban strategies, moving forward, strategies that would mobilise actors from across sectors and at various scales. At the same time, urban development patterns have repercussions that go well beyond the city's administrative boundaries.

Progress towards global commitments needs to be assessed in a way that allows us to compare across countries and that helps to understand urbanisation processes at various scales and in very different geographical contexts. Indeed, as Parnell and Robinson put it, the current urban momentum requires both researchers and knowledge users first to "harness and synthesize knowledge"; second to "acknowledge the limits of commensurability in assembling data on different processes"; and third to "protect against geographical exclusion in the event of data gaps, and to avoid gross generalizations that erase urban specificities."

The complexity of such endeavour is no small hurdle to the building of more efficient and relevant science-policy interfaces to inform, guide and monitor urban interventions at different scales of governance. Dialogue and collaborations fostered through processes such as the one at Habitat III between researchers of urban-oriented fields, as well as with research centres and civil society groups, are driving the current momentum forward. It is pivotal that the energy and new direction to enhance an 'urban agenda' is harnessed – a more coordinated and more explicitly leading scholar community must be assembled, and theory put into practice to achieve set goals and those beyond the 2030 stated scope. However, moving towards a more integrated and policy relevant urban science implies paying attention to the current tensions actively under debate across the global scholarly community interested in urban affairs, as discussed in greater depth in the following chapter.

“ DGs are an opportunity but we need to guard ourselves from being too enthusiastic. They provide some focus [but] we should also be critiquing the SDGs rather than serving them and the architecture behind them and the whole business around city data.”

”



## 2

## WHAT KIND OF 'URBAN SCIENCE'?

## CHAPTER 2: KEY MESSAGES

'Urban science' is a loaded term. It raises profound questions as to the assumptions, logics and methods of scholarly inquiry. This prompts self-critique of the way in which we develop knowledge about cities, the channels used to disseminate urban knowledge and put under scrutiny the very reasons for spending large sums of money on expanding and refining urban research and training. 'Urban science' has a long history. More than a century ago, scholars called for a 'comprehensive' analysis of the city and to develop generalizable knowledge that is both contextual and specific. What is different now, is placing the science in a global context that develops an even wider analytical tent to include a vast array of scholarship and practice. The Panel, mindful of the limits and problematic associations that the term urban science invokes, cautiously endorsed a call for a 'global' urban science, not as merger or flattening of the messages from across diverse constituencies, but as field of collaboration that would open up new frontiers of inquiry and new audiences with more leverage on policy.

- ✚ We are at a stage in scientific knowledge where the tools and theories available can in aggregate go a long way in responding to today's most pressing urban challenges around the globe.
- ✚ The isolation of communities, who cluster around journals, conferences circuits or disciplines, has led to duplication and fragmentation of urban research.
- ✚ Despite calls to develop 'systemic' and 'holistic' and 'interdisciplinary' approaches, the integration across social, natural, and engineering sciences remains sparse, and urban research often becomes devoted towards 'trendier' topics or techniques, whilst the North/South split in academia remains evident
- ✚ There exist fundamental funding and outreach gaps for interdisciplinary, long-term and multilingual projects, which urban science requires if it is to have evidence-based legitimacy and if the cohort is to speak authoritatively to global challenges and global policy debates.
- ✚ The general paucity of very senior or experienced leadership in the urban field (especially with a focus on the global south) negatively impacts access to competitive large-scale open funding opportunities and policy impact.
- ✚ A pluralist and global field of urban science needs *leadership* (institutional and collective), not specific, placing leader emphasis on collegiality in allowing a diverse but networked mix of leaders in different fora.
- ✚ It is critical not to underplay the politics of what kind of science 'matters' in what context: a global urban science will need to devise ways to encourage a variety of qualitative, quantitative and mixed methods approaches and leave a safe space for academic communities to offer critique and engage in internal debates.
- ✚ An integrated and 'global' approach to urban science rests on connecting disparate focuses and scalar orientations: this is 'urban science' not as single science, but as a cross-cutting field of engagement across different urban (sub)disciplines, implying a level of respect for fundamental and theoretical research
- ✚ This global urban science needs to be able to cope with and understand the dynamism of the changing world in which urban societies evolve: a single set of rules derived from the past or present will be insufficient to cope with the changeable world of the future.

## WHAT SCIENCE?

Speaking of ‘urban science’ is, for some, controversial. Our Panel discussions made it clear that, given how important it is to link existing urban research to urban governance at different scales, a fundamental question to be tackled is that of **what ‘urban science’ might be, who might define it, and how it should orient** toward the global challenges highlighted in the previous section. Better clarity on these issues is necessary not just as academic exercise but to better inform urban policies and developments of the divergent scholarly points of departure as credible science-policy connections are fostered.

The next section presents reflections on these matters from the expert Panel, especially in relation to the current tensions faced by the academic research community investigating urban issues – a theme that emerged as key in the debates of the London workshop for the expert Panel. Coupled with individual expert input, those discussions centred on the identification of a diverse, yet loosely cohesive, research community. Across the Panel the question of whose voices are shaping contemporary urban research and its relation to policy and the problems of incentivising collaborative, interdisciplinary research drew strong interest.

These issues are, in the eyes of the Panel, as much questions of the political economy of urban research as they are normative or theoretical. How urban science-policy interactions are configured plays a fundamental role here – and one that the vast majority of experts in the Panel have pointed at as critical for any meaningful input of science in the future of cities.

## ‘URBAN SCIENCE’ BY WHOM?

Almost unanimously, discussions in the Panel surfaced the core challenge of identifying what urban ‘research’ or ‘science’ might be. To meet the pressures of sustainable urbanisation with tangible solutions, it is evident to both the Panel and commentaries beyond it that empirical knowledge about cities, as well as systems to measure progress for further developmental processes, are needed. Whilst

“

What if we have all the knowledge we actually need? Perhaps it’s more about collaborating than individually reinventing the wheel.

”

clearly there remain under-researched topics and places, the remit or scope of urban enquiry was not identified as needing massive expansion. The Panel discussions suggest that we know enough to act.

**We are at a stage in the scientific process where the tools and theories available can, in aggregate, go a long way in responding to today’s most pressing realities around the globe.** However, these pieces of information are scattered and miss key sites. For a solid ‘global’ urban science to exist, the effort of urban research needs to be reconfigured so that it can be sewn together into a more realistic and cohesive body of evidence that address practitioner needs and highlights existing blind-spots of urban developments. This does not mean discarding the search for new knowledge and methodologies, but rather it foregrounds the value of putting emphasis on rebalancing, building capacity and collaborating across scales, sites, siloes and divides.

“

What community? We are hugely fragmented, as a matter of fact, loads of disciplines claiming they are doing urban science and are not, and people do but don’t know they do. [This is a] disadvantage compared to climate science. No one knows what the urban is.

”

The challenge of **better knowledge deployment and greater rebalancing of scientific capacity** is one that, the Panel felt, is closely intertwined with the issue of building a more tightly knit urban research community across specialisations and geographies. The current intellectual project mitigates against bringing together scholars from disparate fields and reorganizing existing knowledge domains that are currently compartmentalized and professionalized. Current configurations of research and professional training often look at different aspects of the ‘urban’, and different scales of urbanisation processes, from daily experience of the city to sprawling urban areas, up to the planetary ecological repercussions of urban activities. An **integrated or composite approach to urban science** would, seek to absorb or overcome those difficulties, for instance by allowing scientists looking at the same phenomenon from various scales or differing approaches, to share their work and collaborate. As Panel interviews revealed, this wider reading of urban issues is hindered by the struggle for the urban research ‘community’ to base its conversations on a common object of study. A fundamental example of this is the lack of agreement on the meaning of the ‘urban’ in urban science.

In disciplines like Geography, History, Architecture or Anthropology substantial effort is directed towards defining what is meant by ‘city’, ‘urban’ or ‘urbanization’. Other disciplines, like engineering, health or education conduct research on cities without much explicit mention of the term or exegesis on its meaning. Experts on the Panel have pointed out at the long-lived tradition of ‘urban’ research in Civil Engineering under the banner of “built environment” and in Law as framed as “local” jurisdictions, or the growing referencing to the “urban” in disciplines like International

Relations and Computer Science.

“

You say ‘urban’ I say ‘built environment’. But perhaps that’s not the same of saying ‘potato’ in American and British English ...

”

Solving the definition of ‘the urban’ puzzle may seem unimportant but the experts point out, the discussion of urban problems (i.e. a problem-based science rather than a fundamental one) would prompt such debates and necessary efforts

at translation between disciplines to encourage greater harmony of intents, explain conflicts and justify prioritisation. Yet, experts note, this is not just a matter of alignment of definitions, and connections of purposes. Rather, it is also a question of **connecting disparate focuses, priorities and scalar orientations**. For instance, understanding the localising implications of global warming and rising sea levels on population displacements, livelihoods, the built environment, also requires understanding and monitoring climatic events at a macro level. Equally, tackling issues related to forced population movements implies looking at geopolitical tensions as well as what happened to those people when they land in particular places, and particularly in cities.

What is currently at stake is the ability to connect existing urban research across many disciplines, with varying ontological and epistemological traditions, from within the academic community. Solving issues of self-identification is no small task but can be a preliminary – and necessary – step to the strengthening of research to action,

“

Despite the growing interest from natural and social science domains, the feeling is that research on cities is not yet a fully consolidated and compelling body of knowledge. The term ‘urban science’ is slowly emerging though not without resistance.

”

for two main reasons that experts identified in the London workshop. First, because a common and collaborative cross-disciplinary understanding of what studying cities means can help fostering collaborations across disciplinary divides to produce more nuanced views of urban processes; second, and following from a necessarily better understanding across academia, because adopting a cohesive appreciation of what ‘urban science’ is can make it more visible and understandable to actors seeking evidence-based advice on urban issues.

As noted by many Panellists, in the social sciences disciplines often convene under the banner of ‘urban studies’, including planning, sociology, economics, anthropology, political science, development studies, science and technology studies, etc. The term is however relatively mute in the natural sciences, where in fact ‘urban science’

“

There is a nascent community but it still rather fragmented: most of the community is still oriented on urban studies. There is a handful of people who have been arguing for urban science.

”

might currently have a greater resonance. This however is not to say that integration and interdisciplinary research is a given across the board of social science researchers interested in urban issues, but some academic journals and collaborative projects have incentivised a plurality of approaches to urban phenomenon.

Interestingly, in both scientific fields as much as funding streams and the practice, disciplines like the various engineering sciences have seen the rise of the ‘city’ as a focus of work. Whilst to some experts this appeared paradoxical, seen (in their views in the Panel) the inherent urban nature of traditions that have effectively built the built environment, others have pointed at the importance of the term in corraling interest across disciplines and across the science-policy ‘barrier’. Here, expert noted, we see the emergence of debates on a “science of cities” in the early 2000s propelled by geospatial and geomorphological analysis as much as the consolidation of long traditions of climate and cities and health and cities discussions that date back to at least the 1980s. Whilst these approaches are debated in social sciences, and bring up important questions as to the quantitative-qualitative relation in academia (which we explore below), there are numerous of the Panellists argue – certainly signs that some possible bridges across the research spectrum might be available.



“

People might not agree with the principle of a ‘science’ of cities, but at least it gets us talking... well arguing... with each other.

”

research and its encompassing areas, stretching infrastructural development to ecological conservation, under a common banner ‘urban science’, has the potential to be strong marking and legitimatisation of the academic scientific community that produce urban knowledge, in order to shape practice at the local, national and global scales. This potential, experts in the Panel suggest is conditional to the recognition that the term science itself needs to be cognisant of the multiplicity of the scientific community it is made up of.

However, **integration across social, natural, and engineering sciences remains sparse, despite various calls to develop ‘systemic’ and ‘holistic’ understandings**

of urbanisation processes over the past decade. Pulling together all aspects of urban

“

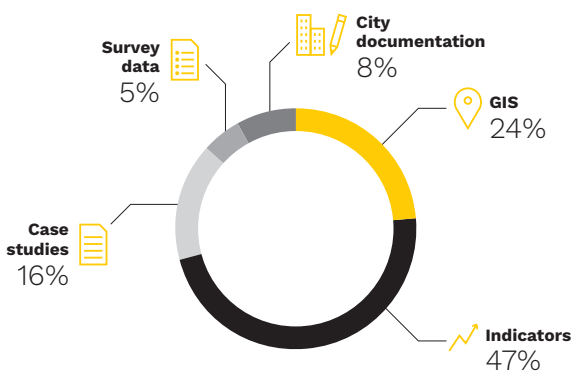
One of the key challenges would be coming to agreement in about what are the critical research areas are. i.e. when you talk to economists it is income inequalities, when you talk to ecologists, it is about green spaces... but all of these groups overlap in the end because they have commonalities.

”

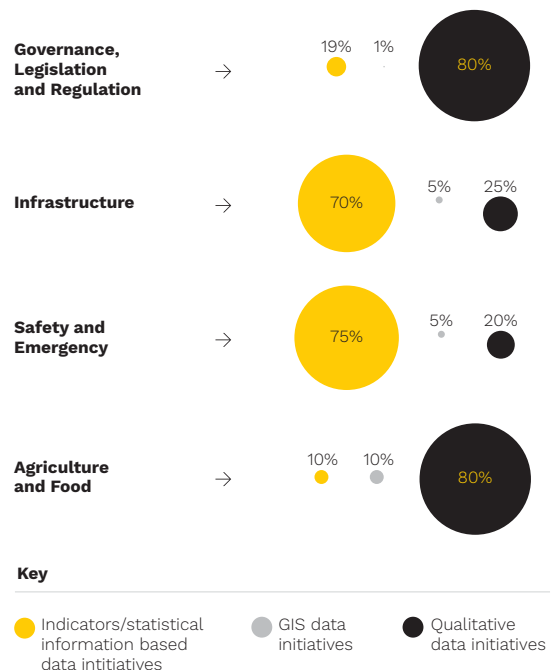
perceived to trump very small-scale ethnographic studies, and today, spatial data (e.g. geographic information from GIS) is deemed more valuable than statistical (e.g. demographic) data by several

For example, on all levels of data collection and sharing, there is split opinion of how this is best conducted, especially in being valuable to a science-policy interface. Different experts argue for different methodological approaches, e.g. econometrics, ethnographic studies, systems thinking, etc. Quantitative assessments are however, often

Percentage of databases covering each type of data



Type of data produced per policy sector



entities, in achieving an understanding of cities. Moreover, there was further disagreement of which type of information is most relevant to different levels of governance. Whilst the monitoring of international agreements requires often quantitative, nationally collected information, various experts highlighted the need for localised strategies to be informed by a deep knowledge of a place's unique historic, cultural, political characteristics.

## WHITHER SCIENCE?

As noted, the term 'science' itself as in recent developments in the 'science of cities' has indeed often been assimilated with quantitative modelling and data-driven understandings of urban systems and dynamics, explaining in part why it has been resisted by various urban studies scholars building on qualitative or ethnographic methods (although not exclusively) to provide thick descriptions of urban processes across very distinct geographical contexts (Parnell and Robinson, 2018), but it has also admittedly sought repeated engagements with policy and practice, not remaining a purely empiricist exercise. In other words, there is disagreement over whether an urban science should be more 'practice'-based and directed at providing actionable and policy-applicable information, versus sharing aspects of self-reflection. Within academia, **impact-directed or applied research, rather than basic research, is often frowned upon.** Additionally, among Panellists there was clear debate as to whether urban science and its intra-tropical development should be driven by where funding-determined interest lies or serve to fulfil needs regarding issues many may not be able to voice their opinion on to affect change.

Equally debated but generally recognised is the importance of the significance of 'science' as a term. The tenets of scientific research, especially in terms of replicability, systematic study via observation and experimentation, and responsibility towards one's own assessment echoed in numerous interviews and discussions. Here 'science' is used to gesture towards the fact that the assessments urban researchers make of the urban environment should be justifiable on the basis of understandable, thorough, generalizable and replicable (though highly debated by Humanities and Arts experts)

approaches. We then speak, as some Panellists noted, of an urban science to speak of a practice of knowledge creation and mobilisation that is accountable for its own opinions and amenable to debate, discussion, disproving of conclusions, and continuing improvement.

Whilst perhaps, as even the more technical experts in the Panel noted, more explicitly embedded in the natural sciences, this is an ethos worth considering when speaking of a need for a more global urban science. In that sense, as discussions about what the object of such a 'global' field might be highlighted, the **responsibility and professionalism of the urban researcher** becomes not only to its local (object/partners/location) but also to the broader process of urbanisation – some experts argued.

Yet, as per above, there is general agreement amidst the Panel on the fact that the production of knowledge itself rests on the use of various methodological approach which, used in isolation, can only provide partial views of urban phenomena. This does not mean that we would find the merger of all disciplines in one as desirable (as we note below on the issue of fundamental science). None of the experts in the Panel in fact argued for a single urban science, as much as instead pointing in many cases at the **value of urban science as a cross-cutting field of engagement across different urban (sub) disciplines.** This implies a level of **respect for fundamental and theoretical research**, and for the continuation of scholarly disciplines and discrete theories and methods in some form (a hotly debated matter in the Panel) whilst contributing to a common-purpose applied 'scientific' field that, in the shape of an 'urban science', would be more explicitly impact-oriented and problem-driven.

For the urban science community to communicate and convey its message with external stakeholders, then, it becomes important that despite divergence, disparity is mended for better purposeful cooperation. As numerous experts and in fact also commentaries around Habitat III noted, what might be needed to overcome this fragmentation is strong leadership, which makes plain important points of disagreement or coalesces voices together.

Urban science is more about recognising a common purpose, sustainable urbanisation, than doing away with individual specialties that can serve that purpose.

## LEADING THE WAY

Putting together different disciplinary, theoretical and methodological approaches is but the start, not the conclusion of the effort at stake here. Yet clear efforts towards group-formation are still largely needed. Various experts indicated that whilst fragmentation and differing approaches to 'the urban' might actually be the strength of an inclusive urban science, it is also argued that there is **a clear need for strong leadership, at multiple scales, to bring all of the interdisciplinary voices together and to make them visible**. This leadership can take many forms, be that through the creation of specific institutional structures or platforms to allow knowledge sharing, or the designation of specific groups of individuals as key bridges between the academic and 'real' world. Some experts argue that, whilst increased collaboration and effective information sharing between different scientific communities is seen as valuable, there is both indecision and disagreement over who should take charge of unifying a disparate community as well as disseminating the research it produces and strengthening science/policy interactions.

To some, it should start with defining the locus and focus of urban science in more precise terms. In contradiction to this search for unity and uniform goals and definitions, others argue that the opposite is needed for urban science. As a result, a one-size-fits-all solution to leadership issues was discarded by Panellists as naïve, noting that different scales of intervention require engagement with different types of actors and institutions, and therefore different types of leadership. This might mean, some experts noted, that **what urban science needs is leadership not a specific leader**. Collegiality in allowing a diverse mix of leaders in different fora, and in recognising differing strengths in differing fields might in this sense push towards collective forms of leadership and alternate roles for the 'face' of urban science in different policy and practical fronts – something numerous Panellists felt really strongly about.

General agreement, was also to be found in the translation and communication task of that leadership: to convey the vast variety of the urban research world, one needs to do much to

“ It is just like organizing a very big party with too many people in the invitation list: it is difficult to know who is in it and to find the common point between all of them to get organised.

”

facilitate ways to exchange information and 'read' each other beyond particular disciplinary dialects and practices. This is, as several discussions throughout the Panel and the Panel event at the 9<sup>th</sup> World Urban Forum in Malaysia uncovered, a fundamental 'interpreter' nature for whichever leadership urban science needs.

Leadership also needs, as some experts noted, to come from institutions not just individuals. There was general agreement in the Panel that forums and institutions are pivotal to facilitate such debate. Universities can play a leading role in producing research for and bringing together actors from the public, civic and private sector. Yet, not all universities engage with their environment in the same ways – while some 'global' higher education institutions might be well connected to international institutions, such as the UN or international firms, and training a very international diverse cohort of students, other universities might be more embedded in their direct and local surroundings. Of course, those two positions (global or local) are not exclusive, as universities can also engage with local actors where they are located but also in other places. Recognising the different degrees and scales of involvement of urban researchers with urban affairs and urban actors is therefore essential in discussions around 'leadership' and visibility of urban science.

Some experts argued that identifying 'leaders' or 'beacons' for urban science would inherently fall into the trap of institutional bias towards institutions that are more powerful, richer and visible – and deemed more vocal – as they are located in the so-called 'Global North' and/or publish research in influential (predominantly English) outlets. Voices of all languages, beyond dominant English need to be heard, as well as from those coming from institutions in the Global South. As a result, leadership issues are likely to be partly overcome through coordination mechanisms that intervene at different scales and involve different types of actors, from transnational knowledge exchanges to local cooperation, with potential solutions will be further explored in the following sections of this report.

“

If you want a community, you need to establish mechanisms to share information and data which are not completely there..You need something which brings all various players together...

”

“

[There is] clear bias surrounding urban science in specific regions: when it comes to the Global South, lenses are brought in from the global north, producing urban systems which do not work.

”

Key however in this leadership bias is the issue of the **North/South split in academia**. Urbanisation is global, however, it is often in cities throughout less developed countries, or the ill-defined region of the ‘Global South’ where demographic, economic and other fluidly means urban problems and opportunities are the most prominent. It is predicted that 21% of the world’s urban population will be in Africa by 2050 up from 12% in 2018. However, the information held on more developed cities in the Global North strongly exceeds that of those in the Global South- there is a definite ‘metrocentric’ bias. For example, we find that 42% of data collected from global urban databases concern European cities, despite the EU being home to only 14% of the global urban population. Urban science needs to not only extend its focus into many different overlooked fields, but also overlooked regional- and human contexts. It truly needs to integrate voices from all across the globe, with contextual perspectives, and both the UN and national governments should cooperate to achieve such an end-goal.

In addition, as skills such as land use planning, geographic analysis and mapping may be lacking in these regions, technological advancements and new instrumentation and data streams can provide helpful contribution in their place. Satellite imagery combined with advances in algorithm development including machine learning can provide cartographic information on informal settlements, building stocks, street patterns, or infrastructure development in an automated fashion. New analytical methods are also developing near real-time analyses of urban conditions, such as energy infrastructure black-outs and flooding, and are likely to transform the generation, dissemination and application of urban geospatial data. Whilst various private companies produce

“

There is an increasingly strong urban research community. I am very happy to see contribution from urban specialists in Africa or in Asia or in Latin America.” (Expert Quote)

”

and provide such analytical solutions at a cost, university-led and/or publicly funded research can disseminate this information freely and make it available to governments which lack the funding and/or analytical capabilities to develop such solutions. Some good signs of possible rebalancing were noted by both North- and South-based Panellists, calling for any leadership in urban science to further build upon and acknowledge these.

## INCENTIVES TO COLLABORATE

In the Panel there was a broad consensus on the **existing funding and outreach gap towards interdisciplinary and multilingual projects**, as well as long-term research. For a start, traditionally, it has been difficult, if not impossible, for urban scientific research to find a common home to publish and disseminate work that is based on and results from interdisciplinary efforts. Indeed, there is a clear absence of journals which go beyond their defined disciplinary boundaries, especially when it comes to bringing together social, natural and computer sciences, to cover its topics. The lack of academic journals that incentivises the production of interdisciplinary, collaborative research is a clear hurdle to urban scholars’ engagement in transdisciplinary research. However, academic publishing, arguably, might not always represent the most adequate and relevant way to achieve societal impact, and there are many ways in which research can be communicated and disseminated.

In addition to publishing platforms and revised funding structures, some experts highlighted the need to incorporate collaboration with non-academic stakeholders into the design of research projects. The degree to which non-academic institutions should be engaged with the urban science community is however, disagreed upon. Those who believe that it should be limited to a greater extent, feel there is a need to enhance the communications of a breadth of scientific findings, and to maintain integrity of research independence and critical thinking.

“

The knowledge needs to be presented to the public in a way that it is understandable and so people can grasp. Urban knowledge is very abstract and for a lot of people it doesn’t have a resonance.

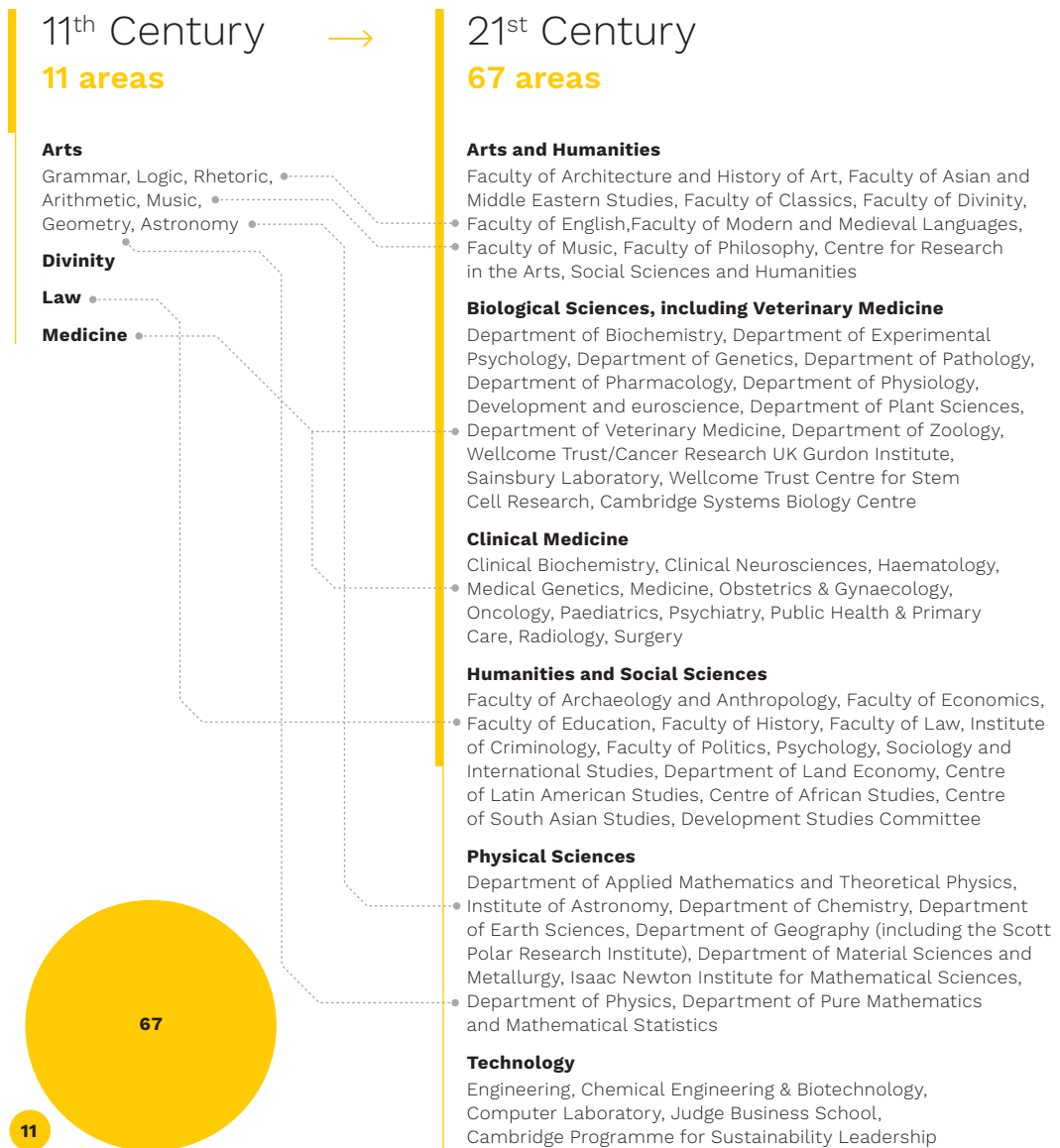
”

For others, whilst communication is essential, relevance might be better achieved through the mobilisation of end-users throughout the research project rather than through communication and dissemination at the end (although those are also important components to ensure project legacy). Engagement can be achieved through various means, depending on the choice of methods adopted and data used. Successful results in capacity building from collaborations across

sectors have been achieved, such as the work carried out between Slums/Shacks Dwellers International, the Santa Fe Institute and Cities Alliance. To strategically place the urban science community in a relevant sphere of the global urban knowledge landscape, academia must look beyond itself not only when it comes to communicating about its work, but perhaps also throughout the knowledge production process.

## Expanding complexity of academia

### Growth of subject specific units at the University of Cambridge



“

Scientists tend to think that putting the knowledge out there is enough but don't do everyday communication to the governance makers as corporations would do. You need lobbying and advocating for scientific evidence to be taken into account.

”

governments, or non-for-profit organisations – none of whom may wish to be engaged with complex interdisciplinarity research over long periods. In addition, those types of organizations have differing financial capacities, which itself shapes their abilities to influence urban research through funding. For instance, if NGOs and local organizations are sporadically funding academic research, those are often short-term research projects; whilst larger organizations such as philanthropic organizations have the financial means to support longer term projects across the world on specific issues. However, experts recognised that it is through funding that collaboration across disciplines and with other actors is incentivised.

“

We need to educate funding agencies toward cross-cutting research.

”

One example of the influence of funding is the 'impact agenda' that has informed the design of much research funding schemes from various organizations has indeed supported research

“

What worries me is the very basic urban development topics do not get as much funding and as much visibility.

”

Ultimately, experts agreed on the fact that the funding structure of scientific research dealing with urban issues determines its content and scope. Academic research within the urban science space is funded by a very wide range of organizations, including national governments, international organizations, philanthropic organizations, the private sector, local

that is apparently relevant to pressing challenges – but which might overlook challenges that might not receive as much political or media attention.

A key aspect of the impact agenda recognised by Panel experts is the short timeframe

of research funding. However, various experts pointed out the importance of monitoring long-term urban trends and of evaluating the impact of urban interventions over several years, especially when it comes to exploring issues related to capacity building, resilience, sustainability, which can only be nurtured and assessed in the long run. It is also through longer term projects that different disciplinary cohorts can learn from each other and develop innovative and truly transdisciplinary methodologies to look at urbanisation processes jointly. But, reliance on increasingly scattered funding sources, with decreasing national public research funding, means that **urban research often becomes devoted to 'trendier' topics** and aligned with corporate, philanthropic or policy needs and timeframes. This fact is not necessarily a bad thing, as research oriented towards real world problem solving is essential, but a key function of universities is also to produce research that is critical, exploratory, theoretical and 'off of the beaten track', an endeavour which cannot be served without the development of long-term collaborative funding streams alongside shorter project-based funding and recognition of the place of lone researchers. As one of the experts put it, universities producing urban research need to act as a "critical friend" for local developments, communities, and other actors involved in urban developments. Those critical skills and the reflective assessment of failure are not always produced from collaborative engagements of co-production.

This critical angle is essential and must be preserved through adequate funding structures that both work with and critique policy. In that regard, international discussions on the need to connect national urban policies to international commitments as well as city-specific projects represent a promising step to align national research funding towards urban inquiries that speak to international agreements such as the NUA and SDGs. Without commensurate investments in longer term applied and basic research, however urban science runs the risk of being reactive and too applied, addressing research questions that are determined by other interests (be that public or private), which themselves might be short-sighted, rather than proactive in identifying research gaps that are aligned with societal and local needs. This can start from some solid grounds: one of the critical contributions that IPCC has made is a clear definition of knowledge gaps in every assessment, and increasingly so by geography. A global 'urban science', some Panellists argue, needs that to be mapped with gaps in practice and capacity, without which impact will be difficult to catalyse.

## CONFRONTING FADS

As the city has gathered interests from the public, academic, civic and private sectors, it is also subject to specific fads which might contribute to overlooking pressing, yet below the radar, issues. Panel experts see a key function of urban science, if it is to contribute to broader development and sustainability objectives, in its capacity to identify those issues which are being heavily overlooked and ought to be recognised and acted upon at various scales of governance. Affirming urban science's place as a growing, multidisciplinary field, means it must be directed at exploring areas and topics, which may not be on everyone's lips and will not benefit corporate growth or create political gain. This critical positioning is essential not only to enhance urban science's 'scientific' 'base' but also to produce knowledge which addresses current research gaps, even though those are not high on the list of political priorities. As Panel members repeated, the knowledge gaps are less numerous when it comes to the broad framing of urban processes, but geographical imbalances and the lack of available research regarding middle size cities around the world, and rapidly growing settlements in Asia and Africa are serious and run the risk of jeopardising the evolution of global urban assessments. As mentioned before, while in general terms we know a lot about cities. research efforts tend to be biased towards particular topics. Over the recent years, urban research focusing on developing data-driven understandings of cities, a systems approach to urban processes, have heavily promoted and invested in in a context characterised by the policy fad that some experts in the Panel found around smart cities – a theme that certainly raised some strong feelings in the Panel debates.

“

The dominance of smart cities is unbearable. We only contribute to make cities turn sexy for corporations.

”

As noted in some interviews, this is not simply a cities story: geopolitical shifts and popular international affairs headlines do affect the world of urban research and practice fundamentally. For instance, topics concerning the impact of the refugee-crisis over the past three years has fuelled research into (and research funding towards) the relationship between international migration and urbanisation (though not in the regions where migration is most dominant). The focus on international migrants to the West distorts other important migration patterns that influence urban growth, such as rural-urban ones. Climate change and cities is

another theme that has gained prominence in academic research and policy discussions, both because of its geopolitics as much as due to the effort of cities (and city networks) themselves. However important, it is not fully ensured that the way the current urban climate discussions are being led, provide the best insight into their topical analysis. For climate change, for example, there is still little understanding of its relationship with urban management and urban poverty, and how climate change and political structures intersect in producing new risks for urban dwellers (be that through exposure to disaster risk, mismanagement, displacement, etc.). As Panellists note, more discussion must be directed toward more 'forgotten questions' featuring lower on the popularity list. This includes waste management, water sanitation, issues of safety, gender inequalities, biodiversity, reproductive health or governance together with the role of non-governmental actors within those.

“

Some issues are always in the backseat. The UN Safer Cities programme is a good example of something that has existed for a long time with limited resources and a fairly committed epistemic community, but it has never got to the level of climate, resilience, or smart cities.

”

This is not to say those issues are not investigated by urban scientists, but they get less traction, public attention, and visibility in policy and strategic discussions that lead to the implementation of particular urban solutions. Hence, Panellists also recognised the **necessity for the academic community to self-critique** in recognising the vital role it has to play in making sure that the insights into these topics are heard by policymakers and beyond. In this aspect inclusivity is key, and urban progression has

“

Part of the problem is that urban science is structured around flavour of the month: we only react in the face of crisis and challenges and we do not manage to be visionary and thinking the unthinkable in geopolitical sense – Brexit or Trump were unthinkable – how do we translate these unthinkable into proactive attitudes?

”

to include everyone - poorer or richer. To achieve this inclusivity, the voices of poorer and marginalised urban communities must be taken into consideration by urban scientists.

Bringing together scholars that work across disciplinary boundaries holds the potential to produce research that addresses wicked, multi-faceted urban challenges and that is relevant to practical actions. This will continue to happen until strong institutional bases are created (in both Northern and Southern contexts) that focus on the goals and themes of new urban science. As long as this effort toward a different kind of urban research is pursued by independent researchers and disparate institutions, often also placed in subaltern departments or think tanks, the ability to respond proactively to unpopular and long-term research questions will be limited.

In this sense, various issues currently hinder the building of a more integrated urban science. Those include differing epistemological and ontological traditions and the lack of funding for long term, interdisciplinary research projects as well as reforming existing academic training to better link training to practical needs. Current funding and publishing structures often incentivise disciplinarily siloed, increasingly short term, urban research, which tends to undermine its ability to generate additional knowledge about critical urban challenges that are less appealing to public and private funders. In addition, current global urban scientific discourses are driven by a handful of English-speaking global institutions located in the Global North, which produces research from the perspective of, and about, northern, predominantly global, cities. As a result, institutions located in the global South and the research they produce are rarely acknowledged. Whilst this chapter has exhibited what the expert Panel identified as the inherent internal tensions of what might be called the 'global urban science' community, as well as providing some insights as to how those might be overcome, the next two chapters provide further insights on the ways in which existing research can be better connected to policy to achieve sustainable urban transitions.



## 3

## URBAN SCIENCE AND ITS EXPERTS

## CHAPTER 3: KEY MESSAGES

Communities, NGOs, citizens, consultancies, international organizations, city networks are all involved in the production of information and knowledge that, to varying degrees but of certain global presence, now fundamentally shapes urban development. Rather than dismissing these actors as ‘un-scientific’, the urban science community needs to think its role and position in relation to those players. An agenda for engagement, advocacy, training and rebalancing emerges here and needs not to be understated as secondary to the reforms of the scientific inquiry itself detailed in the previous chapter.

- ✚ The ‘know-how’ of science-policy interaction might be more explicitly available outside of academia than inside: we must not uphold science on a pedestal and learn from other actors’ engagement techniques.
- ✚ There are mounting data asymmetries between the private sector and the scholarly edifice of academic research that cannot be underplayed in both outreach, public visibility and agenda-setting capacity.
- ✚ This goes hand-in-hand with the expansion of private sector, consultancy and philanthropy in charting the confines of a ‘global’ cities agenda and thus the possible room for manoeuvre for a global urban science.
- ✚ Amidst these, the role of benchmarks, rankings and indexes in the production of urban knowledge globally, which often supports a global urban knowledge base that is predominantly focusing on competition between places, is a key factor in shaping urban development.
- ✚ It is important for universities to adopt a less ‘extractive’ attitude to local knowledge, and also watch out in playing a tricky ‘third party’ role for philanthro-capitalism.
- ✚ It is also critical for the publishing sector to take a more proactive role in building coalition of key ‘voices’ in urban policy, and take a more proactive (as well as self-critical) place in the urban coalitions of scholars and practitioners that have been advocating for more attention to cities.
- ✚ Universities need to be seen more clearly as reservoirs of expertise, and urban science experts can act as connecting ‘glue’ between UN agencies, networks and international initiatives, but also as a champion of ‘scientifically robust’ data co-production with the private sector.
- ✚ This requires breadth and depth urban experts that have depth of specific expertise, but also breadth of translation capacity and cross-sectorial engagement, interest and openness towards working in multiple fields and take part in the global circuits of knowledge.
- ✚ It also requires a more central debate on the role of research in education, so not to forget the other ‘half’ of academia, which possibly might even be more impactful than pure research
- ✚ Rethinking the training the new generation of global urban scholar/practitioners is a key step in the development of more effective local co-production processes which should be encouraged in both local and regional/metropolitan governance.

## WHAT MAKES AN URBAN EXPERT?

Even good science does not always imply influence. Even if we had all the knowledge necessary to understand today's urban challenges, several Panellists pointed out, we might still not be able to link it to policy and place it in cities. The question of **what 'know-how or expertise' shapes the global direction of urban development**

echoed loudly across discussions amongst experts. Reflection was prompted in equal measures by two working features of the Panel. First, by debates on what and whose knowledge are 'effective' or 'matter' in shaping cities. Second, by the title of the Panel itself, as a congregation of 'experts' on urban issues. These conversations led to questions of authority and influence within the academy and the dynamics of interacting with the powerful worlds of knowledge generation that exist beyond the academe – urban science beyond science so to speak.

Members of the Panel recognised that the precise type of 'urban expertise' it needs to nurture to act as a 'critical friend' in the design, implementation and monitoring of urban development was unclear. This question of the most useful form of knowledge output to ensure that urban science is fit for the purpose of global policy impact is essential, especially when thinking about how to overcome issues of audience, topical and disciplinary fragmentation, leadership and training. Viewed from the perspective of the end user, enhancing the role of academic research in informing and influencing sustainable urban strategies inevitably suggest the need to look outside of the academic realm to augment the applied knowledge platform. As partnerships with communities, governments, private sector actors are key in strengthening the linkages between urban science and practice, so is the need to consider the many other types of urban expertise that are currently influencing cities the world over. Indeed, especially in the global south, much urban knowledge is produced outside of the academic realm by private, public and non-for-profit actors at various scales. In that context, it is essential for urban scientists to reflect on their positioning in relation to those other knowledge producers, distributors and consumers.

“

Urban science has not reached the minds of the public decision makers. We need to engage in bigger discussions. We have to break in, in a very dramatic way rather than talk amongst ourselves.

”

We have already noted, and celebrated, the breadth and depth of current urban scientific research should be celebrated. But this is not enough. As scholars in the Panel noted, we should be reflecting more explicitly on the type of individual and

organisational characteristics that are desirable for, and conducive to, action-oriented work and the quick uptake by decision makers of new evidence. Scientific urban research emanating from universities is increasingly influenced by organizations that act as repositories and producers of urban expertise. For instance, contemporary conversations on 'resilient cities' are necessarily influenced by actors such as Arup and the Rockefeller Foundation, as much as the insurance industry (AXA or Willis RE for example); the United Nations itself produces a huge amount of information and primary comparative data that is increasingly disaggregated at the city scale; organisations like Slum Dwellers International (SDI) and other internationally mobile NGOs (not always urban focused) advocate for a knowledge base that is not just *about* the urban poor, but also *generated by* those living in informal settlements. And, major IT and software companies like Cisco, IBM, Siemens and others have been proactive elements of the 'smart' front of urban development, driving innovation and providing analytical solutions directly to local governments and other service intermediaries.

Panellists, then, recognised the need to better understand the dynamics of multiple sources of authoritative knowledge, their underlying geographies and political-economies, and the mechanics of how information from varied points of origin become action. With so many 'experts', there is not only a need to try to understand the competing and complimentary roles those play in informing urban actions, but also how scientific urban research carried out by scholars

“

Academics are more proactive than they use to be but I still don't think they are the dominant voices in the global discourse.

“

There are so many players that coalesce many different interests, so one of the questions would be "who is not doing it?"

”

differs from, or is intertwined with practice based or grounded knowledge. Clarity on what scholars bring to research collaboration and co-production is a necessary preliminary step to enhance

”

collaboration and critical thinking and innovation at the scale required for advancing a global urban agenda.

So, what makes an expert in today's international urban development context? Building on these considerations, the Panel was tasked with reflecting on the qualities that should be encouraged within the urban academic community to enhance its impact. There was a broad consensus that an expert (rather than scholar), from an urban science perspective should be able to link the urban science community to politicians and policymakers. Soft engagement skills centred on creating connections between the different disciplines and disciplinary community members, and further, on identifying opportunities for research topics to flourish were seen as key by the vast majority of the Panellists.

The ability to synthesise and direct knowledge and link evidence makers to policy makers cannot be reduced to opportunism. To be both inclusive and objectively proactive, it would be expected that urban scientists draw on their own strong experience and knowledge within a particular area of urban science, but would foster a wider understanding and interdisciplinary base that had connections to other parts of the science community and an agility across all of urban science. As one of the Panellists put it, we need more "T individuals" in academia, with **depth of specific expertise, but also breadth of translation capacity and cross-sectorial engagement**. Moreover, interest and openness towards working in multiple fields are important, as it would be expected of urban scientists that they interact with different types of people at different governance levels, including both at local initiatives and global networks. Being grounded or having situated knowledge was seen by experts as useful, alongside the **willingness to de-localise and take part in the global circuits of knowledge** (and policy) production. Spending months in the field doing ethnographic work on a peri-urban location of a secondary city or years analysing longitudinal changes in urbanisation could be as important as taking part in side events at the World Urban Forum: some noted with concern the tendency to polarising and split, with one or other of these forms of urban research being deemed good or bad.

Effective science communication skills are essential to urban science, because its nature has complex messages. Being able to communicate research clearly to different kinds of publics is an essential quality from an advocacy and impact perspective. This does not only mean science journalism training in urban issues to ensure public outreach and cross-cultural engagement. There is also a question of internal communication to act as a boundary-bridging of expertise from across urban specialisms and philosophical perspectives. Facilitating a culture of respectful disagreement in the urban science

community, for example by providing platforms (journals, institutions, forums, etc.) can help bridging different voices together and lead to fruitful debate.

Despite the clear need for nurturing interdisciplinary sensibilities, the Panel recognised that the current academic and scientific landscape, and its value system, do not readily promote an integrated or open way of thinking or working. The structures of academic publishing and grant funding have, until recently, impeded the process of trans-disciplinary research for policy relevant subjects. Due to these factors, it was evident for the members of the Panel that there is a need to mould current urban science(s), and general scientific practices to encourage individual development and further urban scholar training to advance a new frontier that breaks with traditional structures, whilst reforming the academic edifice of publication and funding. As some Panellists noted, **many of the currently successful urban scientists have the ability to transgress scale** (vertical as well as horizontal), sectors, disciplines and institutional types and stakeholder groups. Most have a strong systems orientation, even though they may not have formally been trained in systems science, engineering or other natural sciences.

As with academic leadership, expertise was seen by Panellists not just as an individual but also as an institutional characteristic. **Universities as reservoirs of expertise** need to be much better acknowledged by both the scholars that make them up, often acting as individuals and atomised research groups rather than collectives, as opposed to being long lasting and influential actors in urban development. It was noted by Panellists working in Faculties and disciplines not typically badged as 'urban' that built environment expertise is splintered within universities and the societal impact and global significance of the built environment domains was poorly understood and acknowledged by universities. The experts in the Panel, however, noted a growing (or returning) interest by university executives in the theme of 'cities', but with little consistency in developing more cohesive urban offers by academia and with worrying undertones of marketization and branding.

While it is clear that universities in general hold the key to mobilising a more robust global urban science, the nature of the challenges vary hugely.

“

The path of positive transformation will require each sector to not only do more, but also to do things in a fundamentally different manner.

”

Unlike the global south where the problem is an absolute shortage of universities, in some cities that are centres of global higher education, like London or New York, inter-institutional competition is preventing the pooling of knowledge that is critical to address global and local challenges. Ensuring that higher education as a sector works to enable a focus on solving transnational or global challenges is something that will require nuanced understanding and concerted effort to resolve.

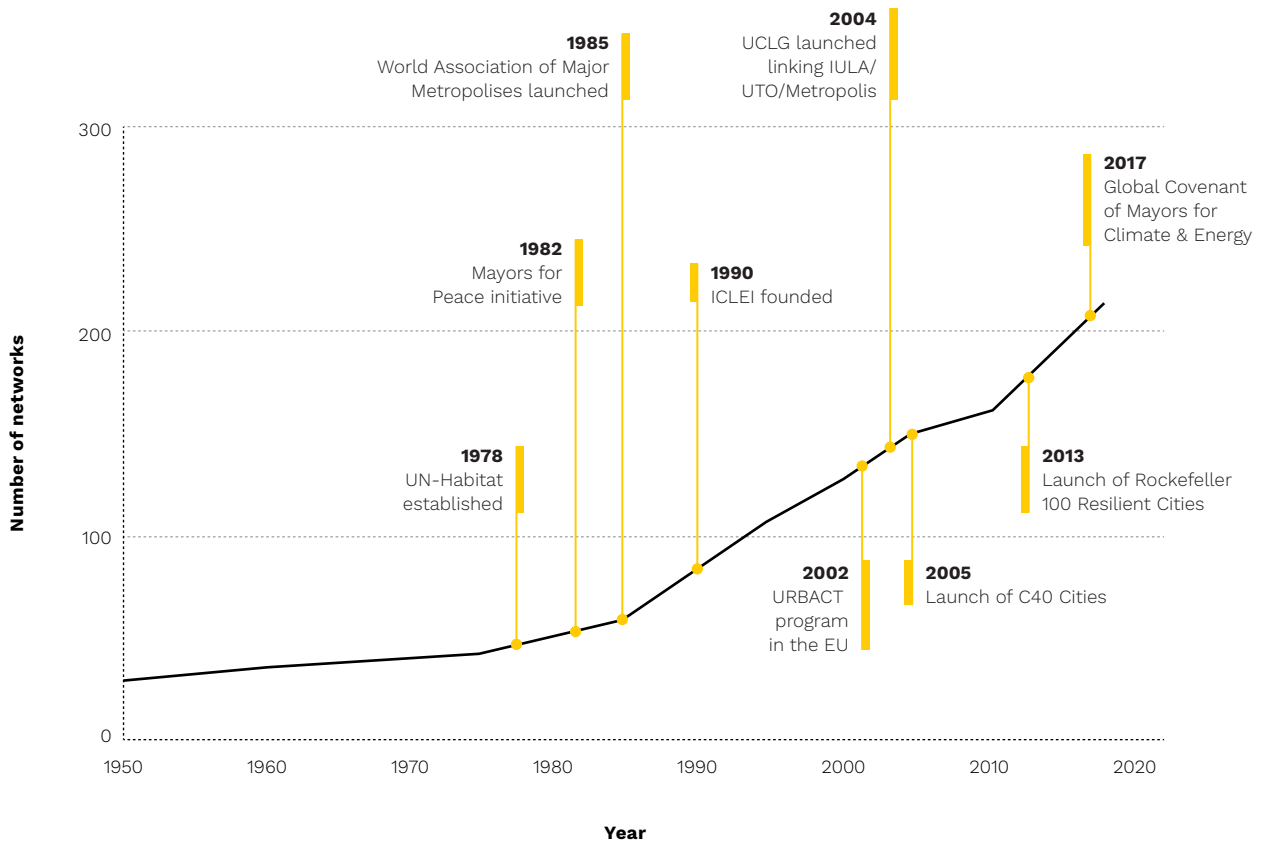
**INTERNATIONAL ORGANISATIONS**

Urban science-policy interfaces are, the Panel reiterated, not just local and national matters. Rather the story of the development of frameworks like the SDGs, the New Urban Agenda and the ‘urban’ elements of agreements like Paris on climate and Sendai on disasters, speak clearly to the well-established importance of the international system in connecting urban

scientific knowledge and urban development. International bodies, such as UN- Habitat, the World Bank and the World Health Organisation, have long encouraged the production of urban knowledge worldwide through programs such as WHO’s Kyoto Centre on health inequality in cities or UN-Habitat’s *State of the World’s Cities*. This active engagement with generating an evidence base and mobilising new research is not surprising as these institutions have been engaged in the development of a cities’ agenda within their own organisations through, for example the promotion NUA and new large-scale programmes on urban health.

As noted in the introduction, the recent development of an Urban 20 (U20) and its convening in October, 2018 alongside the Buenos Aires G20 summit, further points to **a changing dynamic as the role of cities are elevated on the multilateral stage**. Big urban focussed multi-lateral bodies, such as UN-Habitat and the World Bank, have funded several platforms aiming to support the monitoring and implementation of local policies addressing the objectives of particular agreements. The emergence of a

Rise of city networks  
**1950-2018**



global city agenda has allowed these bodies and others to raise awareness on the impact of urbanisation processes on a wide range of socio-economic and ecological issues. But, when it comes to designing robust evidence-based urban strategies, the extent to which the data collected and curated locally match the targets/indicators developed globally or nationally to compare cities' trajectories at a global scale and to monitor progress towards the implementation of global commitments remains unclear.

Furthermore, the way urban knowledge is currently curated and accessed by the public and the research community is highly fragmented. This is true at all scales, even the global level where it would be reasonable to expect some consolidation of information to track trends, patterns and dynamics of urban change. For example, at the UN level, UNESCO holds an urban science portfolio, yet the Secretary General's office has a city agenda, UN Habitat work with cities, and the WHO, UNICEF and FAO are also tackling urban issues. The fragmentation of such information, Panellists argue, is not helpful, especially for certain areas such as the impact of climate change on urban contexts, whereby a breadth of information pieced together is necessary to analyse patterns and developments.

The proliferation of agencies doing urban research highlights the importance of the urban question in global agendas, but also underscores the need to coordinate across UN Departments to ensure the knowledge base supporting the implementation of the NUA is sufficiently integrated and to avoid a piecemeal approach to evidence production for sustainable urbanization. Moreover, some experts in the Panel noted, the growth of trans-national efforts based on linking cities across continents makes the curation of international information and even more complicated at the very moment that there is a recognition of the imperative for cooperative urban governance.

City networks have increasingly gained prominence in global politics over the past decades. Their role is varied, but they often act as platforms for local governments to share best practices in a wide range of policy areas, and some more prominent city networks have been pushing for policy reforms, especially in the field of climate change with C40 or ICLEI. It is therefore not surprising to see they also act as key drivers of urban knowledge production efforts worldwide.

Yet more importantly for the subject at hand in this report, networks like C40 and ICLEI have also been drivers of data collection, comparison and dissemination, monitoring for instance climate emissions in cities. Universities and research bodies have been diversely involved in this data production, with the likes of UCL, LSE, the Stockholm Resilience Centre or the World Resources Institute taking part in gathering and processing datasets that get wide circulation

between cities and urban actors. Urban science must, some experts argued, then take this context as an opportunity and **act as connecting 'glue' between UN agencies, networks and international initiatives, but also as a champion of 'scientifically accurate' data** against the push, as we see below in the case of consultancies, for fads and readily-available information.

## COMMUNITY KNOWLEDGE

Meaningful inclusion of urban dwellers, community groups and NGOs working with those who bear the greatest costs of failed urban development were seen by the Panel as key to the overall task of producing timely, relevant and locally grounded knowledge. However, substantial questions remain, for several Panellists, on how this so called "community knowledge" can reach the science and policy arena. Discussions over the value of these forms of knowledge mobilisation surfaced with divergent views on the reliability of *ad hoc* and untested data on the one hand and on the other hand the view that it was not appropriate to **uphold science on a pedestal** when others are also producing and translating information. The example of the SDI Know Your City programme comes once again.

to the fore here: this produces community-sanctioned knowledge that is intentionally verifiable, like maps and documentation of services (place, time, photo) that can place everyone on the same page – a good practice not just for science's peer review principles, but also something that Panellists note makes for best advocacy.

There are existing protocols, existing communities, existing modes of practices where people already grasp their own community and they are quite big.

Decentralising urban knowledge takes us to how knowledge is produced in the first place, how are questions asked, what analytical frameworks we accept.

In thinking about data the Panel highlighted how the emergence of new technologies has contributed to the routinized collection of data at the community and more formal institutional level. Panellists noted that, both in the North and the South, the

development of even individual data has been predominantly led by private companies. As a result, information about individuals themselves, which could potentially be useful for policy, is used (or withheld) by private entities - rather than being curated by democratically elected authorities. The recurring example of Uber, holding significant amounts of transport data, especially in the Global South, was echoed across interviews with the experts concerned about the data platforms from which science might draw.

Yet, there was also collective recognition that over the past decade new technologies have broadened the scope of what data informed 'expert' views and even defined the expert, with technology allowing citizens or civil society groups to participate more explicitly in the development of usable urban knowledge. The data and social media revolutions have, in some cases, also allowed grassroots movements to interrogate and challenge more traditionally academic modes of knowledge production. For instance, the reach capacity of new technologies has changed the purpose of mapping itself, from being a tool to establish the predictive parameters of development and to control space - including those who inhabit space - to being a tool for holding developers to account and for fostering community empowerment and advocacy.

**Mapping techniques** were identified by many of the experts, irrespective of technical background, **as a central pathway to building community expertise and greater government-civil society engagements**, beyond the work of the major actors in urban development. They highlighted how, through mapping, communities that are below the radar of policy makers can be made visible and advocated for. While many experts agreed that it is now pivotal that data generated from the practices of self-mapping constitute legitimate quantitative urban research, debates and divisions ensued in the panel as to whether non-representative, untested and untriangulated data and small-scale samples could be included in urban science per se. On the one hand, argument for the validity of forms of knowledge production between the 'ivory tower' of academia were presented as justification for this move. On the other hand, arguments as to the need to maintain a degree of scholarly independence, via codified scientific practices and validation systems such as peer review, were flagged as key to the role of the academic in the 21<sup>st</sup> century. Centrally, however, some general agreement between Panellist remained evident as to the fundamental need to engage alternative forms of knowledge mobilisation, and the evident benefit of co-production, just as with industry or government, which might overcome the divide flagged here.

For the Panel, the imperative for finding new modes of data generation that cover the full spectrum of

issues at the local scale speaks to the questions of filling in the blanks and of building better coverage and capacity across places and issues that are typically hidden from scrutiny. This is not simple. Local level research is typically driven by funding available - often limited for NGOs and community initiatives and for concerns that have an

immediate application. The data is not well integrated into the wider information system, is not typically longitudinal and may or may not include key drivers of change. Ideally universities can provide research frameworks and support to improve the quality of research and act as a repository for the information gleaned from local researchers and contribute towards more formal peer reviewed research dissemination efforts. However, experts also highlighted the **importance of universities adopting a less 'extractive' (and sometimes condescending) attitude to community knowledge** to develop partnerships based on equality, and which fight against existing hierarchical and power structures that underpin the value attributed to different types of knowledge.

Universities have traditionally collaborated with local residents and community organisations, often regarding them sources (if not objects) of knowledge for research projects. Panellists pointed out how increasingly there has been an effort to recalibrate this hierarchical relationship with university researchers embracing ideas of co-production. In that regard, communities are not mobilised by universities to provide data or information input, they are sought as active partners in the design, implementation, and dissemination of research projects. The global campaign "Know Your City" by Shack / Slum Dwellers International (SDI) is an example of community-driven data that is used for research and advocacy purpose. Covering 7,712 informal settlements as of 2018, the initiative is led by SDI and in collaboration with United Communities and Local Governments-Africa and Cities Alliance, it was started in collaboration with the Santa Fe Institute Cities' Project and funded by the Bill and Melinda Gates Foundation. Directly collected by communities living in informal settlements, the data generated makes visible everyday lives and

“

The overall goal should be an environment that is accessible to all and not a select few; an environment that promotes diversity and engenders chance meetings. Cities are made for people and people should be at the centre of all decision making

”

living conditions in informal settlements and is used to support advocacy efforts towards local and national governments. There are several equivalent local projects with local authorities.

The SDI example was raised repeatedly in the Panel to illustrate how the collection and consolidation of community collected citywide data on informal settlements can help to form an inclusive dialogue and partnership between the urban poor and local governments. Informal settlements are often ignored by city government and excluded from access to basic infrastructures.

Local governments operate within a regulatory framework that may not fully consider informal settlements and their needs or puts formal housing beyond the reach of most dwellers. Community-based data, consisting of both hard data and rich stories from urban poor communities, provides a detailed picture of everyday lives and spaces in informal settlements. While such data is rarely comparable between countries and may indeed be even hard to compare within countries or even a single city, it can serve as an advocacy tool for the urban poor to better negotiate with local governments, provide a baseline against which progress can be measured, and help to achieve a more equitable distribution of resources and services. The scaling up of these arguments and evidence led local processes has had a profound impact on the normative base of the global agendas.

## PRIVATE SECTOR AND CONSULTANCIES

In the early days of a global urban agenda, in the 1970s and 1980s, cities were a topic of limited interest for the private sector, with national donors and multilateral agencies the key drivers of the resources available to those working on urban development. The landscape has now drastically changed. The private sector is now heavily invested in mobilising knowledge about cities and numerous private entities make the circulation of knowledge about and for cities a business. This raises the question of the appropriate role of the private sector in urban science. As several Panellists pointed out, and as a few examples already raised in this report note, **companies are more and more often producing 'scientific' information shaping urban development.** Obvious examples include the Real Estate industry or the insurance sector. For instance, Swiss RE has for quite some time held and publicised one of the most comprehensive databases of risk in urban areas –a product with far bigger comparative reach than the academic research in the area.

The data power of the private sector is creating new **information and data asymmetries** between

the private sector and the scholarly edifice of academic research. As we see below, the rise of data-based analytics has distorted the idea of what is city information, with the escalation of city rankings, benchmarks and indexing efforts that then impact the diagnostic process and sway the imaginary and way of operating of local governments in both North and South. Given the existing and future power of the private sector as potential urban 'thought leaders' the Panel proposed that consultancy companies and other private sector players might be directly incorporated into debates about an emergent global urban science.

Urban researchers are today confronted with a sprawling reality of private consultancy businesses engaged to provide advice on urban issues to various layers of government and 'back' to other parts of the private sector. As some Panellists noted, private consultancies are often particularly well-positioned to produce short term and impactful research, which can be applied to policy cycles, market needs and political timeframes. For instance, McKinsey regularly publishes a *Global Cities of the Future* report that compares the performance of major urban areas using a wide range of economic indicators. The Economist Intelligence Unit has been a go-to actor in terms of benchmarking sustainability and liveability in cities the world over. Academic research, several Panellists contend, while more robust and critical, is slower and often does not seek direct applicability, leaving consultancy research to be perceived as more attuned with the fast pace of the 'real world'.

“

Consultancies these days are much faster and sexier than traditional academic institutions.

”

Consultancy firms have not only gained credibility in providing relevant urban science research for policy through their modes of work, but also their history. Built environment consultancies have long worked with local governments to produce visions or master plans (e.g. Arup, AECOM, Mott McDonald). Yet this role is now expanding with consultancies taking a far bigger agenda-setting role in the international circulation of knowledge, expertise and funding for cities. For instance, Arup, a large international engineering and planning consultancy, is involved as a key partner in the Rockefeller 100 Resilient Cities initiative and the C40 Climate Leadership Group. In addition to generating urban data, these large multidisciplinary firms have been providing research-based advice on urban issues (ranging from regeneration to infrastructure planning) to

local governments worldwide, contributing to shaping urban strategies globally.

Experts highlighted some of the potential problems that might arise when relying on data (and analysis) provided by the private sector. As Panellists note, data sharing in this case is a crucial issue. Scholarly experts unanimously recognised the **need for open-access, standardised urban information** worldwide, pointing out that the private sector is rarely keen to share its data openly. Private consultancies often provide advice or are commissioned to produce data for cities, at a cost. Given the already noted concern to ensure that poorer cities in the Global South are at the forefront of evidence led urban transformation, the monetisation of data and skilled analysis is clearly a barrier to effective global urban science.

As some in the Panel with extensive consultancy experience noted, local governments often get access to final reports in a ‘PDF format’, short hand for a final non-updatable product that is a format of questionable value for further use in terms of longitudinal tracking or repurposing for cross analysis with other research. Central to the problem is that consultants are generally reluctant to share the raw data in a format that can easily be updated by local authorities, though in some cases, this is available for a fee. The **commodification and compartmentalisation of urban data** was perceived as a challenge almost unanimously across the whole Panel.

Ironically it is the private sector that has both fragmented and integrated urban analytics over the last decades. New data analysis spans traditional, knowledge generating, consultancy firms. GIS software companies like ESRI for instance are providing new interoperable analytical solutions to help process statistical and geospatial urban data and to provide information at resolutions previously unimagined. The question of real-world potential of technical-analytical capacities – especially when it comes to producing, processing and analysing GIS information or big data for instance – is a fundamental one in many rapidly urbanising parts of the world. The lack of technical expertise in many African cities means that this expertise is either completely absent from decision-making processes or it has to be outsourced to private (often international) firms which can provide technical and analytical (though rarely political) advice on solutions.

“

Firms can put up glossy and cool images and data and tend to have more voice: urban is a field that everyone feel they can say something about.

”

However, conversations in the Panel also surfaced the importance of ‘arms-length’ research bodies and institutions outside academia. Think tanks and research institutes like the International Institute for Environment and Development (IIED) and the World Resources Institute (WRI) have been recognised as often central players in shaping international urban agendas, creating (not just mobilising) scientific knowledge about cities, and generally playing an important role in determining the processes of science-policy interaction at stake in this report. This often means that these entities stand between convening and developing knowledge just like, if not in several cases better than, academia. For instance, IIED has been recognised as key in developing a practice of ‘side events’ alongside the World Urban Forum and Habitat conferences of the United Nations, and playing a critical knowledge creation role in producing actionable information on urbanisation trends and development issues. It was flagged by several Panellists, then, that this **think tank community needs far better scrutiny and appreciation** when depicting the geographies of science-policy interactions in and for cities.

## PHILANTHROPIC ORGANISATIONS

Urban science, like any other research, is heavily dependent on its funding sources. This means that as particularly as sources of non-earmarked and open-ended funding remain limited to academia, funding bodies determine to a great extent what gets researched, how, and by whom. The role of governmental funding agencies was flagged in the previous chapter as part of the broader system of science production that shapes the role of academics in global policy arena. Yet experts in the Panel, and especially those more active on the international development also noted the need to discuss more explicitly the role of philanthropies in defining the normative base, sectoral remit, geographical focus and institutional forms of urban research.

“

Many of the most important science-policy programs for cities have (or have had) some philanthropic support: we cannot simply just be critical or we would be hypocrites

”

Philanthropic organizations invest in particular localities but also provide important resources in the production of urban knowledge globally. In recent years, many charities and philanthropies have become actors in the space of funding city networks,



including the Bill and Melinda Gates, Bloomberg, Ford, MacArthur, and Rockefeller foundations. Influentially, Rockefeller supported the generation of new knowledge on issues of resilience and adaptation in cities from all around the world through the 100 Resilient Cities network. The Bill and Melinda Gates foundation has provided financial support to the work of SDI and the Santa Fe Institute through “Know your city” project to map informal settlements across Asia, Africa and Latin America. Realdania and the Children Investment Fund (CIFF) have been key actors behind many of the projects of the C40 Cities network. The Ford foundation has been an important driver of the work of the Cities Alliance directed toward inequality and inclusive urban development. The University of Chicago’s new Institute for Urban Innovation has been supported by a large donation by the Mansueto family, and the London School of Economics’s well known Urban Age Programme was developed via a large grant by the Deutsche Bank.

These are examples, some Panellists argue, that affirm the role of the philanthropic funders as, clearly, they have played a fundamental part, along with national donors like the German GIZ, the UK’s DfID and Swedish SIDA to bring the cities agenda to the fore.

Philanthropy itself is now acting as a ‘friend’ of that data revolution many cities around the world have been progressively invested in. For instance, Bloomberg Philanthropies has launched an initiative to strengthen the statistical capacity of cities. “What Works Cities” is a \$42 million program delivered together with experts from the Harvard Kennedy School and Johns Hopkins University, and the Sunlight Foundation. The program supports selected US cities in making better use of data by providing technical support, access to expertise and peer-to-peer learning.

The action-based research work supported by philanthropies aligns well with priority issues Panellists flagged as being of concern in ensuring that the societal role of urban science is clearly defined. “What Works Cities”, for example, assists cities with creating sustainable open data programs that promote transparency and citizen engagement. Yet, some Panellists argue, much more care as to the bigger agendas behind these efforts is needed.

Some Panellists warned of the dangers of “philanthro-capitalism”: a turn in many philanthropic bodies to mirror for-profit practices by investing in social programs that yield returns over the long term, or by encouraging the role of ‘social investors’ that can benefit from putting resources in

socially-responsible programs. These principles, upheld for instance by the Clinton and the Chan/Zuckerberg foundations, raised worries as to the role of science in the future of cities. Panellists made two particular worries: one the issue of independence of academia and its capacity to work at times normatively in support of those whose voices might not be heard; on the other hand, as to the possibly dangerous role that philanthropic-funded academia might have in speculating, as a medium, interests and agendas by these actors into the creation of evidence bases and into the communities that academia works with. As it was noted at the London workshop, this **tricky ‘third party’ role** is by all means not without consequence, and its impacts are significant. As noted in a recent review published by the OECD, of the sizeable USD 23.9 billion philanthropic giving in development between 2013-15, a large share (68%) was channelled through third parties: not just NGOs and private enterprises, but research institutes, think tanks, and universities – 91% of which was earmarked.

While it is easy to identify the role of philanthropies in sporting urban innovation – including in the funding of pivotal primary research, overall Panellists urged caution. Whilst philanthropic research funding allows research to be carried out at a time where public funding is decreasing, this creates challenges for the overall intellectual project as the support for research tends to emphasise specific themes, without generating the breadth and diversity needed for urban science to act as a ‘critical friend’ for decision makers. Philanthropies may help establish but they cannot sustain large-scale and globally significant urban science without coordinated public research funding.

“

Urban science cannot ignore philanthropy, so the question really is: can we do without it? New principles of cooperation are needed here

”

“

It’s easy to forget the interest and principle that stand behind some of the big money in urban development. We need to ask ourselves: can we be accomplices to all of these?

”

**CITY INDEXES, BENCHMARKS AND PUBLISHING**

The growing dominance of an ‘urban data’ agenda was taken up by parts of the academic community. In data analytics, programming and technical built environment disciplines the city is the new frontier, the popularity of city data is also well heard in policymaking and business. Panellists noted this form of positivist science is no novelty: historically, the production of quantitative information was central to the growing profile of cities in governments’ metrics. Scientific evidence for urban management can be traced back a long way- for example, civil engineers provided health mappings and ‘mobility tracking’ during the cholera outbreaks of the industrial revolution during the 19<sup>th</sup> century. Today, in some places but not all, the amount of data generated is beyond compare with these

“

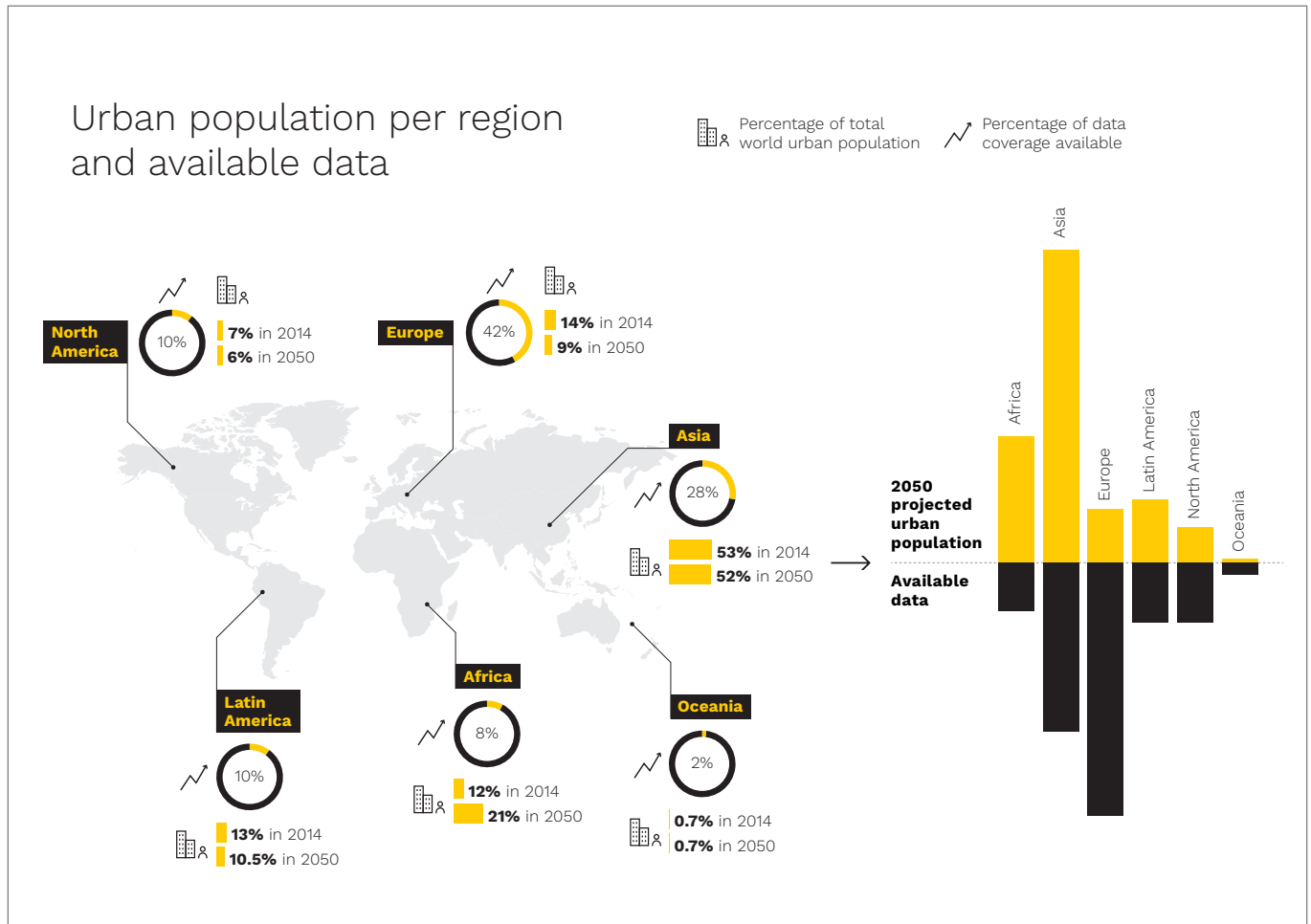
The heritage from 20th century is the overdominance of statistics: we need qualitative information. We need multidisciplinary.

”

precedents for extent, scale, speed and variety.

Open data portals are available, and an increasing number of cities are producing performance reviews and data snapshots. Cities such as Melbourne, Singapore and Paris are carrying out such information processes in order to upkeep the innovation in their urban policies. Scientific advice with city dashboards and city control rooms have been set up in major cities such as London, Chicago and São Paulo to gather real-time information on urban developments. Panellists unsurprisingly concurred that new smart data has taken a centre stage in shaping urban governance and interventions, especially in rich cities, over the last decade.

Along with these developments, the role of ‘city rankings’ was flagged in several interviews and discussions in the Panel as key. According to a report by JLL and the Business of Cities there are currently over 300 global indices and benchmarks that assess the “relative performance of cities across a full range of indicators: finance and business activity, investment profile, demographic diversity, innovation, infrastructure, global reach, quality of life, culture, governance and institutional framework”. In a previous analysis by Key messages reviewing 200 city benchmarks and indexes, they highlight that often use multiple sources, combining global open access datasets with private or more specialised metrics, alongside



with perception surveys. The vast majority is global in scope, comparing cities across the globe (123/200, versus 58 national databases and 23 regional databases), and emanating from US-based institutions, followed by the UK. Finally, such databases often focus on ‘global’ cities, with the most commonly featured cities including Paris, London, Tokyo, Sydney, Shanghai, Hong-Kong and Singapore. Naturally, it appeared important to several Panellists to flag the role these sorts of metrics play in the production of urban knowledge globally, and the challenges the criteria selected might represent to urban scientists. As some noted, the now many forms of city benchmarking available globally have an important place in defining, in the minds of those not in academia how cities could be ‘measured’. More worryingly, there is even the suggestion that urban science might be conflated by the public as the research associated only with urban benchmarking.

The **rise of an urban data discourse** itself was perceived by some on the Panel as legitimising (and even driving) a very quantitative and data-driven understanding of cities and urbanisation. Indeed, research on city rankings, indexes and indicators highlights the power of such metrics in producing specific ways of seeing the ‘urban’ and in isolating other issues that are deemed relevant for policy intervention. Many private companies such as consulting firms (e.g. McKinsey) or media groups (e.g. The Economist Intelligence Unit, Monocle) have developed their own urban rankings and indexes along with sectors like real estate and insurance which have been doing that for quite some time. Panellists pointed out, this **supports a global urban knowledge base that is predominantly focused on competition between places** for foreign direct investments, tourism and the attraction of the global ‘creative’ class. Yet, closer collaborations between the science and policy communities, could yield new “critical” indicators and metrics that challenge conventional thinking about the urban and there is some expectation that the SDG related indicator movement may provide an alternative normative base to that of the competitive benchmarks hitherto produced, even while there is a common mode of enquiry.

Several experts affirmed the usefulness of quantitative indexes in providing standardised ways of measuring urban developments and comparing across places, however, to others, not only do the well-known theoretical critiques of positivist enquiry pertain, but that some numerical metrics lack the depth and contextualisation and explanatory nuance which more qualitative investigation and analysis can provide. Especially in the monitoring of the implementation of global and national urban developmental agendas the more sophisticated reading of dynamics and causation will be critical to identifying priorities for and barriers to effective urban transformation.

In privileging one or another form of urban analysis over another (quantitative vs qualitative, cases study vs high level global abstraction; Northern vs Southern issues etc) the **role of the publishing sector was acknowledged by the Panel as fundamental**. This thread in the Panel started from an observation on the ‘split’ as to where some of the most advanced thinking on the urban science-policy link has been taking place in the past

few years. As Panellists flagged, major academic outlets like *Nature* and *Science* have progressively offered spotlight visibility for the calls that led to this Panel, with specials ahead of Habitat III and commentaries/policy fora after and around major events like the UN General Assembly High Level panel and the Cities IPCC conference. Moreover, *Science* and *Nature* tend to publish “global change” and rarely case studies. This tends to favour global scale urban research and limit the visibility of individual case studies. Some similar thinking about the need for a global urban(isation) science (*PNAS*) and centred on the ‘commission’ model of collaborative discussion (*The Lancet*) prove high level interest is there. Yet on the other hand more conventional urban studies publications have offered patchy attention to the issue of the global science policy interface, with only a few regular venues for this conversation (e.g. *Environment & Urbanisation*, or *Urbanization*) tellingly emerging from publishing spaces that are tightly engaged with the Global South. More writing on this front is now emerging (e.g. with Cambridge University Press having been a regular venue for the climate/environmental side of this conversation) but this is a side of academia (and the broader political-economy of expertise on cities) that needs to be reviewed more explicitly if the social scientists, whose intellectual concerns are in specialist journals like most *Environment and Planning* journals or the *International Journal of Urban and Regional Research*, where there is active but fairly closed conceptual debates, for example around the notion of planetary urbanism.

Importantly, the panel also noted a differentiation between the major academic publishers and the specialist journals that have perhaps less global visibility and ‘impact factors’. Venues like *Nature* and *Science* tend to publish ‘global change’

“

“Cities need indicators to measure their performance in delivering services and improving quality of life... The ability to compare data across cities globally, using a globally standardized set of indicators, is essential for comparative learning and progress in city development. City metrics guide more effective city governance

”

focused statements and broad view statements on cities and urbanisation, whilst other more specific venues tend to be the home for case studies and in-depth assessments. This tends to favour visibility for global scale urban research, and ‘new trend’ analysis, which might in turn limit the visibility of specific instances, regional and local contexts and, in many cases, more qualitative research on urban issues.

“

Whose pages these calls are being printed on? Perhaps it is time for coalition-building in the publishing world too not just in academia...

”

### TRAINING: THE CURRICULUM MATTERS

Discussions of urban science often can turn into very specific **debates on research forgetting the other ‘half’ of academia: education**. Some Panellists felt very strongly that the elements of teaching, both within the ‘walls’ of academia as much as with, for, and in relation to the ‘real world’ out there need to inform our considerations as to the role of science in the future of cities. In shaping urban science, various experts highlighted that to be relevant to societal and sustainability objectives, it is not just research but also training that has to be re-examined and eventually reformed. Education, some experts in the Panel note, is possibly even more impactful than pure research – with millions of graduates ‘exiting’ academia every year. This is not just a Northern issue: in 2017 a record-breaking 8m students graduated from Chinese universities, with similar numbers in India, growing figures in Africa and Latin America, and many universities in Western countries numbering in the tens of thousands. In short: scientific information is regularly conveyed and taught to vast segments of the world’s population, determining much of the basic appreciation of cities for built environment professionals.

**Rethinking the training of a new generation of urban scholars and leaders** appeared fundamental for the experts in the Panel, as it needs to be oriented towards interdisciplinarity and better science-policy communication.

“

Where is it that we have the greatest impact? If we count the thousands of students we have, we can’t answer ‘research’ can we?”

”

While university training has been organised along professional silos: planning, architecture, engineering, economics, real estate, computer sciences, new programs are emerging that aim to foster communication across all those traditions, but they remain rare. In addition, they are partly determined by universities’ abilities to offer such training, as much as problems of professional accreditation of programmes (and graduates) as well as the global student marketplace and its ebbs and flows.

Capacity for experimentation in urban science for education is, many experts argue, quite substantially straightjacketed by these factors. To design multidisciplinary curricula, universities already need departments covering a large range of areas, including but not limited to architecture, planning, social sciences, geography, environmental sciences, data science and statistics, economics, engineering, health sciences, epidemiology. However, Panellists note, this is rarely the case (both in Northern and Southern institutions). Nonetheless there are other ways in which training can be designed to better integrate urban complexity. For instance, Panellists noted that creating opportunities for students to engage with real world issues is one way forward. Training urban scholars and practitioners who can be at the forefront of the science-policy interface, implies developing opportunities to engage with practice through tangible projects. Ideally, these encounters should be with urban actors outside of the urban science community sphere. For such operational training to happen at scale and as part of a core curricula, existing academic institutions will need reshaping in order to incorporate such ‘applied’ curriculum without hindering the value of theoretical education.

Considerations about independence and maintaining a safe space for learning, however, emerge here too according to several Panellists who voiced a worry that “education might become the next frontier for impact metrics”. Some institutions already use models whereby Masters’ candidates produce research or reports for non-academic audiences and clients, and joint PhD programmes exist in collaboration with local authorities. For urban science, it is important that such learning strategies are applied and extended upon, but in a careful manner that maintain pedagogical and emancipatory purposes firmly within the scope of education.

In supporting the next generations of urban scholars, not only does the urban science community need to become more creative and proactive in translating its knowledge into practice and policy, but an overall better understanding of contextualised politics and governance in cities should be in place. Research and pedagogy cannot only be local and the urban science curricula requires students to work at all scales - for example, some countries like China

are driving urban development and change at a national scale. And in Africa, many areas of planning are decided between multilateral organisations and national governments and not at the local level at all.

“

Professional training is not a ‘cash cow’! It’s how we remind the practice of the importance of science

”

Critical thinking and a deep awareness of the complexity of urban management must infuse the urban science project as a whole, but be the cornerstone of efforts to produce the next generations of global urban scientists.

As the importance of the global urban agenda becomes more apparent, universities are different kinds of training – from the reform of undergraduate professional certification to the expansion of lifelong learning and introduction of executive programs. The modes of engagement with those different student communities calls for different modalities of teaching and the diversification of the training routes will have a feedback impact on urban science as established scholar/teachers have new more direct exchanges with practitioners.

The importance of this interactive aspect of training received attention in the Panel discussions where the tension between executive/professional training as new frontier of profit-seeking universities and its more productive role of facilitating engagement with the professional sector to build sound (and scientific) capacity from ‘within’ the already operational urban management cohort was a key theme.

## 4

## ENHANCING SCIENCE-POLICY LINKS

### CHAPTER 4: KEY MESSAGES

The pathways to reform and improvement of the role of science in the future of cities go, inevitably, through a number of layers of governance. There is not one, but rather multiple entry points for the proposals and principles articulated in this report. Rather, a global urban science needs to work with a variety of differently placed actors, including the public and the private sector, and demonstrate leadership across different scales of urban policymaking and space-making.

- ✦ Today we are confronted with limited and partial global information in a comparative sense: this means that global urban analyses, in academia or beyond, remain limited in scope and rarely 'global' in reach
- ✦ Yet it also means that more data points do not necessarily lead to better decision making: the 'global' in global urban science needs to be articulated in an aggregate sense, identifying common trends and their future directions, and pushing multilateral/international but also national and transnational actors to think of the aggregate conditions of our urbanising planet, and better articulate a truly transformative agenda beyond incremental progress (scientific and in policy)
- ✦ On this front the value of the United Nations remains of central importance to uplift from national interests and regional specificities but it then needs not be treated as sum total of national elements, as we might have a basic problem with accepting cities within the state-based reality of the international system - we need to rethink and resource more effectively the UN's capacity to take the helm on steering trends and challenges of urbanisation.
- ✦ Regional coordinating and lending bodies often offer an important and partly side-lined entry point to these challenges and are important actors in pushing for analytical exercises beyond boundaries or 'global' city clubs.
- ✦ Despite disagreements on the shape of the platform and or the planetary orientation of the science, some form of global assessment on sustainable urbanisation is therefore necessary.
- ✦ This global assessment requires sound multi-scalar sense: it will have to be operationalised regionally and remain relevant locally, or risk becoming a poorly relatable top down international initiative.
- ✦ This however needs not to hinder the development of the role of universities in engaging with partnerships with local communities, local governments and with civil society movements across boundaries
- ✦ Equally, it has to be centred on universities advocating, but also more clearly experimenting with a reform of science (advice, generation and mobilisation) within local government

## LINKING SCALES

“

Policy responses to the most pressing challenges and opportunities for sustainable development have been hindered by a set of core weaknesses in current research and information at the city level.

”

Despite its apparently ‘local’ and academic mission, centred on cities and science, the Panel’s focus was very much multi-scalar in purpose and oriented towards the governance of information in policy. As described in the previous two chapters, this has meant that Panel discussions put

much emphasis on the political-economy of science-policy interactions, and on introspective look at the challenges of urban research that is not blind to the vast populace of actors beyond the confines of universities. As these conversations already flagged, the internal tensions of the urban science community as well as the recognition of the existence of a wide range of actors producing urban knowledge forces us to interrogate the ways in which separations can be overcome and collaboration can be enhanced.

Building on the previous three chapters, this section offers some preliminary reflections from the Panel on the issue of multi-scalar governance. In particular, we look here at how urban science can be better connected to policy and practical action, and link to the needs of various stakeholders whilst preserving its critical insights, across the variety of ‘levels’ at which today’s urban challenges take place.

At the very heart of those imperatives lies the question of integration and governance of existing knowledge to strengthen the relationship between scientific research and practical action. What follows explores avenues for better science-policy integration at the international, regional, national and local level, based on inputs from Panel interviews, roundtables and workshops – laying the ground to a set of practical recommendations summarised in the next section of the report.

## AT THE GLOBAL LEVEL

The frameworks embedded in the UN’s 2030 Agenda call for regular reporting on national progress towards the achievement of sustainable urban development. Reporting on SDG targets should provide information on the state of

urbanisation worldwide, representing a key opportunity to generate new and harmonised knowledge at the country level. Yet, as some Panellists pointed out, a collection of national assessments does not equate to a ‘global’ grasp on cities. Often, we are confronted with **limited and partial global information** both in a truly comparative sense, looking comparatively at the vast majority of cities, or in an aggregate sense, identifying common (or regional/specific) trends and their future directions. Some work, especially of demographic nature, has been done by UN-Habitat around the *State of the World’s Cities* report and UN-DESA Population Division with the *World Urbanisation Prospect*. Yet for the rest, little remains available beyond studies of selected cities by city networks or academia, or indeed the private sector – all of which remain limited in scope and rarely ‘global’ in reach.

Some experts pointed out how this could, for instance, start from tracking the city-level progress on SDG11, as already tested in the United States by the Sustainable Development Solutions Network, or by mirroring the efforts in health. Here, some experts noted, the last decades have seen the emergence of more explicitly international efforts at gathering a global picture, with the rise of ‘Global Health’ first and ‘Planetary Health’ afterwards, attention by key publications in the field like *The Lancet*, and research-to-policy exercises like the Global Burden of Disease program. Similar efforts could, the Panel argues, be made on the ‘cities’ front to track urbanization on key SDG areas such as inequality, gender, and energy. However, integrating the ‘urban knowledge’ that is generated through the monitoring process of other agreements (e.g. Paris Agreements, Addis Ababa Declaration, Sendai Framework) is then essential to generate a truly planetary and cross-sectorial knowledge base on global urbanisation processes. At this scale, some experts argue, **the value of the United Nations remains of central importance**: reforming science-policy links at the UN level could inspire more formal multilevel policy efforts that can nudge national politics more explicitly toward cities, encouraging a cross-cutting reform of the ways information is collected and deployed in city politics.

As such, Panellists noted, the global piece of the urban science-policy puzzle should not be treated as aggregate of national elements, or consequence of transnational initiatives like city networks, but rather as a legitimate domain of governance,

“

A collection of comparative studies is not a global assessment: we often lack the planetary view on urbanisation.

”

a ‘global urban governance’, that cannot be underplayed or side-lined.

Even if the science-policy interface is not necessarily UN-led, several in the Panel argued that the international agreements in place still provide a solid ground to refer to in order to set guidelines and clear directives on all levels of influence- global, regional, national and local. At present there is certainly a complex mix of reporting systems that feed into the UN monitoring processes. Cities and an ‘urban interest’ should be mainstreamed within all these processes – as current efforts of the CitiesIPCC initiative show. In 2016, the campaign was led by a variety of urban stakeholders, researchers and city networks (and a South African governmental proposal for a Special Report) calling for the inclusion of the ‘urban question’ in the Intergovernmental Panel on Climate Change’s monitoring activities. As a result of those coordinated efforts, it was decided that the Assessment Report (AR7) starting in 2022 will include a Special Report on Climate Change and Cities. In March 2018, the CitiesIPCC conference was organised in Edmonton (Canada) to kick off the production of the Special Report on Cities and Climate Change. The conference brought together representatives from scientific bodies, academia and other research organisations, UN member states, stakeholders from city and regional governments, and other urban and climate change policy-makers and practitioners. Several Panellists involved in this campaign noted how this opportunity is one of several that can bridge the gap between urban science, climate change research and policy. Key insights from the conference have for instance included the recognition for urban science, a Global Research and Action Agenda on Cities and Climate Change Science, and policy to engage more deeply with issues of informality, with the production of urban-level information and with the design of adequate funding and finance schemes to support localised and coordinated initiatives.

Thinking about the relevance of the urban across the 2030 Agenda, and doing it so from within major multi-lateral cornerstones like the IPCC, can then contribute to mainstreaming urban agendas in national and regional policy processes. It can also contribute to connecting where some of these initiatives might in fact be more advanced than the international scale, highlighting the importance of cities of all sizes for addressing global challenges and contributing to cross-scalar integration.

As noted in the previous chapters, this implies working across UN Agencies and finding a narrative that illustrates how urban/territorial/global challenges are interconnected, whilst showcasing the importance of city level information for the 2030 Sustainable Development Agenda. However, discussions in the Panel flagged there is at present a tension on this point in the urban science community. These

types of internationally-generated guidelines may not be relevant or suitable if the focus of an urban agenda should rather fall solely in the responsibility of cities themselves rather than multilateral organisations.

Workings of this Panel, then, went in parallel with the involvement of several Panellists in the debates on the effectiveness of UN-Habitat, as the ‘urban’ agency of the UN in particular, and of the UN system more in general, which took place in and around Habitat III, as well as a follow up via the UN Secretary General High-Level Panel on the implementation of the NUA and the reform of UN-Habitat in September 2017. Reporting to the UN General Assembly, several Panellists made clear the **need to rethink and resource more effectively the UN’s capacity to take the helm on steering trends and challenges of urbanisation**. Suggestions in this context ranged from a proposed new inter-agency coordinating body, tagged ‘UN-Urban’, to better inclusion of cities and local authorities in the workings of UN-Habitat and its governing council. Whilst the outcomes of these recommendations remain limited (by the pace of the broader UN reform process but also by national politics), the debate at the UN and at the Panel flagged the urgency of these matters. For instance, members of the experts Panel have pointed out that logistically, UN Habitat is heavily underfunded and could therefore not be justified to be at the forefront of this global science-policy interface.

“

Building new policy interface is always tempting, but mainstreaming urbanisation throughout what we have already also needs frameworks that acknowledge it across government departments but also at the local level.

”

Equally, it was acknowledged that international agreements, as mentioned in chapter 1, have provided very little information as to how the urban dimension of those various targets and objectives would be monitored, and how harmonised information collection processes would be coordinated, at which frequency. However, the involvement of the UN was not entirely discarded as they are the main driving force behind the 2030 Agenda. Some Panellists discussed the idea, already circulated in the Habitat III negotiations and discarded eventually at the last round of the New Urban Agenda, that an international assessment platform under the aegis of ‘Global Assessment on Sustainable Urbanisation’, or an ‘Intergovernmental Panel on Urban Change’ (akin to the IPCC) could be an



interesting way forward. It would, some Panellists argue, replicate the aggregation (of science and policy) experiences of IPCC in climate change and IPBES in biodiversity, learn from the limits of these, and seed the demand for more ‘global’ and usable knowledge in urban research via an intergovernmental panel focused on urban issues. However, several Panellists involved in these already existing initiatives also noted how the IPCC model can also be criticised for its slow and “gargantuan” negotiation effort, due to the 1990s political consensus-based processes built in it, its limited results despite the *scientific* consensus, and as it could result in the risk of becoming too servient towards specific actors.

Equally, some pointed out, the experience of these intergovernmental panels is limited to national-level discussions and diplomacy: a panel on cities would have to deal with much broader reality and relate to far more actors, namely local governments, and that format of multilateral working still needs to be tested. This also went hand in hand with a divide between Panellists as to whether a focus on that scale of reform would be detrimental to (detracting attention and resources) change at national and local levels, or indeed a force of positive encouragement to spur greater action at these other levels.

“

Those IPs [IPCC and IPBES] are designed for national governments, we need a local government focus.

”

Hence, the question of which actors should be participating in a global reporting process on urbanisation remained a fundamental one for the Panel, not just as part of the discussion of an ‘IPCC for cities’ but also in the broader mechanisms of assessment of the SDGs, Paris, Sendai and so on. Global networks representing cities, it was acknowledged, are already producing relevant information in relation to cities’ actions

“

A global urban assessment, even without the UN, can show something important: that cities and scholars are ready to take matters in their hands if states wait any longer

”

on issues such as climate change, governance, disaster risk, gender equality, and very often they are doing so by collaborating with universities.

Leveraging those science-policy experiences in a global assessment process might be a way to avoid the ‘nation-centric’

bias of IPCC-like structures, some Panellists argued. However, despite disagreements on the shape of the platform and or the planetary orientation of the science, it is clear amongst experts that **some form of global assessment on sustainable urbanisation is necessary.**

## AT THE NATIONAL AND REGIONAL LEVELS

National governments play a prominent role in shaping urban development and trajectories. Panel experts recognised that it would a significant mistake to take the challenges at hand here as appoint of departure from states. Often national legal frameworks underlie the way in which the science-policy interfaces can be conducted, and national macro-economic and fiscal policies generate the funds and investments which go towards urban projects. Further, institutional power at the national level shapes the multi-scale governance in place, and the role cities take on in this, and have a strong-hold on international relations setting many of the global development pathways for cities.

However, Panellists acknowledged that despite the power and development boundaries often set at national levels, the dynamism of cities is often causing central governments to push beyond these, especially as they change the international landscape of power by setting up their own networks, funding streams and cross-boundary initiatives. If the evidence is that cities are thriving and connecting across national borders, the Panel recognised, then **we might have a basic problem with the state-based focus of research and practice.** As noted in the previous chapters, the funding of science is very ‘nationalised’ – even though in most fields the practices and scientific culture is increasingly internationalised. It can also be argued that (at least some) states still play a very strong role in fostering balanced territorial developments, allocating role, responsibilities and funding across layers of government, and providing citizens with an accountable form of democratic input. All knowledge is political and urban knowledge is especially so. To some extent then making the case for cities is, inevitably, a case for greater decentralisation. The problem, then, becomes one of positioning urban science to encourage the application of the positive roles of central government on questions of urbanization while ensuring that states are not alienated by the growing profile of ‘local’ issues. Ideally, Panel members suggested, a global urban science agenda will remain alert to multi-scale dynamics and not foster an alternative world of urban governance detached from the system of national and international relations.

As several experts pointed out, developing sound national urban strategies and making a thorough

effort at aligning those to Agenda 2030 can be a fruitful entry point to the challenges at hand here. They can, for instance, become useful to think the relationship between national territorial development and equity, to align urban policy with national development strategies (including rural) and to feed into global sustainability objectives as set out in international agreements. This can also provide a useful mechanism to tap into the expertise of national universities for the development of national urban strategies.

If experts in the Panel pointed at the state-centric bases of university funding, they also acknowledged in this context how such bias can be turned to a part advantage, with universities playing a key bridging role between local and national and coalitions of national-local-academic actors delivering on sound multi-scalar efforts. In return, national urban policies can also contribute to identifying pressing urban challenges universities can help solve, as well as education and research priorities. Interestingly, some Panellists pointed out somewhat ironically to the Northern bias in academia, it is “deep in the South” (sic) that some of the best examples of this are now flourishing. There is a need to learn from models such as Chile’s National Council for Urban Development which contributes scientific expertise towards national urban policy. This however calls, first and foremost, for an openness to discuss North and South models, and a bigger conversation on the structure of science cooperation and advice at the national scale in a way in which any reform pays more explicit attention to the local issues of cities.

The potential has already been proven in a few cases as with the South African example of the Gauteng City Region Observatory flagged by several Panellists as perhaps one of the most widely-known Regional + Metro + University partnership models. GCRO is a collaborative project which builds, and analyses, data on the Gauteng city-region covering 14 million people. The GCRO was established in 2008 between the University of Johannesburg, the University of Witwatersrand, the city of Johannesburg and the Gauteng Provincial Government (GPG). The local government of Gauteng is furthermore represented on the board of the GCRO. The GCRO receives its core funding from the GPG, as well as financial input from the involved universities. The GCRO is based at these two South African universities, however it also extends links to other higher education institutions, think-tanks, knowledge councils, research NGOs and information-exchange networks within the area.

National data initiatives can also produce information that are overlooked in global databases. For instance, in the US, the Big Cities Health inventory has been led by the Chicago Department of Public Health. Equally, in the UK the encounter of a national foresight exercise to understand the future of cities, and the

expertise on ‘civic’ modes of academia in specific universities, has led to the creation of Newcastle City curated by the University of Newcastle for the local communities to think through the pathways for change in the city. This is particularly important in a context where the design of national urban strategies has increasingly been presented as an important corner stone of sustainable urbanization and broader development efforts and has been taken up as an important agenda by actors such as the OECD and UN-Habitat.

“

Rather than dissing the State, we could turn biases into advantages

”

However, greater attention to national frames should not let us not to forget, as some Panellists noted, the growing influence of the region in world affairs offers a unique perspective on ways to cooperate and put forward urban science data which can then shape international agendas. Regional coordinating bodies such as the European Union (EU), Association of South East Asian Nations (ASEAN) or Caricom, in that regard, can provide useful **platforms to strengthen harmonised data collection efforts**. This of course presents us, the Panel notes, with the extra complication of making sure that the data can be compared to one another across regions, not just countries and cities, which some argue might require further standardisation. Yet it also opens up alternative funding streams (like the Horizon2020 programme in the EU), as well as alternative venues for better science-led governance should some national context prevent these in the first place. Efforts such as the Group on Earth Observations’s (GEO) new initiative to map the human planet, including human settlements and infrastructure, is one important step towards developing comparable datasets across countries. Satellite data have the advantage of being collected in a consistent and uniform manner, regardless of geographic location. However, even with remote sensing, issues of standardisation exist, because satellites do not in and of themselves measure ‘urban’, but physical characteristics of ‘urban’, it is thus incumbent on the analyst to infer and interpret the data. Here, local knowledge is essential for improve the accuracy of satellite-based assessments. Regional bodies also play important roles in harmonization of efforts as much as in the circulation of expertise and ideas, and this is in several cases also valid for sub-regional efforts such as those in the Mekong Delta, Scandinavian countries or Pacific states. Equally, national-to-regional links, like the regular Centre for Cities *Cities Outlook* in the UK using Eurostat data, present interesting examples of

attempts to coordinate urban data collection and harmonization efforts at a national scale.

The Panel flagged, for instance, how recent research has highlighted the positive role regional bodies play in incentivising the collection of harmonised and comparable spatial and statistical information about cities (Robin et al., 2017). In Europe, in fact, the function of the European Union as science-policy aggregator has been unequivocal. The EU has supported the collection of city-level information across Member States, as shown by the very large pool of demographic, socio-economic, environmental data available on Eurostat's City Statistics portal (923 cities from all sizes and from across Europe). The EU's regional policy – through standardized reporting and monitoring schemes – has allowed the collection of comparable data from European municipalities. EU-driven efforts to support the harmonization of urban data production now also spans beyond the boundaries of Europe. For example, the European Commission's Joint Research Centre (JRC) has been collaborating with the Group on Earth Observation since 2014 to create the Global Human Settlement Layer. This open access online tool combines satellite imagery with socio economic data to provide GIS information as well urban indicators that will help monitoring the implementation of SDG11 and other SDGs. The platform provides a wide range of information that can be used to design and monitor policies in the field of disaster reduction and crisis management, spatial planning, health policy, population forecast, transport planning, climate change strategies, heritage and conservation.

'Regional thinking' when it comes to science and the future of cities should also acknowledge that there are, as several Panellists flagged, important regional actors at the multilateral and private level that cannot be underplayed. This was clearly the case, in Panel discussions, of development banks like the Asian Development Bank or the Interamerican Development Bank, which have substantial financial impact on countries especially across the 'developing world' and which can offer important alternative pathways for urban action beyond the landscape of UN agencies debated in the previous chapters.

Of course, these actors are not free from many of the challenges and concerns raised in the previous chapter. Yet they are often poorly acknowledged despite being hugely influential in pushing regional agendas and linking local levels with more-than-national aspirations, not least for the SDGs. Needless to say, some debate also took place in the Panel as to the limitation of science-policy links at regional scales, especially as it pertains to perceived replication of national interest politics present at the international scale, the rigidity and complexity of regional funding

mechanisms, as well as the perceived weakness of certain regional institutions.

Yet, in almost a consensus amongst Panellists, discussions of the expert group unveiled the still valuable angle that regions bring about when considering multiple science-policy mechanisms

## AT THE COMMUNITY LEVEL

This report highlighted the importance of accounting for citizens' every day experiences and struggles in the city, and the conducive role urban scientists can play in fostering engagement with local communities throughout their research project – from design to dissemination. As a result, various means of interactions allow to relate information and knowledge from those who are most affected by rapid urbanisation processes – from emerging participatory digital platforms to long-term, qualitative partnerships based on ongoing collaboration.

The important **role of universities engaging with partnerships with local communities** and working with those to shape the content and purpose of an effective, locally relevant, science-policy interface is evident.

First of all, university institutions do not only gather and distribute information, but their environment fostering critical-thinking provides new ideas and interpretations of scenarios vital for urban development. Secondly, in their process of carrying out research, they train individuals who can further explore this, and new, data to provide new takes on it. Thirdly, universities are multi-layered in their institutional structure and the partners they engage with- they work with local communities and governments, with national institutions, and engage in global conversations. By these means, universities form a convening space where private, public and civic actors are able to meet, and global universities could take on a bigger role at being at the interface between UN, government, local entities and private actors. However, the opportunity to

“

A vibrant urban environment requires a certain degree of unpredictability, disorder and randomness to be truly human. If such possibilities do not exist, or are not accounted for, we would be left with a cold and mechanical urban setting in which people are forced to follow a carefully planned script.

”

take on this position with prominence is often hindered by the availability of funding, causing universities to work within rather narrow disciplinary niches, and focusing on research output that do not necessarily benefit, or speak to, local communities.

In addition, it is of interest to not only look at what type of data is being produced and what it entails post-analysis, as well as who this information is being collected from and its impact on the collected outcome, but also the response of citizens to the technologies used

Currently, private corporations such as Google gather the type of data of citizens applicable to urban science research through extensions such as Google Maps and Google News. For the urban science community, the question of the connected role of big corporations for data collection is thereby raised, including its extent. Furthermore, such methods for data collection raise further issues in relation to data integrity and privacy. Additionally, there is an issue of the relevance of such technology in contexts that lack the infrastructures for data collection and analysis. Moreover, and relatedly, even when this type of data exists, they do not necessarily feed into better decision-making or more just policies, which again points to the need to ask who produces data, and for what purpose. In other words, **more data points do not necessarily lead to better decision making**. As a result, bottom-up engagement also needs to focus on building collaborations with community organizations and citizens that may instead be creating urban change directly through community projects- by creating infrastructures for social engagement.

## AT THE LOCAL LEVEL

Ultimately, an agenda for reform of science-policy interaction in and for cities cannot do without local actors. The Panel's debates and discussions, perhaps in stark contrast to some of the national-level negotiations around the Habitat III process, continuously related back to the city and 'situated' communities that, in the end, are in the very midst of urbanisation.

To enhance the science-policy interface at a local level, it is useful to draw from successful examples. Ahead of the 2030 Agenda, as

discussed in chapter 1, it was observed that the institutionalisation of local movements and their collaboration led some successful emphasis to be placed on urban topics in frameworks like the SDGs, Paris or Sendai. The Panel noted that, currently, local governments are driving innovation within several areas in higher governments, including climate change. Good governance by both local and 'higher' governmental institutions is characterised by the consideration for social movement and less advantaged individuals and their voices.

Local governments have stronger ties and access to gaining insight of these, and develop innovation accordingly, which could in turn be valuable in the implementation of and reporting on NUAs and SDGs. Information from citizens and communities, must be fed toward city governments. Although a rarity, and without numerous examples of clear success, it has been suggested that a chief local scientific advisor would be worthwhile.

The Panel explored and debated the usefulness of 'chief scientists' in cities, by pointing at both the validity of these types of positions to build bridges between academia and everyday policymaking, but also the limits that advisory posts might have in actually swaying local executives and garnering substantial resources for university collaboration. Some also pointed at the fact that national models of science advice might not easily translate into the needs of the local reality that cities face, and that greater innovation on these fronts has to be tested and tried.

The Panel then recognised that other forms of science-policy links might be as valuable as a **reform of science within local government**. In South Africa, this type of system has proved to be highly beneficial for scientifically based urban management in the Gauteng city-region. This system built on co-production on knowledge and capacity, has constituted the Gauteng City-Region Observatory, the Universities of Johannesburg and Witwatersrand, as well as the Gauteng Provincial Government. Other initiatives like the Mistra Urban Futures program have explored how international commitments such as the Sustainable Development Goals, and SDG11 on human settlements in particular, could be implemented at the local level, bringing together universities and local governments from four cities in this endeavour. At the international scale this is now recognised in the Executive Office of the Secretary General of the UN (under the aegis of the Deputy Secretary) via the "Local2030" partnership program aimed at enhancing local appreciation and implementation of the SDGs beyond national and multilateral action. Yet cities are also deploying mufti-stakeholder models similar to this and to the example of, amongst others, GCRO in South Africa, to develop joint commitments to science-policy action. In Melbourne for instance, the City Council and the University of Melbourne have made substantial

“

If this is an 'urban' age, then at the end of the day it is in the city that we should experiment

”

“

Co-design, co-production of knowledge and co-implementation are the key conditions for integrated knowledge and for this knowledge to be translated into effective strategies.

”

joint research agendas.

joint investments in the set-up of a common City of Melbourne Chair of Resilient Cities, linked to the city’s participation in the Rockefeller 100 Resilient Cities programme, which is facilitating the near everyday interaction of university and local government experts, secondment of researchers and development of

This is a mode of operation that the University of Cape Town has also tested successfully via its African Centre for Cities, and that holds in the eyes of the Panel much promise at to successfully re-thinking the ways in which we bridge town-gown divides. These are also initiatives that can go hand in hand with greater community engagement as and if universities begin to reconcile their global aspirations with their local impact and responsibilities. Almost unanimous agreement was then present in the Panel in arguing that more of these are needed and can be built with support from national and regional bodies (e.g., the European Union and Association of Southeast Asian Nations) as much as multilateral funders.

## 5

## RECOMMENDATIONS

Throughout its discussions, the Panel was centred on understanding different and, most importantly, collaborative ways to unpack today's urban challenges when it comes to science-policy linkages. This meant not privileging a disciplinary angle or engineering a consensus on how an 'urban science' could be created.

In this spirit, recommendations by the Panel come on two levels: a set of more aspirational and normative suggestions as to how the urban science-policy interface can be enhanced are coupled with sub-propositions which trace more explicit pathways to action and implementation. This second layer is not intended to be an exclusive list, nor a recipe to be followed literally. Rather, it offers practical options in what Experts see as feasible and achievable in the near future to chart a better role for science in the future of cities.

## 1

**Global urban challenges need a global urban science that reaches out across disciplines, is geared towards impact, and is accountable to its role in shaping cities**

- |   |  |  |  |
|---|--|--|--|
| <p><b>1.1</b><br/>Disagreement and divergence of opinions on urban issues should be encouraged and cultivated: urban science needs to be a collaborative and overarching field, not a new discipline displacing existing expertise, simultaneously cultivating and bridging disciplinary diversity.</p> | <p><b>1.2</b><br/>The management of science at national, regional, international and private scales should allow for more open interdisciplinary peer reviewing and adjudication of funding schemes, whilst also encouraging foresight and long-term thinking.</p> | <p><b>1.3</b><br/>Training programs need to be considered more clearly in the sciences' capacity to impact the practice.</p>   | <p><b>1.4</b><br/>This needs to be geared towards the development of experts that also have a breadth of cross-disciplinary engagement skills, and enable life-long learning as much as accreditation by professionals</p> |
| <p><b>1.5</b><br/>Research-to-education (and vice versa) processes need to be included in the academic evaluation of individuals and institutions.</p>  | <p><b>1.6</b><br/>The sciences, natural and social (including the arts as much as legal and management sciences), need to strive to build more explicit and reputable venues for joint discussion, review and collaboration.</p>                                   | <p><b>1.7</b><br/>A global assessment of urbanisation needs to be sanctioned at UN level and given the capacity to act in bringing together what we currently know of global urban trends and challenges beyond selective studies, comparative rankings and national datasets.</p> |  |

## 2

### **Reviews and reforms of the role of cities within the multilateral system are long overdue, and need to go hand-in-hand with the implementation of the 2030 Agenda**

- 2.1** Relevant elements of the United Nations system need to be rapidly reformed to consider the pivotal role of cities in advocating, exchanging information and taking action on today's most pressing urban challenges: a scientific assessment of, and action plan for, the status of cities in multilateral processes is urgently needed.
- 2.2** Following the Secretary General's 2017 High-Level Panel on UN-Habitat and the NUA, a working group on the future of 'global urban governance' should be established to encourage more explicit multi-scalar discussions and review of blind-spots, controversies and lock-ins.
- 2.3** Clear implementation-oriented plans for the New Urban Agenda need to be put in place to include local, regional and community actors and offer explicit recommendation as to how to implement the targets embedded in SDG11 and across the wider SDG spectrum. The work of Global Urban Campaign and Taskforce can be (re) purposed in this direction but needs wider UN sanctioning.
- 2.4** Efforts at including an explicit global urban assessment of key international challenges, like that of the CitiesIPCC in climate, need to be undertaken across all major frameworks around Agenda 2030, as well as in key areas that might be silenced in these.
- 2.5** This assessment can be undertaken by a purpose-built international panel of experts, gathering academia and other key sources of urban research, not simply for the purpose of reporting but also with a clear intent at community building to further open up collegiality in global urban science

## 3

### **The role of the private sector needs to be rebalanced towards capacity building and accountable input where the most pressing challenges are**

- 3.1** Akin to the Good Humanitarian Donorship in aid, major urban philanthropies can sign up and implement a 'Good Urban Donorship' code of conduct geared towards ethical developmental practices and against unnecessary earmarking
- 3.2** Data asymmetries and scientific capacity gaps are some of the most concerning matters today that need swift and effective action: the private sector has the potential to be a positive force for change but both data and funding need to be made more explicitly accountable
- 3.3** A systematic review of the publishing sector's role in charting what science influences what urban processes is urgently needed: a cross-company working group on urban data with the major academic outlets should be established in parallel with scholarly and policy efforts detailed in this report.
- 3.4** A global task force on the role of consultants in agenda-setting and implementation of major international frameworks is needed: rather than background actors, these entities need to be considered carefully as part of the bigger picture of global urban governance

## 4

### **National governments and regional actors need to become pro-active advocates of urban innovation for sustainability**

- 4.1** Mainstream urban commitments and aspirations from the SDGs, Sendai Frameworks, New Urban Agenda and similar 'Agenda 2030' items relating to cities in National Urban Plans
- 4.2** Develop national-level exercises to understand the trends, pressures and futures of a country's cities, with the explicit intent of considering national-level tactical areas of investment but also mobilising domestic expertise in universities and research institutes into national conversations.
- 4.3** Encourage the development of regional 'urban agendas' (akin to the EU Urban Agenda) to implement NUA/SDG11 aspiration in relation to particular local geopolitical/geo-cultural needs of different areas of the world
- 4.4** Establish a cross-regional advisory panel that links major regional bodies (e.g. ASEAN, Caricom, African Union, EU etc.) on urban issues and encourages the cross-fertilisation of urban action
- 4.5** Develop an international assessment of current funding sources and projected funding requirements by geography and theme (e.g. under the aegis of UNESCO) to better understand the in-built biases in resourcing urban academia.
- 4.6** Encourage the adjustment of national science advisory schemes towards a more explicit urban capacity, linking local reforms (see below) to national efforts

## 5

### **Experiments in science-policy collaboration at the local level are fundamental. Academia and local governments should take tangible steps towards joint investments for science-policy collaboration**

- 5.1** Involve universities, or city-wide university collaborations, directly in the processes of strategic planning and city-to-city networking
- 5.2** City-regional and metropolitan science-policy mechanisms, as 'urban observatories', need to be supported and taken seriously by both universities and local governments, but with the help of the UN system
- 5.3** Include peer review processes within the production of major private sector and city network datasets, engaging in scholarly outputs as much as reports from these analyses, including clear outlines of methodologies
- 5.4** Create jointly supported university posts, institutes and networks that share the responsibility and accountability for applied urban research between local authorities and university executives.
- 5.5** Include peer review bodies within the production of city network datasets (e.g. on climate, culture, risk or governance), aim to produce scholarly outputs as much as policy reports from these analyses, and acknowledge more explicitly lessons learned from the difficulties and advantages of these collaboration



## REFERENCES

The list below offers a more specific detail of texts and sources the Expert Panel proceedings and the expert interviews drew upon in formulating this report.

- Acuto, M., & Parnell, S. (2016). Leave no city behind. *Science*, 352(6288), 873-873.
- Acuto, M., Parnell, S., & Seto, K. C. (2018). Building a global urban science. *Nature Sustainability*, 1(1), 2.
- Alberti, M. 2016. *Cities That Think like Planets: Complexity, Resilience, and Innovation in Hybrid Ecosystems*. Seattle: University of Washington Press.
- Bai, X., A. Surveyer, T. Elmqvist, F. Gatzweiler, B. Gunerald, S. Parnell, A. Prieur-Richard, P. Shrivastava, J. Siri, M. Stafford-Smith, M. Toussaint, and R. Webb (2016): Defining and advancing a systems approach in cities. *Current Opinion in Environmental Sustainability* 23: 69-78.
- Bai, X., Elmqvist, T., Frantzeskaki, N., McPhearson, T., Simon, D., Maddox, D., . . . Roberts, D. (2018). New Integrated Urban Knowledge for the Cities We Want. In T. Elmqvist, X. Bai, N. Frantzeskaki, C. Griffith, D. Maddox, T. McPhearson, et al. (Eds.), *Urban Planet: Knowledge towards Sustainable Cities* (pp. 462-482). Cambridge: Cambridge University Press
- Barnett, C., and Parnell, S. (2016) Ideas, Implementation and Indicators: Epistemologies of the post-2015 Urban Agenda, *Environment and Urbanization*, 28(1): 87-98.
- Batty, M. (2008). The size, scale, and shape of cities. *Science*, 319(5864), 769-771.
- Batty, M. (2013). *The new science of cities*. MIT Press.
- Batty, M. (2013). A theory of city size. *Science*, 340(6139), 1418-1419.
- Bettencourt, L. M. (2013). The origins of scaling in cities. *Science*, 340(6139), 1438-1441.
- Bettencourt, L.M.A. (2013). The Kind of Problem a City Is. SFI WORKING PAPER: 2013-03-008.
- Bettencourt, L., & West, G. (2010). A unified theory of urban living. *Nature*, 467(7318), 912.
- Bettencourt, L. M., Lobo, J., Helbing, D., Kühnert, C., & West, G. B. (2007). Growth, innovation, scaling, and the pace of life in cities. *Proceedings of the national academy of sciences*, 104(17), 7301-7306.
- Birch, E. L. (2016). A Midterm Report: Will Habitat III Make a Difference to the World's Urban Development?. *Journal of the American Planning Association*, 82(4), 398-411.
- Brenner, N., & Schmid, C. (2014). The 'urban age' in question. *International journal of urban and regional research*, 38(3), 731-755.
- Brenner, N., and Schmid, C. (2014). Planetary Urbanization, in Brenner, N. (ed.) *Implosions/Explosions: Toward a Study of Planetary Urbanization*. Berlin: Jovis, pp. 160-163.
- Moonen, T., Clark, G., Feenan, R., Kelly, J. & W. McBryde. *Decoding City Performance: The Universe of City Indices 2017*. London: Jones Lang Lasalle, 2017.
- Dellas, E. and F. Schreiber (2018): Follow-up and Review of the New Urban Agenda. *Planning Theory and Practice* 19 (1): 133-137.
- Dellas, E., Carius, A., Beisheim, M., Parnell, S., & Messner, D. (2018). Local and regional governments in the follow-up and review of global sustainability agendas. Berlin/Brussels: adelphi. *Cities Alliance*.
- Elmqvist, Thomas, Xuemei Bai, Niki Frantzeskaki, Corrie Griffith, David Maddox, Timon McPhearson, Susan Parnell, Patricia Romero-Lankao, David Simon, and Mark Watkins, eds. *The Urban Planet: Knowledge Towards Sustainable Cities*. Cambridge: Cambridge University Press, 2018.
- Ford, G. (1913) The City Scientific. *Engineering Record* 67 (May 17, 1913): 551-52
- Forrester, J.W. 1969. *Urban Dynamics*. Pegasus Communications.
- Fragkias, M., Güneralp, B., Seto, K. C., & Goodness, J. (2013). A synthesis of global urbanization projections. In *Urbanization, biodiversity and ecosystem services: Challenges and opportunities* (pp. 409-435). Springer, Dordrecht.
- Geddes, P. 1915. *City in Evolution*. London: Williams and Norgate Ltd.
- Halle, M. and R. Wolfe. *Follow-up and Review for the 2030 Agenda: Bringing coherence to the work of the HLPF*. IISD Policy Brief. IISD: Winnipeg, 2016.
- Hodson, R. (2016) Urban Health and Well-Being, *Nature*, 531: 7594.
- ICSU. *A Guide to SDG Interactions: From Science to Implementation*. Paris: International Council for Science, 2017.

- Ljungkvist, J., Barthel, S., Finnveden, G., and Sörlin, S. (2010). The Urban Anthropocene: Lessons for Sustainability from the Environmental History of Constantinople, in Sinclair, P.J.J., Nordquist, G., Herschend, F., and Isendahl, C. (eds.), *The Urban Mind: Cultural and Environmental Dynamics*. Uppsala University: Department of Archaeology and Ancient History, pp. 367–390.
- Lynch, K. 1961. The Patterns of the Metropolis. *Daedalus* 90:79–98.
- McPhearson, T., S. Parnell, D. Simon, O. Gaffney, T. Elmqvist, X. Bai, D. Roberts and A. Revi (2016) Scientists must have a say in the future of cities. *Nature* 538: 165–166.
- McPhearson, T., Haase, D., Kabisch, N., & Gren, Å. (2016). Advancing understanding of the complex nature of urban systems. *Ecological Indicators*, (70), 566–573.
- Mitlin, D., and Satterthwaite, D. (2013) *Urban Poverty in the Global South: Scale and Nature*. London: Routledge.
- Misselwitz, P., M. Rosa Muñoz, J. Salcedo Villanueva and A. Walter (2016) The Urban Dimension of the SDGs: Implications for the New Urban Agenda. Berlin: Urban Catalyst and Habitat Unit.
- Mumford, L. 1961. *The City in History*. New York. Harcourt.
- Nilsson, M., D. Griggs and M. Visbeck (2016) Map the interactions between Sustainable Development Goals. *Nature* 534: 320–322.
- Parnell, S. (2018). Globalization and Sustainable Development: At the Urban Crossroad. *The European Journal of Development Research*, 30(2), 169–171.
- Parnell, S. (2016). Defining a global urban development agenda. *World Development*, 78, 529–540.
- Parnell, S., & Robinson, J. (2017). The Global Urban: Difference and Complexity in Urban Studies and the Science of Cities. Hall, S., & Burdett, R. (Eds.). (2017). *The Sage handbook of the 21st century city*. SAGE, 13–31.
- Ratti, C., & Helbing, D. (2019). The Hidden Danger of Big Data. In Helbing, D, ed. *Towards Digital Enlightenment* (pp. 21–23). Springer, Cham.
- Ratti, C., & Claudel, M. (2016). *The city of tomorrow: Sensors, networks, hackers, and the future of urban life*. New Haven: Yale University Press.
- Rosenzweig, C., Solecki, W., Hammer, S.A., and Mehrotra, S. (2010). Cities Lead the Way in Climate-Change Action, *Nature*, 467(7318): 909–911.
- Rudd, A., Simon, D., Cardama, M., Birch, E. L., & Revi, A. (2018). The UN, the Urban Sustainable Development Goal, and the New Urban Agenda. In Elmqvist, Thomas, Xuemei Bai, Niki Frantzeskaki, Corrie Griffith, David Maddox, Timon McPhearson, Susan Parnell, Patricia Romero-Lankao, David Simon, and Mark Watkins, eds. *The Urban Planet: Knowledge Towards Sustainable Cities*. Cambridge University Press, 2018, 180.
- Sampson, R.J. (2019) 'Foreword: the City for the Twenty-first Century' in Park, R.E. and Burgess, E.W. *The City*, updated edition. Chicago: University of Chicago Press, 2019 (1925).
- Sampson, R. J. (2018). Neighbourhood effects and beyond: Explaining the paradoxes of inequality in the changing American metropolis. *Urban Studies*, First Published online October 2, 2018, DOI: <https://doi.org/10.1177/0042098018795363>
- Seitzinger, S.P., Svedin, U., Crumley, C.L., Steffen, W., Abdullah, S.A., Alfsen, C., Broadgate, W.J., Biermann, F., Bondre, N.R., Dearing, J.A. and Deutsch, L., (2012). Planetary stewardship in an urbanizing world: Beyond city limits. *Ambio*, 41(8), pp.787–794.
- Seto, K. C., Fragkias, M., Güneralp, B., & Reilly, M. K. (2011). A meta-analysis of global urban land expansion. *PloS one*, 6(8), e23777.
- Seto, K. C., & Ramankutty, N. (2016). Hidden linkages between urbanization and food systems. *Science*, 352(6288), 943–945.
- Simon, D., H. Arfvidsson, G. Anand, A. Bazaz, G. Fenna, K. Foster, G. Jain, S. Hansson, L. Marix Evans, N. Moodley, C. Nyambuga, M. Oloko, D. Chandi Ombara, Z. Patel, B. Perry, N. Primo, A. Revi, B. Van Niekerk, A. Wharton and C. Wright (2016) Developing and testing the Urban Sustainable Development Goal's targets and indicators – a five-city study. *Environment and Urbanisation* 28 (1): 49.
- Simon, D., & Schiemer, F. (2015). Crossing boundaries: complex systems, transdisciplinarity and applied impact agendas. *Current Opinion in Environmental Sustainability*, 12, 6–11.
- Solecki, W., Seto, K. C., & Marcotullio, P. J. (2013). It's time for an urbanization science. *Environment: science and policy for sustainable development*, 55(1), 12–17.
- Torrey V. *Science and the City* Washington, DC: US Department of Housing and Urban Development, 1967
- Wachsmuth, D., Cohen, D. A., & Angelo, H. (2016). Expand the frontiers of urban sustainability. *Nature* 536(7617), 391.
- Watson, V. (2009) Seeing from the South: Refocusing Urban Planning on the Globe's Central Urban Issues, *Urban Studies*, 46: 2259–2275.

## FUNDING AND SUPPORT

The Expert Panel on Science and the Future of Cities was set up as a collaboration between University College London and *Nature Sustainability*, the new interdisciplinary journal of *Nature Research* in the aftermath of the third United Nations Conference on Housing and Sustainable Urban Development (Habitat III). The management and development of the panel involved financial support from University College London and the University of Melbourne. Additional event support was provided by the then-International Council for Science (ICSU, now International Science Council) as well as the Prince of Wales's Charitable Foundation International Sustainability Unit (ISU).

***Nature Sustainability*** was launched in January 2018 by Nature Research and is an online-only monthly journal publishing the best research about sustainability from the natural and social sciences, as well as from the fields of engineering and policy. Part of the journal's mission is to facilitate a cross-disciplinary dialogue around sustainability issues, and narrow the gap between research and policy making. *Nature Sustainability* supported the development, convening and report production for the Panel.

The **UCL Grand Challenge of Sustainable Cities** is one of the six major Grand Challenges of University College London which, since 2009, have aimed to bring researchers together to set agendas for future research while building bridges between academia and external partners. The Grand Challenge of Sustainable Cities has supported the UCL City Leadership Lab, a research group within UCL's Department of Science, Technology, Engineering and Public Policy, in convening the London workshop of the Panel and carrying out interview for the Panel's discussions in 2017.

The **Prince of Wales's Charitable Foundation International Sustainability Unit (ISU)** was established between 2010 and 2018 by The Prince of Wales, to address critical challenges facing the world, particularly the question of how to sustain the health of the environment while advancing development goals. ISU has supported Panel convening in 2017.

The **University of Melbourne's Faculty of Architecture, Building and Planning**, incorporating the Melbourne School of Design (MSD), is a creative and people-oriented built environment faculty in Australia's leading research-intensive university. Within the Faculty, the Connected Cities Lab is centre of excellence designed to address the challenges that city leadership faces, and the information it needs, in an interconnected and increasingly urbanised planet. The Lab has supported Panel events and report production in 2018.

The **International Science Council** (formerly ICSU at the time of establishment of the Panel). The International Science Council (ISC) is a non-governmental organization with a unique global membership that brings together 40 international scientific Unions and Associations and over 140 national and regional scientific organizations including Academies and Research Councils. The ISC was created in 2018 as the result of a merger between the International Council for Science (ICSU) and the International Social Science Council (ISSC). It is the only international non-governmental organization bringing together the natural and social sciences and the largest global science organization of its type. ICSU supported Panel convening and research in 2017 and 2018.

nature  
sustainability



International  
Science Council



INTERNATIONAL  
SUSTAINABILITY UNIT



CONNECTED  
CITIES –  
– LAB

Melbourne  
School of Design  
The University  
of Melbourne

