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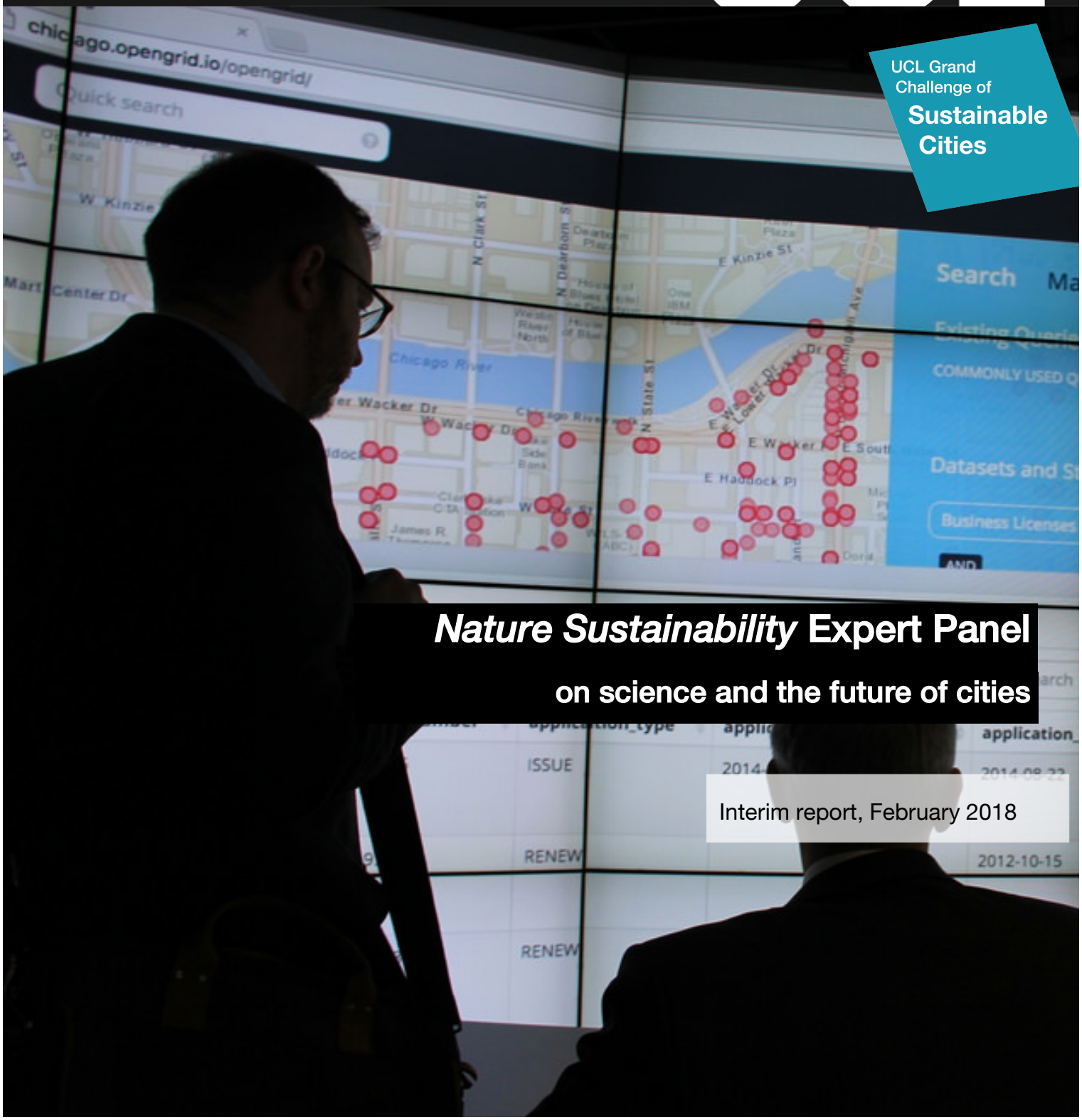

UCL Grand Challenge of **Sustainable Cities**

Nature Sustainability Expert Panel

on science and the future of cities

Interim report, February 2018

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Cover image: City of Chicago Chief Data Officer Tom Schenk at OpenGrid Launch, UIC Electronic Visualization Laboratory, January 19, 2016. Image by Daniel X. O'Neil.

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This Research report has been developed by the UCL City Leadership Laboratory, a research group of UCL's Department of Science, Technology, Engineering and Public Policy, and the Melbourne School of Design, within the Faculty of Architecture, Building and Planning at the University of Melbourne. It is intended to inform research, policy and public discussions on the present and future of cities. The authors have sought to ensure the accuracy of the material in this document, but they, the Lab and UCL STEaPP will not be liable for any loss or damage incurred through the use of this report.

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Summary

This short interim report introduces the work of the *Nature Sustainability* Expert Panel on science and the future of cities. Developed in partnership by University College London's City Leadership Lab and *Nature* Sustainability, and supported by UCL's Grand Challenge of Sustainable Cities, the expert panel focuses on the urban science-policy interface for global sustainability. It offers a first look into the themes that will be developed in the upcoming Panel's report (July 2018). The document here discusses existing tensions in the current global urban science landscape and explores how those could be overcome to make existing urban research more responsive to global urban sustainability challenges.

Global urban science: hot topics and blindspots

The Panel emphasised the difficulty of defining the contours of global urban science and its policy relevance. For instance, climate change and urban resilience have been the focus of much of global discussions on cities in recent years. Some experts have argued that linking rapid urbanisation to the issue of climate change has been beneficial in bringing together a large community of scientists working on disaster and risk, and other related themes such as urban growth (especially issues of sprawl and density), smart cities, big data, sustainable transportation, economic transition and the low carbon agenda. Some of these themes have furthermore gained traction in academic, policy and business circles. For example, the smart city and big data conversations coalesced interest from big businesses, researchers as well as national and local governments worldwide.

While the need for a deeper engagement of urban science with the "real world" has been mentioned as fundamental by most experts, the question of who, in the real world, should be involved in those conversations remains highly debated:

"The dominance of smart cities (as a topic of conversation) is unbearable. We only contribute to make cities turn sexy for corporations."
(expert quote)

"We need to direct urban policy to the right sort of organizations (not only governments but also multinationals etc.). The nature of urban policy resides where it is located."
(expert quote)

It has been argued that by only serving existing or trending (research) needs, urban scientists run the risk of overlooking important issues that are ignored by "real world" actors; this blindness to less popular topics might contribute to reinforce undesirable urban patterns of inequalities, segregation and uneven development.

"The urban science community does not speak the language of those it is supposed to serve. It does not speak to poor people."
(expert quote)

Other, more recent themes are emerging in global discussions related to urban sustainability: issues around urban health, as well as more systemic approaches to urban dynamics ("science of cities") have recently gained greater attention in academia and beyond. Even more recently, and fuelled by the ongoing refugee crisis, the question of how cities can integrate an ever-increasing number of displaced people, and how urban systems can cope with growing population pressures have been the focus of scholarly and policy research.

In addition, while experts recognise that climate change can constitute an interesting entry point to tackle urban issues in a more holistic, multidisciplinary way, it remains insufficient to fully understand problems of poverty, conservation of biodiversity, governance and urban management, to name only a few. Indeed, as highlighted by many experts, pressing challenges remain below the radar, even when they have been the focus of a large body of academic research (sometimes for a very long time), and feature very low on the list of global urban "hot topics". For instance: issues around waste, water and sanitation; the social construction of risk and issues of adaptation; urban inequalities;

informality; questions related to urban governance, and the role of non governmental actors in city developments. Despite being the subject of ample academic research, these themes have not shaped policy discussions (or if they have, they have to a lesser degree than climate change) around the future of our rapidly urbanising planet.

"Part of the problem is that urban science is structured around flavour of the month: smart cities, resilience, migrants and refugees - we only react in the face of crisis and challenges and we did 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?"
(expert quote)

In addition, the scholarly community was rarely mentioned as a leading voice in global conversations. In fact, apart from a handful of individuals and regional hubs such as the African Centre for Cities (ACC), the Indian Institute for Human Settlements (IIHS) in the Global South, LSE Cities and MIT Sense Lab in the global North, as well as the International Institute for Environment and Development (IIED), most dominant voices in global conversations were identified outside of the academic realm. Large philanthropic organisations such as Rockefeller, but also Bloomberg and Ford were seen as prominent actors in the global urban policy landscape; equally, non governmental actors such as SDI or Cities Alliance were also highly visible in global conversations; leading Mayors and city networks (C40, ICLEI) were often referred to as key players, alongside private sector consultancies (Arup, Atkins) or big businesses, especially in the IT sector, including IBM, Cisco, Siemens, to name only a few. As a result, many experts pointed out the lack of visibility and inclusion of urban "knowledge holders" (be that urban scientists in academic institutions or ordinary citizens) in global policy discussions.

Central issues:
Which key themes and institutions are driving today's global discourse(s) on cities? How are existing global initiatives (HIII, SDGs, Paris Agreement, Sendai…) intersecting with 'cities' agendas and issues?

A global scientific community?

"What does "urban science community" mean? What is the definition? How are you flagging this community? No, there isn't any community. And if there was one, it means so many things for different people: you have the data science people, the engineers, the social science side, the public policy management of cities etc. It needs further defining."
(expert quote)

The lack of leadership in "urban science" also stems from the lack of coherent and easily identifiable scientific community working on issues that relate to sustainable urbanisation. Cities have been the subject of ample research from academic institutions across a very wide range of discipline, but a number of challenges make it very hard to form a coherent and cohesive scientific community.

Epistemological challenges. Different disciplines, with their own epistemologies, have been looking at cities. What is "the urban"? what is "urban science": a science of cities? a scientific approach to cities? is science only academia? There exist very distinct ways of knowing and distinct ways of engaging with complex urban phenomena. How the academic urban scholarship manages to reconcile these while respecting the diversity of approaches in a truly trans-disciplinary manner is a key challenge to the consolidation of an urban science community. There is also a tension between the need to provide thick descriptions of urban phenomena versus more policy relevant and actionable knowledge. Some disciplines have been more actively engaging with the policy world.

Methodological challenges. Different disciplines bring with them distinct methodological approaches. Which type of science policy interface would be able to integrate ethnographic work, data analytics, system thinking, econometrics, qualitative research, etc.? and to make them policy-relevant?

Geographical tensions. Centres of knowledge production are mostly located in the global North; English is the dominant language of urban science. But despite this bias towards Northern institutions, many experts identified the ACC and IIHS as central

actors in the urban science landscape, showing that a handful of institutions of the global South are highly visible and relevant.

"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)

Even when looking at influential research institutes located in the global South, these are mostly communicating in English. This represent a key barrier to the dissemination of any research conducted in other language.

Central issues:
Can urban theory/research exist as a community despite its internal contradictions? Is it possible to accommodate this diversity of epistemologies, methods and experiences of the urban? Should global urban scientific leadership encourage the production of thick descriptions or should it be focusing on general urban trends?

A global 'cities' agenda?

Many panellists envisaged 2015 as a pivotal moment for cities in global policy. Three years on, there is a political momentum around the SDGs, a political momentum around globalisation and the challenges is raises. Within that, a number of factors are driving current interests in the "urban question". The extent to which the scientific community can position itself to harness these is fundamental.

A thirty years' momentum? The global urban science community should be wary of past failures

It is not the first time we witness momentum around cities or local governments. Back in 1992, with the Agenda 21, there was a moment where interface and commitment were there and much more focused on implementation than what exists today. So perhaps the global scientific community needs to think harder about what can be done differently and learn from failures to take this past opportunity forward.

Cities are at the forefront of developing innovative solutions to global urban challenges – if it looks at the right ones.

There a has been an institutionalisation of local movements and of the collaboration between local governments which has lead to the inclusion of the urban question into various international agreements since 2015. Global networks representing cities are gaining power. A lot of innovation in government, and climate change particularly, is being driven by local governments. What drives good governance is accountability to social movements and disadvantaged people and there is a phenomenal range of innovation that is completely outside the New Urban Agenda but is yet happening in cities. Most of it is unreported, as, for instance in Latin America, because it is communicated in Spanish or in Portuguese. The same goes for research in Chinese. There are very few places that publish work that is not conducted in English (*Environment and Urbanisation* is one example where work can be submitted in original language and then translated into English – and where the journal supports translation fees).

In addition, the extent to which cities are equipped with the necessary knowledge to overcome pressing challenges also depends on what urban science has to offer to the policy world. The urban research landscape is very much dependant on and shaped by its funding structure. Therefore, a cohesive urban science community should also have an explicit mandate to shape this funding landscape, to ensure the breath and depth of global-urban challenges are being looked at, bringing in various disciplines (not only the ones that are explicitly urban).

Urban science needs to accompany the move towards experimentation (from governments, private sector, civil society groups)

Depending on where you sit, we are moving away from urban planning and strategic development to government by experimentation. The type of knowledge needed in the experimental city is different from the type of knowledge you need in a centrally-planned city. Within that, systemic

approaches that bring together different expertise and different approaches to understanding urban processes (from global flows of capital to street level interactions, architecture, public health) is fundamental.

Big international players are focusing their efforts on cities

The last ten years have been marked by a growing interests of philanthropies for the urban question. Many charities and philanthropies have come into that space funding city networks, for instance Rockefeller Foundation (Resilience), Bloomberg (smart cities, city leadership, urban health) and Bill and Melinda Gates Foundation. Many multilateral agencies now also want an urban space or a unit focusing on urban questions. International consultancies have their own urban units which contributes to producing more urban research. This is a key aspect of contemporary interests towards cities but also a key challenge for the urban research community. Very often, good research is produced but it is locked in a format which cannot be updated by local governments, with no access to original data and therefore limiting the longevity of the impact of private consultancies' research.

What appears clear is that many actors are involved in urban knowledge production and that there are many places where that knowledge is scarce, or even inexistent, at least in a policy relevant format. One of the critical issues for the academic community is to identify where this knowledge is needed and to respond to that need. There is a need to identify where policy makers are asking for that knowledge, which consultancies arguably currently do better.

There is a need to take this global moment seriously: with or without *the UN system?*

There is a real tension: is it useful to use the NUA, created by multilateral organizations, as an anchor for global conversations? Or should we really push the idea that UN is irrelevant and that efforts should actually focus on cities? Other multilateral agencies like the WHO previously had phenomenal programs on cities, with working groups organised in a very efficient and innovative way – these were abandoned and only now are they slowly getting back into urban health and the urban science community might benefit from getting them on board early on. The question of getting into the road of international assessment mechanisms is also problematic, when thinking about a strategy that is focusing its efforts on the multilateral system. Apart from one chapter in the IPCC report, there is no mainstreaming cities at all. Assessment processes and multilateral decision making arena are two distinct things. Urban science needs ot be repurposed in relation to these different kinds of international processes.

Shaping the urban momentum beyond the 2030 agenda: towards a proactive urban-science policy interface

If urban science is deemed to go down the road of an international assessment, then it also needs to come up with a strategy to set up the global research agenda and assessment needs in the long run, to avoid being too servient to international agreements and their implementation. Global urban science should not only support the implementation of the SDGs or the NUA, it should go beyond that and identify needs and priorities that are not necessarily accounted for in those agreements.

One of the key questions then becomes: is there enough understanding out there as to why urban knowledge is needed? The urban science policy interface would become a platform that can act as critical friend not just as source of data/validation. The urban science community can do better than the multilateral world looking at much larger timescales than the 2030 agenda. 2030 is tomorrow, and urban science should look into 50 to 100 years timescales. Forecasting science and real-time information on urban processes are of course very important, but should also be informed by back casting science and learning from the past. Understanding why certain things change very fast and some other do not change (e.g sanitation crisis) is essential.

Addressing leadership issues

What appears clear when looking at the global urban science landscape is the lack of leadership, and one of the key challenges is that of a mushroom approach to the urban.

Bringing a fragmented community together

Do we need a unified epistemic community of urban science? There is widespread consensus among the experts group that while the urban science landscape remains fragmented, this matter of fact is not necessarily problematic.

"I would not say that we are either fragmented or united. The community is differentiated but we need multiple epistemologies to approach urban challenges."
(expert quote)

Some experts argue that fragmentation does not really matter after all, the challenge is more to find a strong leadership or leading voice to bring all these voices together in a coherent way. The fact that urbanisation is now recognised as a global issue has contributed to support the emergence of a more connected (yet differentiated) community of urban science. The Habitat III process has generated momentum to foster dialogue and collaboration between researchers, research centres and civil society groups (for instance through the General Assembly of Partners). Yet, many experts fear that this precarious momentum will soon fade away, and that no leading voice is coordinating efforts to highlight the need for urban knowledge in supporting the implementation of the post-2015 sustainable development agenda, in particular the NUA and SDG11.

In that perspective, improving information sharing on a clearly identified platform would help consolidate this community. But even so, whose voices would be the most legitimate to carry this torch? Many experts argue that UN Habitat is not necessarily fit for purpose, and are quite reluctant to identify a leading institution for the urban science/policy agenda.

"The community is there – the fragmentation not so much of a problem, what is lacking is some sort of leadership. What needs to be tackled is coordination at multiple scales, to find a beacon that people could direct themselves towards. Global Health is very fragmented but having WHO points everyone to the same direction in terms of where they need to be advocating for."
(expert quote)

Central issues:
Is there an existing/nascent 'epistemic community' of urban science? What are the challenges to its consolidation? What are its drivers? How does it relate to the global political agenda around cities?

Academia inside-out

While many organizations are claiming their expertise over the urban, understanding what distinguishes universities and academic research from other type of "urban experts" appears crucial. SDG11 and the NUA have offered avenues to think about a global research agenda that would be focusing on informing, and accompanying the implementation of these objectives across a wide range of policy areas. The global academic research community needs to embrace a longer term, critical engagement with policy and also needs to be able to produce research that is policy relevant, beyond those agreements. This implies engaging more seriously in the co-production of research questions. While some experts argued that strategic engagement should be pursued where interest (and funding) lies. Other argued that the role of urban research is to serve the needs of those affected by rapid urbanisation, environmental and social issues, and who currently do not have a voice in the process, as research itself can constitute a formidable tool for capacity building (SDI/Santa Fe/Cities Alliance partnership).
Therefore, academia's modes of engagement with the outside world need to be critically evaluated if one wishes to have an impact on the shape of future urban trajectories. Issues of collaboration, openness, trans-disciplinarity, renewed methodological approaches, the need to communicate in a way that is understandable by a wide range of actors are all equally important. Similarly, understanding how

academic institutions can train the next generation of urban scholars to strengthen their commitment to tackling real world problems is key. Some institutions have started to develop joint PhD programs with local authorities for instance, or students' projects at the master level which allow students to produce research/reports for a non academic audience. These constitute promising examples of how curricula can be redesigned from the inside to be more outward looking.

Central issues:
What does the role of science in the future of cities look like from different academic standpoints? What is the role of scholars and of universities (research, training, engagement)?

Beyond academia

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

Cities have gained traction from a various range of public, private and not for profit actors. Diving deeper into the role of the trend-setters beyond academia, to understand urban science-policy connections, is key for the academic and scientific community to place itself strategically in the global urban knowledge landscape. Initiatives like the Future Earth Urban Knowledge and Action Network constitute a good example of how an inclusive coalition of scientists from within and outside academia can communicate and exchange information about urban challenges and ongoing research agendas. City networks like C40 or ICLEI have also been very vocal in putting cities and mayors at the forefront of global conversations, especially around climate change. Identifying leading voices in the policy sphere would help the urban research community to engage more critically with current policy needs, but also to shape and contribute to the design and communication of solutions that are currently on offer.
The consolidation of an urban science community involves moving beyond academia and including citizens, alongside public and private actors involved in the production of urban knowledge. In this very diverse landscape, building a community that recognises this diversity of voices and finds a way to coordinate their work is a key challenge. The urban science community, and urban scholars more generally, need to be more creative about the ways in which they connect knowledge to policy.

The Panel further identified a need for an urban science that is wary of the politics of cities and the different scales of governance that influence urban trajectories. Connecting research to the right scale of government is indeed fundamental, in some countries like China it is the national scale that is driving urban change. In Africa, there are many areas of planning which are very important, like financing and infrastructure, that are decided between national governments and multilateral organizations. Understanding the geopolitics of urban policy, and identifying central actors within that is essential.

Central issues:
Considering the challenges of the 'cities' agenda, the issues around the urban 'epistemic community' and the urban tensions we confront, who is the 'expert' here? Who should urban research work with to be strategic? Which type of institutional arrangements are needed to achieve a higher degree of strategic engagement?

What makes an urban 'expert'?

The global urban science community needs experts who are linked to politicians and policy-makers. An impactful expert should be able to think and create connexions beyond disciplinary boundaries, identifying new fields of inquiries. In that perspective, being disinterested, curious, impartial and transparent is necessary. An ideal urban expert would be proactive and inclusive, outreaching at various scales. Having a core (topical) expertise resting on a wide disciplinary base appears crucial. The complexity of urban problems requires urban experts to be able to engage with very different types of people, as well as being able to understand their needs, at different scales. Being embedded in the city/place where they are located but also within global networks is therefore important. Curiosity

and working across disciplines however, in the current context, do not necessarily pay off, because the academic reward system does not value or encourage a proactive, curious mind-set. Equally, publishing trans-disciplinary work on policy relevant issues is often difficult due to the structure of academic publishing.

In addition, some panellists pointed out that the culture of dissent should also be encouraged and valued. In that perspective, the ideal urban expert should be able to create safe space for people to express contradicting views whilst respecting each other's position. Not only should urban experts create those safe spaces but they should also be able to translate these contradictions into narratives that are useful and productive from a practical standpoint. The institutional context within which these experts evolve appears essential, as sometimes organizations are a proxy for individual characteristics and foster more inclusive and outward looking behaviours.

In short, discussions amongst members of the Panel highlight how an ideal urban expert would be

- Curious, original and visionary;
- Well connected and able to understand a navigate a system composed of very different types of stakeholders, acting at various scales;
- An expert in her/his field but with a broad disciplinary base which allows to understand how different actors see problems, through distinct analytical lens;
- Charisma is also essential to drive the conversation and input knowledge where it is most efficient to foster change.

To make them thrive, important language and gender barriers need to be removed and overcome; other institutional barriers, even societal ones, related to the type of leadership style that is most highly valued would also need to be overcome.

Unpacking the 'how' of urban science-*policy*

Understanding the main barriers to research translation and solutions to overcome these going forward is essential. The lack of clarity around what urban science is, for whom, and what it pursues, often makes it scantly visible to policy makers and other actors involved in urban developments (community groups, businesses, architects, planners, engineers, etc.). Linking research to implementation implies that urban science is able to shape and respond to urban stakeholders needs.

Building a coherent narrative, linked to practice

> *"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 about economic issues, income inequalities, when you talk to ecologists, it is about green spaces, climate etc. but all of these groups overlap in the end because they have commonalities."*
> *(expert quote)*

Some panellists cited the example of the climate change community as a good example of scientific research that influences policy. They argued that this community has managed to self-organise in a way that has created strong links across disciplines on the one hand, but also between researchers and policy makers on the other hand. The global health research community was also mentioned as an example of how different disciplines, research traditions and epistemologies could work together towards common objectives. Other communities, by linking research to professional activity directly (e.g. in medicine, conservation/heritage with the International Council for Monuments and Sites for instance) have managed to galvanise a network of professionals, government entities and researchers who work collectively in a reflective way.

The urban science community needs to articulate a clearer message about what it is, what it does, what it is contributing to, and who it is for; clarifying the modes of interactions between practitioners (policy makers and practitioners alike) and the research community also appears essential (through the creation of regular international meetings, common objectives, etc.). As mentioned above, while many

experts argue that seeking consensus on the themes to be explored and agreeing on the most pressing urban issues to be tackled can be a way to better coordinate a very diverse and disparate community, others have stressed that what is currently needed is actually quite the opposite. Urban issues are very complex, diverse, locally embedded and therefore, it is important to allow a culture of dissent to emerge, a culture of respectful disagreement among the urban science community. What's more, according to both perspectives, creating forum/institutions for facilitating dialogue is crucial.

Central issues:
How does urban research inform policy? What are important examples of science-policy interaction that can inform the design of an urban science-policy interface?

Urban (science) solutions

There was little agreement among the panellists as to which form the urban-science policy interface should take. Serving the needs of a very wide community of users (city governments, national governments, international institutions, citizens, grassroots movements) whilst also preserving the diversity of the scholar community studying "the urban" is challenging. A number of issues still prevent the emergence of an integrated and policy relevant urban science.

Financial tensions. There is a lack of funding for trans-disciplinary, multilingual research. A lot of the agenda is driven by the private sector and philanthropic organizations who have the money to invest in visible research. In doing so, they shape the research agenda, not always in the most relevant way. A handful of international organizations (UN Habitat, World Bank, ICSU) are funding research on urban science per se but this remains very limited when one thinks about the vast amount of urban information that is still needed. Otherwise, research institutions remain constrained by national funding systems.

Tensions related to the timescale of urban science. Private consultancies are better positioned to produce short term and highly visible urban research that can match policy cycles and policy needs. Academic research often takes much longer: revising the modes of production of academic research (and its system of rewards based on peer-reviewed publications), so as to engage various stakeholders along the way, in a continuous fashion, is necessary to strengthen its policy relevance without losing its depth and breadth.

Lack of dissemination opportunity. It is very difficult to get trans- disciplinary papers published in existing "urban studies" outlets. Environmental journals are still very environment focused. There is a clear absence of journals that break disciplinary boundaries to disseminate trans-disciplinary work that could fall under the umbrella of urban science. Ongoing engagement with policy makers or urban stakeholders more broadly (including the private sector, community organizations, citizens) is essential to some experts but other voices raised concerns about the risk of becoming too servient of the needs of specific actors, at the expense of others. The IPCC model did not always seem to represent a satisfactory avenue to think about the urban science-policy interface and the dissemination of research.

"There were discussion leading up to Habitat III on rather or not we should build an interface such as the IPCC. But I was part of the skeptical ones, because those IP are designed for national governments, we need a local government focus."
(expert quote)

Some experts argue for an IPCC-like, global coordination mechanism involving nation states (especially through the formulation of national urban policies) whilst other argue that it needs to build on leading forces in local governments (e.g. mayors, city networks). Some experts advocate for a strengthening of the work started at Habitat III and with SDG11, but many experts pointed out that UN Habitat remains largely underfunded and lacks legitimacy to support the urban science policy interface.

Another avenue to foster collaboration across

disciplines and increase the policy-relevance of urban science would be the creation of a Global Assessment on Sustainable Urbanisation, building on the targets set out in the NUA and SDGs and on issues that were not necessarily highlighted in those documents. A global assessment could act as a platform to identify pressing challenges in relation to sustainable urbanisation, just as source of data/validation for the implementation of international agreements.

Central issues:
What current examples of institutional collaboration could support the emergence of an integrated science-policy interface? What could be done to improve them? Can we think of solutions to the challenges of academia from 'outside of the box'? What are the risks of becoming "too servient" if urban researchers create stronger link with the policy community?

What are the key links of the science-*policy* connection?

In debates, interviews and roundtables members of the Panel have been highlighting a series of key elements of the science-policy puzzles: individuals, universities, national governments and international actors.

What is the role of individuals?

If you think of a city with millions of people, each person is an individual. How do they see their city? How does rapid urbanisation influence their daily life? How do you integrate these perspectives into urban science? With the emergence of big data and connected devices as tools for decision making, individuals in a massive scale are going to be able to produce real time information. Within that landscape, it is interesting to look at who is collecting the data and what type of individuals are being look at (or overlooked), but also what type of behavioural response those technologies create. For instance, Google maps or Google news is different for every individuals and it is based on your search history etc. Google has an incentive to personalise as much as they can for you. What is the urban science's response to the involvement of big corporations in data collection? Data driven/smart solutions help collect a vast amount of individual information in real time but large parts of urban populations worldwide do not have access to those technologies; equally, localities might not have the infrastructures in place to support the collection of such information. And even if they did, more information does not necessarily mean better decisions. Thinking about the people who do not fit corporate driven models of urban science is essential. In many places, ordinary individuals are shaping cities instead of policy makers, they are service providers, house builders and care workers where there is a lack of service delivery. Other individuals have a more deliberate and identifiable impact on urban developments, for instance those based in universities, NGOs or agencies dealing directly with urban issues. Those need to be engaged with.

What is the role of universities as currently articulated?

Supportive role. Information about urban processes is needed and should be provided by universities.

Critical friend. Typically, universities are also engaged in challenging the status quo and providing new ideas. Questioning global, national and local political agenda, not just accepting what is given.

Educational role. Universities train professionals, workers, people who make the city through various ways, at different stages of their life through different types of education (Bachelor, Masters, Executive/Professional).

Convening role. Universities are multi-layered: at the local scale they interact with communities, governments, other research institutes; at the regional scale they can work with national governments as well as institutions located in the same region; they can also engage in global conversations. Within this landscape, universities can be seen as neutral space where public, private, civic actors meet. Including the voices marginalised

communities can also be the focus of universities. Global universities can be an interface between government entities, UN entities and local universities; but also with private actors. However, current structures of university funding can push higher education institutions to work within narrow niches, which in turn hinders collaboration and undermines universities' role as a convenor and broker.

What is the role of national governments?

National governments are shaping urban trajectories in a number of ways: legal frameworks are invariably national (normative base that shapes science-policy interaction); the macro-economic policy (interest rates, trade etc.) and fiscal policy are also often a national prerogative which shapes cities ability to generate and access finance. Multi-level governance frameworks are decided at the national level and do indeed shape the power and responsibilities cities have. But if the evidence is that cities are thriving and connecting across boundaries, then we might have a basic problem with the state-based reality of the system; science itself is very 'nationalised' in terms of its reference frameworks and underlying institutions as well as funding structure: it currently plays well with states but does it need to be rethought more globally/locally (city focus)? In international affairs, the national government is the ruling entity. In other word, cities do not have an official say in international affairs, they cannot bypass the state when it comes to agreeing on international agreements (unless they offer to do more than what national governments have committed to, for instance with sanctuary cities in the US or recent commitment of a number of US cities to implement the Paris Agreements). Engaging with national governments might therefore be crucial.

What is the role of international actors?

Multilateral institutions need to be putting cities on the radar (in relation to their global challenges). At the global level, there is this capacity to project and think through futures, but obviously there is always this local versus global tension of universally accepted targets (discussed previously). This includes identifying trends and scenarios which are happening across the globe at local levels. One of the key challenges for the urban science at a global level is the need for benchmarking and validation through global comparison; resources need to be harnessed at the global level to allow science to continue its work. Another challenge is that the international system is fragmented, even at UN level: UNESCO holds science portfolio but there is a science agenda in the Secretary General's office, UN Habitat holds cities portfolio, WHO, UNICEF and FAO are tackling some urban issues. There are emergent global processes (e.g. climate systems, global commons, global financial system) that impact urban systems so not adequate to look at the local dissociated from these. Major funding sources (from foundations for instance) are being internationalized. The growing field of science diplomacy which acts at an international level and international actors could connect cities to these geopolitical agendas.

The Expert Panel

*Prof Michele Acuto, Professor of Urban Politics, University of Melbourne, Australia
Prof. Adriana Allen, Professor of Development Planning, University College London, UK
Prof. Sahar Attia, Professor of Architecture, University of Cairo, Egypt.
Prof. Xuemai Bai, Professor of Urban Environment and Human Ecology ANU College of Medicine, Biology Department, Australia
Prof. Michael Batty, Professor of Planning, The Bartlett, University College London, UK
Prof. Luis Bettencourt, Director and Professor, Mansueto Institute, University of Chicago
Prof. Eugenie L. Birch, Lawrence C. Nussdorf Professor of Urban Education & Research
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Ms Maruxa Cardama, Urban Adviser, Cities Alliance.
Dr Charles Ebikeme Program Director, ICSU, Paris
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Prof. Timon McPhearson, Professor of Urban Ecology, New School, USA
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Dr. Sheela Patel, Chair, Slum/Shack Dwellers International
Prof. Mark Pelling, Professor of Geography, Department of Geography, Kings College London
Prof. Edgar Pieterse, South African Research Chair in Urban Policy & Director, African Centre of Cities, South Africa
Prof. Carlo Ratti, Professor of the Practice, Senseable City Lab, Department of Urban Studies and Planning, MIT, USA
Prof. Aromar Revi, Director Indian Institute of Human Settlements, Bangalore, India
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Dr. David Satterthwaite, Senior Fellow International Institute for Environment and Development, London, UK
Prof. Richard Sennett, University Professor of Humanities at New York University, New York, USA; Professor of Sociology at LSE, London, UK
*Prof Karen C. Seto, Professor of Urbanization Science, Yale University, USA
Prof. Nick Tyler, Professor of Civil Engineering Department of Civil, Environment & Geomatic Engineering, UCL, London, UK
Prof. Thomas Elmqvist, Professor in Natural Resource Management Stockholm Resilience Centre, Stockholm University, Sweden
(*Panel Chairs)

Nature Editor: Monica Contestabile, Chief Editor of *Nature Sustainability*
Panel Coordinator: Enora Robin, Doctoral Researcher, University College London, UK
Research Support: Sam Lane, Research Intern, University College London, UK

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About the Lab

The **UCL City Leadership Laboratory** brings together world-class academic scholarship, public authorities, international organizations, the private sector and local SMEs to create a unique environment for urban experimentation, research, teaching and – most importantly – action. The Lab builds on three years of projects, grants and activities of the City Leadership Initiative, a joint effort of the World Bank Group and United Nations Human Settlements Programme (UN-Habitat), with funding from the UK Government's Economic and Social Research (ESRC) and Engineering and Physical Sciences (EPSRC) Research Councils. The Lab sits within UCL's policy-focused **Department of Science, Technology, Engineering and Public Policy** (UCL STEaPP) and has links across UCL's network of urban research and practice.

About the UCL Grand Challenge of Sustainable Cities

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The **University of Melbourne's School of Design** (MSD) is the graduate school of the Faculty of Architecture, Building and Planning at the University of Melbourne. The Faculty actively seeks to extend the linkages between education, research and practice in the built environment, and aims to inspire learning through interdisciplinary reflection, and its integration of research, teaching, and practice around the implications of all forms of urbanisation.

About the authors

This interim report was prepared by Prof. Michele Acuto (University of Melbourne) and Enora Robin (University College London) on behalf of the *Nature Sustainability* Expert Panel. You can contact the authors at: Prof. Michele Acuto, m.acuto@ucl.ac.uk; Enora Robin, enora.robin.15@ucl.ac.uk

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UCL City Leadership Lab - University College London, Boston House, 2nd Floor, 36-38 Fitzroy Square, W1T 6EY London, UK
www.ucl.ac.uk/steapp www.cityleadership.net

Melbourne School of Design - Faculty of Architecture Building and Planning, University of Melbourne, Masson Road, VIC 3010, Australia.
www.msd.unimelb.edu.au


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