URBAN OBSERVATORIES: A COMPARATIVE REVIEW

RESEARCH REPORT

JANUARY 2021

CONNECTED CITIES – – LAB

Melbourne School of Design
The University of Melbourne

UN-HABITAT

UCL
DEPARTMENT OF SCIENCE, TECHNOLOGY, ENGINEERING AND PUBLIC POLICY

THE UNIVERSITY OF MELBOURNE

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This report has been developed by the Connected Cities Lab, a laboratory within the University of Melbourne, based within the Faculty of Architecture, Building and Planning.

The Connected Cities Lab is designed to address the challenges that city leadership faces, and the information it needs, in an interconnected and increasingly urbanised planet.

The University of Melbourne's School of Design (MSD) is the graduate school of the Faculty of Architecture, Building and Planning. The Faculty actively seeks to extend 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.

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EXECUTIVE SUMMARY

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Cities are increasingly recognised as critical to global challenges. They have been identified time and time again as key sites for addressing interconnected environmental, health social issues affecting our increasingly urbanised planet. Numerous global agreements and frameworks, including the 2030 Agenda for Sustainable Development (2015) and the New Urban Agenda (2016), call for recognition of this relationship between urban settlements and global processes. Many of them, like with the Sustainable Development Goals (SDGs) or the Paris Agreement on climate change, also call upon developing a better understanding of how these challenges pan out in cities, and vice-versa of how cities are mobilising to tackle them. Data and the information arising from it has certainly arisen as an increasingly critical component of the way we think of, experience and ultimately manage, cities. We generate more urban data than ever before, through a variety of formal and informal channels, but this is not always accessible or collated into formats that make it possible to use. Urban governance, from this point of view, is steeped deeply in, and many argue increasingly dependent on, flows of data, information and the knowledge derived from them. From this point of view, understanding how the development, production and mobilisation of these urban insights shapes urban governance is a pressing agenda for those seeking to manage cities the world over.

'Urban observatories' have thus emerged as organisations capable of supporting knowledge translation between research and decision-making. In a microcosm, they represent an important experiment in informed urban governance. Yet they also present us with a vast varieties of ways, institutional set ups and logics upon which this bridge can be built. This report presents a comparative study of 32 of these urban observatories, including a series of institutions with what we call 'observatory-like' functions not just explicitly named 'observatories', drawing examples from both the Global North and South. The report's goal is to represent how these institutions operate, and prompt learnings from these comparisons that are explicitly international. Mixing document reviews with interviews and collaborative workshopping, observatories were examined for characteristics such as level of operation, type of host institution or funders, or the types of outputs emerging from these observatories.

DEFINING THE URBAN OBSERVATORY

Based on a scholarly and practice literature review and building on the definition set by the Data and Analytics Unit of the United Nations Human Settlement Program (UN-Habitat), as well as our experience analysing these institutions, we define urban observatories as boundary spanning institutions with an explicit monitoring role focused on one or more urban settlements. Observatories are expected to perform five key functions:

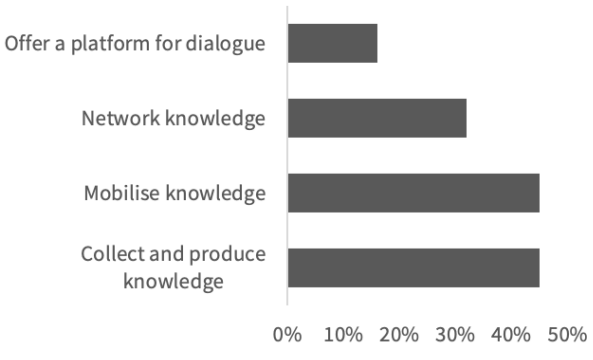
- data and information gathering;
- research and knowledge production;
- policy development;
- capacity development;
- facilitate dialogue and collectively advocate for urban priorities across a range of global agendas.

INTERNATIONAL EVIDENCE: GOVERNANCE

Visions

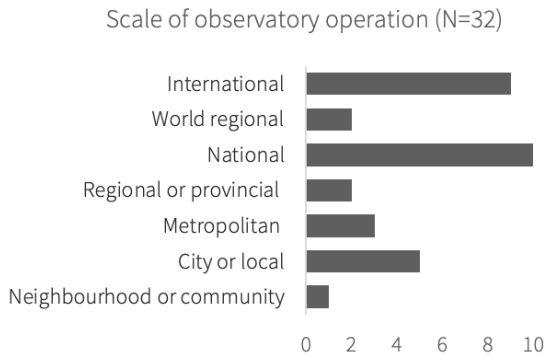
Upon reviewing the observatories' officially stated visions, four non-exclusive types of commonplace aspirations emerged:

- to collect and produce urban knowledge about a defined area;
- to mobilise urban knowledge to shape urban governance, decision-making and development;
- to network urban knowledge and drive knowledge exchange;
- to offer a platform for dialogue about urban challenges between different stakeholders.



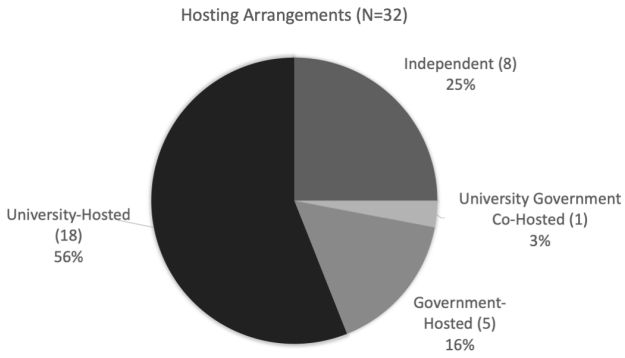
Scale: at what level are observatories placed?

The observatories analysed target several levels of operation, hinting at a varied geography when it comes to their 'placement' across scales of urban governance.



Governance structures

The governance structures of the observatories were determined by systematising the comparison of governance in relation to the hosting institution housing the operations of the observatory; the formalised institutional partners that operate in relation to the observatories; and the original funding source that led to the observatories' establishment.



Funding the operations

The diverse funding structures behind the observatories yield variant operations. Observatories are typically funded by one or a combination of funding institution types, including government, university, philanthropy, and private institutions.

The funding itself ranges from flexible to inflexible and depends on the funding body. Whereas flexible funding has minimal conditions, allowing the observatories mostly to decide how to allocate it, inflexible funding carries specific conditions for how the funding can be spent and is typically project-based.

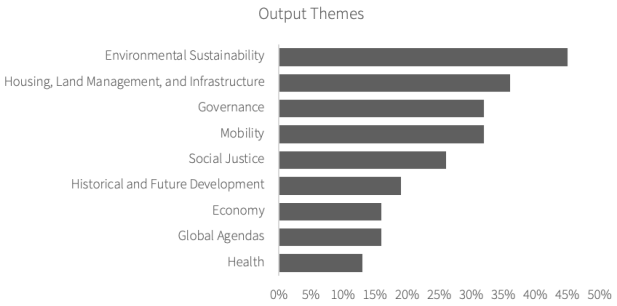
INTERNATIONAL EVIDENCE: OUTPUTS

Output types and targets

Like their governance structures, observatories vary in the outputs they produce. Typically, they generate multiple output types, with 84% of the case studies doing so. A majority of observatories cite researchers and practitioners as intended targets and thus produce research reports to inform future research and practice, with 65% of the cases studied producing reports that are publicly available on their websites. Research reports are the most commonly produced output. Of the observatories examined, 16% serve in some educational role, offering either or both Masters and PhD programs. Observatories with this function all produce academic publications and actively seek to network urban knowledge and drive knowledge exchange. An additional 13% of the observatories offer advisory and consulting services. Open access to observatory outputs emerged as another key trend across observatories, with 84% of them making their outputs publicly available. This demonstrates a commitment to observatories' function of distributing the information they gathered. At least 35% also produce outputs in multiple languages, thus further easing accessibility.

Thematic content

Numerous, non-exclusive themes manifested when analysing the content of the observatories' research. Most observatories addressed multiple themes.



URBAN OBSERVATORIES AND THE COVID-19 CRISIS

In order to better understand how the various observatory features, functions, and outputs manifested in real-time, we contextualise our findings from the third stage of research against the COVID-19 crisis. COVID-19 has brought to the fore the strengths of observatories in a time of crisis, including their ready access to pre-existing data and analytical expertise; capacity-filling and strategic support roles for governments; and quick dissemination of information and outputs relevant to the crisis. Their positioning also enabled them to produce specific responses attuned to the needs of the localities in which they operate by, for example, connecting local and global networks of information; leveraging pre-existing relationships and capacity-building activities to support communities in responding to COVID-19; and playing an advocacy role, bringing the voices of typically marginalised groups to the fore of city-level decision-making.

Observatories also faced challenges during the pandemic, including those related to deploying new research methods, particularly with regards to working remotely. Using new technologies and existing technologies in new ways enabled new methods, tools, and forms of engagement, but also introduced ethical dilemmas around the intrusiveness of sourcing data while communities dealt with the many COVID-related stresses as well as with the creeping expansion of digital surveillance at a time when the pandemic has given governments essentially free license to control populations and rapidly acclimate them to a "new normal."

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CONCLUSIONS

With our comparative review, we seek to offer an intimate snapshot of 'urban observatories,' which have been developed to mobilise the various kinds of knowledge that exist in and about cities. The report demonstrates how observatories serve as intermediaries – between research and decision-making, but also between communities and decision-makers. Our study highlights the need to account for observatories' role in urban governance, particularly with regards to their advocacy and capacity building functions. We also underline the significance of observatories' trust-based relationships with stakeholders, including decision-makers, individuals and communities. Through these relationships and the knowledge produced by them, observatories bring complex urban realities into the evidence base used by decision-makers. Another report finding is the role observatories play in providing strong and continuous data that supplement state data , or in some cases, are the only sources of data in places where state capacity is weak. And finally, we discuss the increasing centrality of knowledge networking in urban governance, both within and between cities, to encourage shared learning and to make knowledge dissemination accessible and inclusive.

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01 INTRODUCTION

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With 4.2 billion people now living in cities, and an equal number connected to the internet, we could argue quite confidently we have now entered both an 'urban' and an 'information' age.
The coincident increase in urban living and information access is progressively shaping human settlements the world over. Data, and the information arising from it, has certainly arisen as an increasingly critical component of the way we think of, experience and ultimately manage, cities. We generate more urban data than ever before, through a variety of formal and informal channels, but this is not always accessible or collated into formats that make it possible to use. The (current) lack of comprehensive and accurate information about many urban settings, makes it more and more complex for city-level policymakers to make sound decisions about how resources should be allocated across their urban settlements. This is particularly prescient in light of global agreements around achieving sustainable development such as the *2030 Agenda for Sustainable Development*[1] and its Sustainable Development Goals (SDGs), including SDG 11, which focuses its targets on sustainable cities and communities, as well as the United Nations' *New Urban Agenda*[2]. The same goes, of course, for those in the multilateral and national levels of government, but also for industry and community actors as much as for scholars and researchers who seek to provide tangible advice on the current challenges and the future of urban development. The impact of the unprecedented disruptions brought about in 2020 by the pandemic crisis of COVID-19 has provided a further need to understand this twin urban-information nature of our current planetary condition. With contagion spread propelled by a worldwide system of interconnected urban areas, cities have been proven to be on the frontline of the crisis in both case numbers and implications of complex lockdown procedures to avert the spread of the virus. At the same time, the circulation of information (and indeed mis-information) about the unfolding crisis has become a critical reality of the global response to COVID-19. This has been clearly recognised by the United Nations both on the 'cities' front, with the UN Secretary General releasing a clear policy briefing calling for more explicit attention as to how COVID-19 has unfolded in "an Urban World",[3] but also by partnering with the World Health Organisation in the launch of an information-focused Communications Response Initiative[4]. Urban governance, from this point of view, is steeped deeply in, and many argue increasingly dependent on, flows of data, information and the knowledge derived from them. From this point of view, understanding how the development, production and mobilisation of these urban insights shapes urban governance is a pressing agenda for those seeking to manage cities the world over.

Urban observatories could be on a more central stage than they presently are. With a mounting 'informed cities' agenda taking the front stage internationally it is perhaps surprising that institutions whose purpose is precisely to mobilise data, information, and knowledge in and about cities are little scrutinised and discussed. Many of them bridge academia and public policy, community groups and private sector, to name but a few actors linked by the production and circulation of what we could tag as 'urban knowledge'. Many of these have often to do so in changing and challenging circumstances, as the concurrent climate, health and inequality crises setting the tone of the century thus far have proven. This bridging or 'boundary-spanning'[1] role between knowledge creation and mobilisation has been taken up in many cases by a type of knowledge-intensive institutions often referred to as "urban observatories". These have emerged in the past few decades in both Global North and South as boundary-spanning entities whose broad role is explicitly focused on mobilising urban knowledge about one or more urban settlements. In this sense, urban observatories sit in various ways between urban research and decision-making and focus on the generation and circulation of data, information, and knowledge in and about cities. Some institutions label themselves explicitly as 'urban observatories' as in contexts like Melbourne and Newcastle, but many other institutions perform what we would call "urban observatory *functions*" (as we detail below) within wider mandates and institutional set ups. Many urban observatories are recognized locally, nationally and even internationally as 'observatories', such as the Gauteng City-Region Observatory in South Africa, others are often identified on international stages as critical in performing some urban knowledge mobilisation and translation alongside other activities they perform, as for instance with the recognition of London School of Economics' LSE Cities program and its work on mapping urban density internationally. The variety of these institutions is wide and often very much influenced by specific contexts. Urban observatories are not the only type of boundary-spanning organisation in urban governance. Similarly important roles are, for instance, covered by entities like dedicated (chief) scientific advisors in local and national government, and are often spread between the centres of policy-making, the boundaries of academia and research, but also in many cases within the private and community sectors. Yet, overall, urban observatories and institutions performing urban observatory functions are no passing trend or occasional fad. They are numerous and they constitute, in our view, an important phenomenon that to date has yet to receive systematic attention,

1 Appendix A offers a definition of "boundary-spanning and other key knowledge mobilisation terms used in this report.

and indeed further recognition, when it comes to understanding the ways in which knowledge mobilisation in cities relates to urban governance and its challenges.

Broadly, urban observatories serve to collect and analyse urban data and present the knowledge derived. Many do so explicitly for decision-makers who can then mobilise these insights in practical urban development. Defined as per above, as boundary-spanning institutions whose primary role is to mobilise and monitor knowledge about one or more urban settlements, urban observatories are now numerous and widespread enough that they present an interesting, if not to some degree unique, confluence of data and information to create knowledge on urbanisation. They offer an important window into how we 'know' about our cities and how knowledge can be mobilised to shape them. Many observatories have vast stores of data, information and knowledge as well as researchers familiar with them who can manipulate and present in an explanatory way to the public, decision-makers, or other urban actors. Several observatories have already been recognised by research, policy and even the media to perform important knowledge functions in and for cities. Many have proven to perform functions of critical support for urban decision-makers and researchers alike, who would otherwise not have access to these resources or the ability to interpret and use them. Several observatories explicitly aim at enabling more equitable and sustainable cities through this process. Urban observatories in cities large as well as small have supported local government capacity to make decisions based on systematic urban research evidence. Importantly, examples of urban observatories are present in both the Global North and South. In fact, several observatories with a relatively long history of brokering knowledge between institutions of knowledge creation and mobilisation are well-established presence in Southern cities, and likely a model for other contexts irrespective of income thresholds.

The United Nations, through its Global Urban Observatory (GUO) program housed within the UN Human Settlements Agency (UN-Habitat) has repeatedly acknowledged and encouraged, and in some cases supported directly through training and technical assistance, the establishment of urban observatories. Many others have formed through a confluence of global and local factors requiring detailed urban insights. Yet a still limited systematic understanding is available both in academia and practice as to what functions these observatories perform, their positioning in cities, and the logic for establishing one. The goal of this study is to offer a comparative look into the realities, both institutional as well as practical, that observatories face on the ground in different urban contexts around the world. We do so by offering a snapshot of organisational set ups of these institutions as well as seeking to capture their 'voices' in an attempt to lend more tangible evidence to their role in today's urban challenges.

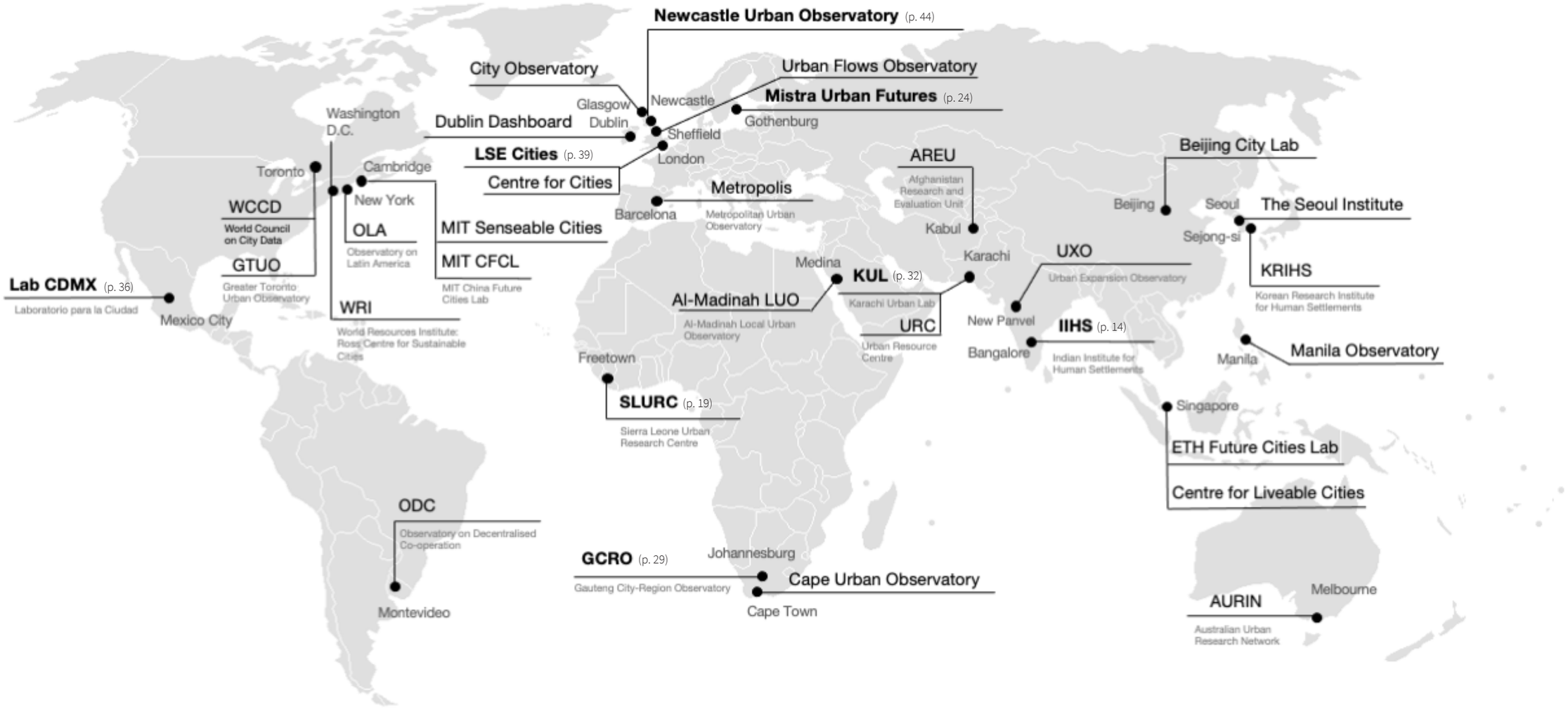

Figure 1: Atlas of the urban observatories analysed for the study. Case study snapshots are bolded with the page number on which the case can be found.

REPORT BACKGROUND AND OUTLINE

The goal of this report is to outline, on the basis of a first-of-a-kind review, the operations of urban observatories, their 'value proposition' and their challenges, in a variety of urban contexts around the world. We seek to offer tangible comparative evidence of their functioning and take a number of deeper 'dives' into the practicalities of their daily work, but also into the challenges brought about by COVID-19, seeking not to rank, catalogue or typify their operations, but rather offer insights of use to this (arguably growing) community of practice as well as to others that might be interested in the operation of urban observatories. We look at a selection of institutions that explicitly label themselves as 'urban observatories' as well as examples of broader entities that perform 'urban observatory functions' which we have included in our thirty-two case studies to underscore that observatory activities, at least when it comes to urban knowledge mobilisation, are not always either explicitly labelled as such or indeed performed independently of other roles. We do so to go beyond only those institutions that choose for whichever reason to label themselves as observatories, to understand how urban observatory functions can work within broader urban research realities. Centrally, urban observatory functions can be defined as such because, in some form (without prejudice for either qualitative or quantitative methods), they perform an explicit 'observation' or monitoring role in terms of keeping a regular record of urban issues that occur in one or more defined urban areas as well as, in some instances, support evaluation and citizen engagement roles. In Part II of the report we expand more in depth on what 'observatory' functions are according to practice and literature.

The report is thus structured to provide a landscape review of urban observatories, and centres for urban research that perform observatory functions, around the world, whilst striving to represent as fairly and collegially as possible their voices through their practical experiences. We do not aim to present this report as a comprehensive review of all observatories currently existing, likely a much wider community (more on this below), but rather offer here some preliminary comparative considerations to underscore their institutional positioning and the activities they perform. The study underpinning this report was carried out by the University of Melbourne in partnership with University College London and in collaboration with UN-Habitat's Global Urban Observatory program. Part I provides an introduction and discussion of the methods used. Part II provides a historical overview of the functions that urban observatories perform. Part III follows this by presenting international evidence drawn from thirty-two case studies about the governance of urban observatories. These cases look at the main themes drawn from observatory missions and visions, the scales at which they operate, and their level of operation and placement in the context of urban governance. Further international evidence is then presented in Part IV, shifting the focus to observatory outputs, discussing their targets, alignment between outputs and themes in observatory visions, the balance between qualitative and quantitative research, and comparative or international aspects embedded in the functioning of at least some of these institutions. Eight in-depth case studies drawn from the wider 32 cases are provided in the report to offer a insights into the varied ways in which observatories operate, and specific themes that emerged from the wider study. Building on the challenges of information, knowledge and urban management in a time of unprecedented disruption such as that ushered by the COVID-19 coronavirus crisis in 2020, a further 'situational' case study is presented in the report to demonstrate how observatories can help with the mobilisation of information in cities in a time of severe disruption. Building on this varied and international evidence, the report concludes with a discussion of the international landscape of urban observatories and a series of suggestions as to the future and possibilities afforded by these institutions for a well-informed urbanised age.

RESEARCH METHODS

This project was executed in three phases. For the first phase, researchers from the University of Melbourne and University College London conducted desk-based comparative review from January 2018 to January 2020 to create a set of thirty-two case studies. The project was developed in collaboration with UN-Habitat, which has for many years now been a key animator of discussions and exchanges between 'urban observatories'. Case studies were initially selected drawing from UN-Habitat's database of urban observatories, facilitated by the agency's Global Urban Observatory program (GUO), but also involved Melbourne and London teams reaching out to other institutions performing urban observatory functions or having an explicit mandate as 'urban observatory'. These institutions mainly emerged from the literature on this theme or were repeatedly highlighted by experts in the field. Thus, the study is based in UN-Habitat's definitions and cataloguing efforts and extends, too, into the scholarly work around urban observatories internationally (see page 9). The project aimed to veer away from Northern views onto the world of urban knowledge brokering (which is already well represented in much of the boundary-spanning literature), and explore the vast variety of urban observatory experimentation present across the Global South. Equally, the study sought to select a sample of institutions that illustrated the variety of organisational set ups available, as well as the variety of themes, foci and outputs, and importantly aimed to provide a relative geographical balance. In doing so it is important to outline that we do not mean this study to be a definitive review of all observatories available internationally, but rather an initial discussion paper and an attempt toward a more systematic discussion of what role these institutions have and what their value proposition might be. We took the liberty of ascribing 'urban observatory' functions to some entities who might not have described themselves as such in their visions and missions, confirming with these directly via (in-person, online or email) interviews this was a categorization consistent with these institutions' core purpose and not a 'at-a-distance' imposition from our research team resulting from simple desk research.

For each observatory, researchers reviewed publicly available information, including observatory websites, social media, and academic literature (where available), to track a total of sixty-three features, such as physical location, level of operation, partners, output typology, and visions. Forty-six of these features were scored on a binary scale to identify their presence (or lack thereof), while the remaining seventeen required descriptive text. Eleven observatories were contacted directly in this phase with requests for further information in order to address areas that might have been unclear to the general public or indeed to request further information. We of course understand this approach to be a 'blunt instrument' that might lose much of the nuance in the process for the sake of constructing a more 'global' conversation as to the role of urban observatories and, in the latter part of this study, we advocate for that nuance to be the cornerstone of further analysis and engagement.

This initial analysis was followed by a second phase that included more extensive direct engagement with many urban observatories featured in this report. To do so, researchers attended the Tenth Session of the United Nation's World Urban Forum (WUF) in Abu Dhabi in 2020 and conducted interviews with representatives of seven of the case study observatories present at the conference. An additional three observatories, not in attendance at the World Urban Forum, were interviewed over video calls, along with another three (IIHS, GCRO and SLURC) already having had input in the set up and development of this study and long-standing research collaboration relations with the research team. The interviews were conducted to draw out a more comprehensive understanding of observatory operations than was available from desk-based research and to inform the more in-depth case studies outlined in this report. Centrally, a concern of this report is to allow where possible sufficient space to capture the 'voice' of observatories, stressing the important ways in which they have been navigating complex urban, governance and challenge contexts around the world.

The final phase of the project involved a two-part webinar (online due to COVID-19 travel restrictions) with six observatories as well as project partners from UN-Habitat and University College London, to delve more specifically into the impacts of the 2020 crisis on observatory operations and practices. The webinar served as a forum within which the observatories could discuss the preliminary project findings and the impacts of and responses to COVID-19. The discussion then informed a dedicated COVID-19-related chapter and the final conclusions drawn.

All observatory quotes are drawn from the aforementioned interviews and webinars, unless otherwise noted. Lastly, the report was circulated for peer review before publication.

02 INSTITUTIONALISING URBAN KNOWLEDGE EXCHANGE

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A TIME FOR 'INFORMED CITIES'

Urban areas are increasingly seen as critical sites of global governance in response to an array of interconnected environmental and social challenges[5]. This focus is encapsulated in the numerous global agreements for sustainable development emerging in the last decade, often spearheaded by the so-called *2030 Agenda for Sustainable Development* [6] and its Sustainable Development Goals (SDGs), but also more specifically by the United Nations' *New Urban Agenda*[7]. These United Nations frameworks have been calling for a specific recognition of the 'urban' as a domain in which environmental and social issues can have amplified impacts and come with a concomitant responsibility for cities to 'know themselves better' in order to make appropriate diagnostic and management decisions[8]. Indeed, the SDGs have promoted a marked emphasis not just on the environment and equality, but also on the ways we account for them and the 'indicators' or targets that are set in these international frameworks to track how national, but also, more and more so, regional and local, governments are performing in terms of sustainable development[9]. The capacity to acquire, analyse and communicate urban knowledge is, therefore, increasingly seen as essential for decision-makers operating in this space, be they within the multilateral sector or indeed municipal administrations. There are many calls for cities to develop the capacity to generate, mobilise and access comprehensive knowledge about their environments and to support decision-making and societal action[10]. Building on this growing emphasis on knowledge as key to the localisation and implementation of global agendas, we suggests in this report that we need to examine more closely institutions like 'urban observatories' in this context, as important entities catalysing critical urban knowledge spaces that can shape decision-making and governance. Whilst we offer more detailed discussion of their role below, we encourage the reader to think of **urban observatories** as knowledge brokering institutions focused on data, information and knowledge in and about cities.

The case for the role of urban observatories, and knowledge about cities more generally, has been made repeatedly over at the very least the last two decades. Estimates by the United Nations Population Division suggest that there are currently over 4 billion global urban dwellers and that this is increasing by about 1 million every 10 days." It is, perhaps, inevitable that since the 1960's, the view that cities are large and complex systems has begun to emerge and define the way in which we understand both urban data collection and urban knowledge creation as "a new frontier for science" [11]. This data-driven view is embedded in our understanding of urban issues, in a way that "seems to be more than just a fad and is likely to influence policy in the years to come."

Box 1. Attributes and skills of a knowledge broker (adapted from Lomas 2007, p. 130)

- Actively networks
- Problem solves and innovates
- Trusted and credible
- Communicates clearly
- Understands the cultures of both the research and decision-making environments
- Able to find and assess relevant research in a variety of formats
- Facilitates, mediates, and negotiates

After a steady rise in popularity across policy and academia, 'data' is very much at the heart of urban issues, if not a paradigm shift in how we conceive of the management of cities. This data-driven view has become a dominant rhetoric in many local, national and international fora concerned with urban matters in both the Global South and North – as recently testified in major United Nations processes from the Habitat III summit to the first UN World Data Forum. At first WDF in 2017 the UN recognized in its Cape Town Global Action Plan how "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."[13] What we might call an 'informed cities' paradigm, of data-driven urban thinking, is one of the most defining trends in urban decision-making of our time. It feeds a widespread belief in data as key ingredient to urban policy, from competitiveness, to good governance, accountability and transparency, as well as in the 'information' intensive advantages brought about by information-intensive sectors, products and activities. Appreciating the (eco)system that underpins this paradigm and stepping beyond specific discussions of the 'smart city' that often dominate the discussion in favour of a broader understanding of 'information ecosystems' capable of describing this shift is, in our view, critical. Our focus here is on a class of institutions that, at least in principle, are designed to do so, and on understanding how the 'observatory' approach is put into practice in cities across developed and developing urban contexts.

The growing demand for urban knowledge and contextually specific ethnographic insights based on the collection, analysis and interpretation of large, complex datasets, innately requires platforms capable of performing these operations. It also requires some capacity for disaggregating data and reassembling data at different levels, from local to global. In some urban settings this platform may be provided by a single large institution, while in others it requires the collaborative, or at least co-operative, working of many smaller institutions. It may even require the enactment of brand-new institutional forms. Securing effective collaboration in knowledge generation processes, including data collection, analysis and communication can be difficult, not least because of the likelihood of divergent purposes, structures, cultures and rhythms of the different institutions involved[14]. Given the increasing importance of research to inform decision-making, there are growing calls for new organisations that are designed to 'bridge' and navigate between research and decision-making[15]. Although the salience of these organisations is now acknowledged, there is currently only limited analytic reflection on the contemporary institutions that operate in this space[16]. 'Urban observatories' as research organisations that commonly work across decision making and academia – have emerged as a visible, if broadly defined, class of institutions operating within this space between the two.

For the purposes of this paper, the key descriptors for an 'urban observatory' are derived from well-established work that UN-Habitat's Data and Analytics Unit (which oversees the Global Urban Observatory program, and henceforth referred to as UNHDAU) has been doing over several decades, as perhaps the most visible international actor in the establishment and convening of observatories within the wider multilateral arena offered for instance by the World Urban Forums. We take this work as a starting point, but also propose a widening and sharpening of the definition of observatories. Practically, UNHDAU has been defining observatories as "local network of stakeholders responsible for producing, analysing and disseminating data on a meaningful set of indicators that reflect collectively prioritized issues on sustainable development in a given area or country" [17]. UNHDAU proposes that all observatories share common aims, including (as we detail more below) that of creating sustainable 'urban monitoring systems' to support local planning and management processes, and the development and use of 'urban indicators' that facilitate the collection of disaggregated data at city and sub-city levels. An important common theme in UNHDAU work is that of stressing boundary-spanning activities, seeing observatories as linking data to policy, but also of the relevance of context, advocating for as much as defining observatories as key to promote local ownership and local use of data.

THE HISTORY OF THE *URBAN* OBSERVATORY

The earliest documents that make explicit reference to urban "observatories" appear in the 1960s and describe partnerships in research by cities and universities[18]. The model emerged as a way to make decision-making and data collection more "scientific" through this partnership and formally proliferated in 1969 when the National League of Cities' Urban Observatories Program led to collaborations between universities in the United States and city governments. With the UN-Habitat's II Conference in 1996, the Habitat Agenda indicators were established with the aim to globally monitor data on shelter, social development and poverty eradication, environmental management, economic development, and governance for informed policy[19]. Shortly after in 1997, with the creation of the Global Urban Observatory program, local and national authorities sought to develop a system for the collection of locally relevant but globally linked urban data[20]. Since then, observatories have proliferated, with clear attention by the United Nations. There are at least 187 such bodies currently recognised by UN-Habitat's Global Urban Observatory Network, which they operate specifically to monitor urban development in line with UN development agendas[21].

Despite the existence of many observatories, Siedlok and Hibbert highlight the paucity of literature that builds an understanding of how long-term research collaborations are organised and managed and what has enabled the longevity of these bodies[22]. Academic literature on the topic of the urban observatory is vastly non-scientific, and instead based on available archives and documentation.

Like other bodies in this space such as urban labs, 'observatories' have remained a "'fuzzy' concept", as Van Geenhuizen noted in the case of 'Living Labs'[23]. In a 2011 conference paper, Farah posed that "while urban observatory structures may differ in their scale, mode of operation, objects of interest and outputs, they are all similar in the central thing defining their mode of operation: observation"[24]. Urban observatories are therefore, viewed as generally responsible for sustainable and sustained monitoring and data collection for immediate policy support, with their capacity to do this highly contingent on their structure, objectives and partnerships. The act of observation is what 'nominally' distinguishes urban observatories from other research centres. Observation itself is done by public and private organizations at different levels and scales, yet within the urban space, observation takes a different practical and conceptual shape when concerning governance. From a practical perspective, operations are defined by a concern for participation, as well as monitoring and learning by multiple actors through networks. In conceptual terms, the creation and dissemination of knowledge through developing and comparing indicators that track progress against the Millennium Development Goals (MDGs) and their successors, the Sustainable Development Goals (SDGs), as well as contextualizing them to local conditions is central to the capacity of an urban observatory.

DEFINING THE URBAN OBSERVATORY

Some formalised terms for describing the size and operation of urban observatory have also been shaped and brought in to use by UN-Habitat. The Global Urban Observatory was originally established to "help find [a] scientific solution to the urban information crisis", charged with generating "better information for better cities"[25]. According to current UN-Habitat guidance on urban observatories: "An urban observatory is a local network of stakeholders responsible for producing, analysing and disseminating data on a meaningful set of indicators that reflect collectively prioritized issues on sustainable development in a given area or country. Data and information resources produced by the local network are used to support decision-making and the formulation of evidence-informed policies. An urban observatory is therefore a focal point for urban monitoring at the local or national level, provides a platform to facilitate data collection, analysis, interpretation and reporting on performance against different indicators, and supports effective knowledge exchange and evidence-based governance." [26]

UNHDAU goes on to propose that all observatories might share five specific aims:

1. "Develop, collect and analyse data on a set of localized indicators to monitor a range of local or national priority issues – e.g. social development, economic performance, service delivery, etc.;
2. Establish permanent mechanisms for monitoring SDGs and Urban indicators;
3. Promote the use of urban data in planning and policy-making at local and national level;
4. Disseminate information to strengthen accountability and transparency;
5. Promote local ownership of urban indicator systems and a culture of monitoring and assessment." [27]

We take cue from this approach by simplifying the above 5-part definition to our suggestion to recognise urban observatories as **boundary-spanning institutions** (elements 3-4-5) **with an explicit monitoring role** (elements 1-2-5), **focused on one or more urban areas**. Through our re-definition, we recognise that not all observatories might yet be invested (as we demonstrate below) in the SDGs, engage with national level-policy, or advocate for accountability and transparency – thus allowing for a broader category of institutions than the UNHDAU definition allows, and for different normative stances. Centrally, however, we stress our focus remains on *institutionalised* organisations rather than other either one-off, *ad hoc* or informal observatory approaches not captured in this study.

Irrespective, the discussion of the value of urban observatories by UNHDAU is important to our overall framing too. The five UNHDAU aims are said to support three areas of work that urban observatories are intended to perform:

- "Providing assistance to governments and local authorities to reinforce their ability to collect, manage and maintain and use information on urban development;
- Enhancing the use of knowledge and urban indicators for policy formulation, planning and urban management through participatory process; and
- Facilitating collection and dissemination of results of global, national and city level monitoring activities, as well as disseminating good practices in the use of urban information world-wide." [28]

Again, we take these into account but broaden them for our understanding of what observatories "do" into a wider 'boundary-spanning' and 'monitoring' twin core function. We do so in order to avoid the assumption that observatories are necessarily set up to assist governments and local authorities primarily (and not other urban stakeholders like communities or the private sector), or that they necessarily deploy participatory processes in data collection and creation, or indeed that they necessarily aim at expanding their reach internationally (or 'world-wide').

In support of these areas of work, UNHDAU propose three rationales for why cities, regions, and nations should establish observatories for their localities:

- "Generating value-based urban data and distributing information by coordinating various sectors and partners within the city or country;
- Facilitating the participation of communities and public and private stakeholders in the development process of their neighbourhoods by producing urban data at the appropriate scale;
- Supporting decision-making processes and enhancing governance within the urban sector by producing local knowledge-based information."[29]

We pick up the question of the reason for, or 'value proposition' of, urban observatories in the last part of this report, but once again aim at offering a wider approach to the nature of urban observatories that, in our case, starts from the observatories' own stated intent and value as articulated in missions and goals we will discuss further in the next part of the study.

Our study stems from an encounter of the UN definitions and cataloguing efforts, and the scholarly work that foregrounded it. It does so conscious of a few important lessons this limited but valuable line of academic research already casts for our journey through 'urban observatory' work internationally.

Academically, urban observatories have been an object of only a few specific studies to date, and typically in case study format. In 2019, for instance, we conducted an in-depth case study of, and in collaboration with, the Gauteng City-Region Observatory,

emphasising their importance in generating and mobilising urban knowledge for decision-making. That study, as with this report, was designed to illustrate how observatories provide us with insights into the opportunities and challenges facing transdisciplinary boundary organisations in shaping urban knowledge systems[30]. In a previous paper 2007, and in a similar style, Hasan provided a detailed account of Karachi's Urban Resource Centre, including its foundation, objectives, activities, and its evolution over time, and highlights how informed challenges to government plans can force government to modify projects and policies accordingly to achieve more equitable outcomes[31]. Meanwhile, in 2006 Holden presented a case study of the establishment of sustainability indicators for the Regional Vancouver Urban Observatory as a process for realising a new sustainable vision for the region[32], and Chiu and Webster recently presented (in 2019) the One Belt One Road observatory in light of a number of key projects guiding the observatory functions[33]. Farah[34] and Ferreira et al.[35] also present a recent review of urban observatories, with the former even establishing a draft typology of urban observatories based on available documentation and the latter conducting a literature review – both of which grounded our study. An important element of this tradition of urban observatory research is that of introspection by, and direct engagement with, the voices of these observatories. Many of these pieces have been written by, or co-authored with, the urban observatories analysed and in a spirit of capturing, with some degree informed critique or **self-reflection**, the possibilities and challenges of urban observatory work both as animators of urban knowledge transfer and of monitoring the 'status' of urban areas. This certainly opens up great possibilities for auto-ethnography by these institutions, or indeed other reflexive methodologies to account for the development of urban knowledge boundary-spanning practices, but also more generally stress the centrality of reflection on one's positionality when it comes to the operation of many (but not all) observatories. This is an important part of the ethos of our report and its aim to capture some of the 'voices' of these observatories.

OBSERVATORY FUNCTIONS

The discussion above begins to frame already an important issue: what do observatories do? This is the question of what we could call "observatory functions" and one that allows us to also consider observatory functions as performed by institutions who might not explicitly identify themselves as such. Urban observatories are often designed with the task of monitoring, through collection and transformation of urban data, various issues about one or more cities. This is typically done to inform decisions and/or research discourses about and in cities and also aids in tracking city performance against the urban SDGs and NUA. Through this monitoring function and boundary-spanning role, observatories often facilitate engagement between stakeholders and inform relevant actors of the potential impacts of pernicious processes of urban governance and development.

In order to understand and compare systematically a variety of different institutions that might fit our definition and align with UNHDAU's approach to the idea of 'urban observatory', a clearer set of functions might need articulation. Building on the history highlighted above, as well as on the (unfortunately limited) literature available, but also the direct experience of observatory operations in countries around the world by the report authors in our engagement and analysis of these institutions, we suggest the following definition of five main areas of operation. The functions expected are outlined in Table 1 and pertain in equal measure to boundary-spanning and monitoring.

Table 1. Summary of urban observatory functions.

FUNCTION	DEFINITION	BOUNDARY-SPANNING	MONITORING
1. INFORMATION GATHERING AND MOBILIZATION	This function involves the collection, storing, and dissemination of urban data about one or more urban settlements. It is predominantly about the gathering of 'secondary' information that has either been produced systematically by other sources (either individually or across multiple entities) or exists in some form in the public domain. It is both a boundary-spanning role as well as one of monitoring in that it combines outreach across institutions and data gathering.	X	X
2. RESEARCH AND KNOWLEDGE PRODUCTION	Observatories also define and develop their own research programmes in collaboration with stakeholders. This process encourages local participation, ensures observatories address conditions specific to their locality, and decentralises the production and transfer of applicable information to policymakers.		X
3. POLICY ADVICE AND DEVELOPMENT	Complementary to their research and knowledge production functions are observatory functions dedicated to contributing to processes of policy-making and evidence-based decision-making within their localities.	X	
4. CAPACITY BUILDING	Observatories engage with individuals, organisations, other observatories, and governments. In doing so, they bear the role of sharing good practice and resources within their network to enhance the effectiveness of urban governance.	X	
5. ADVOCACY AND FACILITATION OF DIALOGUE	Finally, observatories play an intermediary role between citizen and decision maker. As such, they create civic awareness and stimulate dialogue about development issues amongst the citizenry. This enables public co-operation and enhances local knowledge, thus fostering more inclusive communities.	X	X

CASE SNAPSHOT: INDIAN INSTITUTE FOR HUMAN SETTLEMENTS

Located in Bangalore and founded in 2008 by a group of individuals from government, private sector, and civil society, the Indian Institute for Human Settlements (IIHS) embodies the confluence of practice, policy and scholarship in urban research and presents an illustrative case study demonstrating the various functions an observatory or observatory-like institution might have (see Table 1). A now well-established voice on the international and national stages, whether around questions of Indian urbanism more narrowly or indeed as a key voice in 'Southern urbanism', IIHS's decade-long history has had much to do with some of its capacity to tell the 'story' of Indian human settlements from an interdisciplinary perspective. According to colleagues at IIHS, "India does not yet have the institutional capacity to address the dramatic rate of urbanisation occurring, so IIHS was founded to fill that gap by educating and training a new generation of urban professionals." These urban practitioners and "changemakers" can then apply a systems approach to managing the urban transformation of India, and in a larger sense, South Asia, as around 600 million people move to urban areas over the next two to three decades. In this case the Institute was not explicitly set up as an 'observatory' *per se*. Rather, IIHS is thought of as an education centre with a specifically normative mission dedicated to the equitable, sustainable, and efficient transformation of human settlements in India.

From this perspective, IIHS's work on data and information gathering (function 1) complements not only public dissemination and research (function 2) but also education Knowledge production is here tightly intertwined both inwardly with an extensive variety of training programs for built environment professionals and early career scholars moving to doctoral and academic work elsewhere (function 4), and outwardly with frequent public engagements for instance media events, arts-based festivals and seminars (function 5). This broad bridging function is perhaps best embodied by IIHS's core agenda, which seeks to integrate systems that are currently approached disparately in India. This programme is categorised into five transformational themes or 'Schools': Systems and Infrastructure, Environment and Sustainability, Governance, Human Development, and Economic Development. The programme is designed to create and synthesise knowledge across Indian institutions, cities, and universities in addition to the rest of the world, and key to this programme is that it seeks to ground this knowledge in the Indian context. As IIHS colleagues note, "borrowing knowledges from other parts of the world is interesting and useful, comparative work is very important and [IIHS] do[es] that a lot, but when you're dealing with half a billion people in a certain part of the world, it becomes a significant cultural process" and therefore requires knowledge creation within the context for which it is developed. Yet again IIHS emerges as a research-intensive reality: underpinning much of this is research of a mix of specialisms, from ethnographic site work to sensor-based analytics.

As a boundary institution, IIHS has a quite clear mission to reach out to policymakers (function 3). IIHS engages across all levels of government to help construct to reach out to policy-makers

Figure 3. IIHS works closely with governments, such as with the State of Tamil Nadu with whom the Institute collaborated on urban sanitation. Pictured here, IIHS representatives participated in a field visit on faecal sludge management. (Image courtesy of IIHS)

(function 3). IIHS engages across all levels of government to help construct policies, structure new processes, design new programs, and establish new connections between challenges, such as climate change and urbanisation. In the Indian context, it is important to note that cities are governed predominantly by civil servants, for which IIHS has been the primary training institution for the more than 4 years, from entry level to mid-career and management civil servants. As such, IIHS plays a critical role in training the individuals tasked with urban governance through a distinctly interdisciplinary lens. In addition to its training programme, IIHS hosts activities like its Urban Policy Dialogues, multi-day workshops during which challenges and innovations relating to themes varying by year are discussed by policymakers, researchers, practitioners, and representatives of civil society. This is a long-standing feature of the Institute and one that responds to real-world changes emerging in the country (and recently more widely across the Global South). The first iteration of the Urban Policy Dialogues was hosted in 2014, a year in which significant urban policies were being developed in India.

Concurrently, higher levels of government regularly called upon IIHS to consult on significant and complex challenges, such as its work in sanitation. For one such project, IIHS orchestrated sanitation service provision for over three million people, which will be scaled up next year to twenty million people – "the size of some countries," as IIHS colleagues observe. Another example that illustrates IIHS' boundary-spanning nature is the consultative role the Institute played for the government in managing India's lockdown during the COVID-19 pandemic – something that has never been done before. IIHS helped the government think through one of the largest lockdowns in the world and how to transition between lockdown, reopening, and locking down again as waves of infection continually run through. The Institute also helped establish emergency food provision in Delhi as the crisis took hold of the megacity, leaving many stranded without access to the state-provided food support system, and, building on an existing 5-year engagement with the state government of Tamil Nadu, secured personal protective equipment (PPE kits) for at-risk sanitation workers, provided food rations, and created enterprise-based livelihood support programmes for the urban poor, These experiences relate directly back to the grounded nature of IIHS' work – the Institute and government were learning "on the fly" and thus developing knowledge through experience¬ – and also uphold the Institutes explicit social inclusion mission . IIHS's ability to manage these complex projects stem from its role as an observatory-like institution capable of providing "a sense of continuity" in a context where state data and knowledge capacity is weak.

As a result of its research, education, and capacity building activities over more than a decade, IIHS sees itself as serving as a sort of "collective memory" in providing space for reflection and analysis of "where things were, where they might be going, and how new imaginaries can be contested."

Figure 4 and 5. IIHS hosts capacity-building and practice programmes, pictured here, where professionals can expand their knowledge about subjects such as housing tenure and urban sanitation. (Images courtesy of IIHS)

This boundary nature is certainly also clear in the way IIHS places heavy emphasis on its networking activities that are decidedly inclusive in nature. As IIHS colleagues note, "We live in a country that is stratified, there are great amounts of poverty, so we try to create a system to draw these people into the institution, provide them space to learn how to transform their own lives, their families lives, and the lives of their communities." As a result, IIHS engages extensively with civil society institutions, community-based organisations, and non-governmental organisations to help them understand how systems of urban governance work and how to engage with ongoing urban processes.

Notable is the mix of observatory functions with the Institutes hosting approach to capacity building, which sets its more monitoring oriented activities, such as reconstructing the urban development trajectory of Bangalore throughout its history, with residence programs for practitioners and scholars Likewise, via a ten-month, full-time, residential and inter-disciplinary Urban Fellowship Programme IIHS targets scholarly capacity building for recent graduates and young professionals.

Interestingly, despite the breadth of observatory-like functions IIHS already performs, it is currently in the process of establishing a 'Bangalore Observatory' – an urban observatory to be embedded in the same city as where IIHS' primary campus is located. Whereas the Institute with its urban informatics lab acts, colleagues at IIHS describe, "in effect as a national observatory " the Bangalore Observatory is a project that seeks to deepen engagement with the city, which is undergoing rapid change as a global services hub. In addition to the statistical and analytical activities that would be expected from an observatory, the Bangalore Observatory also "speaks to the city through different ways of knowing and through different media," operating "as much as an art project, an oral history project, a photography project, as it is a data and mapping project" with the intention to bring together these different modes of seeing and understanding the city into one place. Thus, while the Bangalore Observatory "aligns very well with IIHS's mission to bring about urban transformation," it seeks to do so with a slightly different vision.

This snapshot has provided a case of an observatory-like institution, showcasing the various ways each of our proposed functions might come to life. It has also highlighted an example of an organisation that performs observatory-like functions and yet still intends to found a more explicit "urban observatory" (at least in name) as part of the larger organisation. While not a typical occurrence, other institutions studied for this research have taken a similar approach, such as the Metropolis Urban Observatory, which is a subsidiary of the observatory-like Metropolis Secretariat General.

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03 INTERNATIONAL EVIDENCE: THE GOVERNANCE OF OBSERVATORIES

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Understanding how observatories are managed provides insight into their operations as institutions sitting at the boundary between research and decision-making. Starting with analysing their strategic visions, this section aims to provide an overview of the various governance structures present in our thirty-two case studies.

The strategic visions articulated by the observatories described in this report centre around four key themes that, in a way, echo observatory functions more generally: to collect urban knowledge; to mobilise urban knowledge to shape cities; to network urban knowledge and drive knowledge exchange; and to offer a platform for dialogue about urban challenges between different stakeholders. Interestingly, these approaches do not match specific observatory 'types': rather they take purchase across the variety of geographical scales that we have noted in the report, from local to international, and governance structures varied from university-hosted to government-hosted to co-hosted between government and university to independent (e.g. a private entity). In turn, this scalar differentiation offers a further insight as to what geographies of data mobilisation and what boundaries are being 'spanned' by the institutions in question here. Of course, with governance structures also come resources: observatory funding is typically sourced from four different types of funding institutions – governments, universities, private sector, and philanthropies – and the use of the funding itself tends to be either flexible or earmarked, each combination of which is of course poised to yield different operating conditions. This section of the report tackles these four characteristics (visions, operational scale, funding and governance structures), with the help of further in-depth snapshots from existing observatories.

Visions

Four main types of aspirations stand out when considering the ways in which our sample of observatories has framed their strategic visions:

1. To collect and produce urban knowledge about a defined area
2. To mobilise urban knowledge to shape urban governance, decision-making and development
3. To network urban knowledge and drive knowledge exchange
4. To offer a platform for dialogue about urban challenges between different stakeholders.

Understanding what these mean practically for the operation of an observatory is necessary to determine how they facilitate tangible urban action. The wealth of examples at hand is, once again, substantial, so we offer below here a snapshot of these four visioning elements in the context of the thirty-two case studies scoped in this report, noting that in many cases, observatories cite multiple visions.

To collect urban knowledge

A frequently emerging theme in the strategic visions of the thirty-two observatories examined was the aim to collect and produce urban knowledge about a defined area, with 42% of observatories falling within this category. This theme was identified by the use of words such as "information," "data," "systems," and "datasets" in conjunction with "provide," "capture," "collect," "generate," and "measure" in the strategic visions of the observatories. The Urban Flows Observatory, for example, "will deploy mobile and fixed sensors around Sheffield to improve […] understanding of the city." The Dublin Dashboard "provides citizens, public sector workers and companies with real-time information, time-series indicator data, and interactive maps about all aspects of the city," while the Cape Urban Observatory "provid[es] a public platform for the collation, analysis and interpretation of timely and reliable geo-spatial data and information." The Urban Resource Centre in Karachi states its objective to be "to collect all available material on Karachi and update it through newspaper clipping and analysis," and the Gauteng City-Region Observatory (GCRO) "generate[s] the data sets by means of which the region of cities and towns making up Gauteng can better understand itself and compare itself to equivalent city-regions in other parts of the world."

To mobilise urban knowledge to shape cities

Another typical aspiration emerging from the strategic visions of the analysed observatories is to mobilise urban knowledge to shape urban governance, decision-making and development, with 42% of observatories falling within this category. Observatories pursuing these aims were identified through the use of terms such as "develop policies," "formulate plans," "aid decision-makers," and "improve capacity." The Al-Madinah Local Urban Observatory, for example, was founded with the objective to "contribut[e] to the formulation of new urban policies or reform existing urban policies as well as act[] as a focal point for decision makers in their policy formulation at local, national, and regional level." The Afghanistan Research and Evaluation Unit cites its mission to be "to inform and influence policy and practice

by conducting high-quality, policy-relevant evidence-based research," while the Centre for Cities "produce[s] rigorous, data-driven research and policy ideas to help cities, large towns and Government address the challenges and opportunities they face."

To network urban knowledge and drive knowledge exchange

A third emergent aspiration is to network urban knowledge and drive knowledge exchange, with 32% of observatories falling in this category. Observatories with this aim seek to increase access to and advance the sharing of knowledge locally and internationally. This theme was identified by use of the terms "network," "joint initiative," "outreach," and "exchange." The Beijing City Lab, for example, describes itself as a "research network […] employing interdisciplinary methods to quantify urban dynamics, generating new insights for urban planning and governance, and ultimately producing the science of cities required for sustainable urban development" while the Australian Urban Research Infrastructure Network (AURIN) says it is a "collaborative network of leading researchers and data providers." LSE Cities "carries out […] outreach activities in London and abroad" and "hosts a wide range of international conferences, public lecture series, seminars and awards that span the core of our research goals, and works to consolidate a growing network of urban experts." The Korea Institute of Human Settlements (KRIHS) "serve[s] as a venue for exchanging research information," "actively participate[s] in a variety of research cooperation projects," and is "establishing a global network for effective dissemination and sharing of its accumulated knowledge in national territorial planning and policy development".

To offer a platform for dialogue about urban challenges between different stakeholders

A final emergent theme is to offer a platform for dialogue about urban challenges between different stakeholders. Of the thirty-two observatories analysed, 16% fall within this category.

The Observatory on Latin America, for example, "fosters public debate on the processes of social reform occurring in Latin America." The Metropolis Urban Observatory is a platform for cities to connect and share experiences and expertise on urban governance at the metropolitan scale and describes its main objective to be "to offer reference frameworks for metropolises as concerns the need to include the metropolitan perspective in urban governance." Lab CDMX is an archival project that ran from 2013-2018 and was designed as "a space in which citizens, civil society, academia, private initiative and government met to change the way of understanding the city and perform actions together."

Overall, then these four main types of aspirations point in our view at an important learning: whilst much is said about the content of what is observed (data, information, knowledge), we should understand how pivotal it is and has been for observatories to stress their actions and positions. What these institutions do, networking, mobilising and collecting, or offering platforms, is an essential component of their nature. In turn, this tells us an important institutionalisation story. Observatories have been explicitly placing themselves in the structures of urban governance and knowledge mobilisation, occupying a space in both localised and international dynamics of knowledge, but also emerging as institutionalised actors in urban governance.

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CASE SNAPSHOT: SIERRA LEONE URBAN RESEARCH CENTRE

The Sierra Leone Urban Research Centre (SLURC) is a research centre based in Freetown, the capital of Sierra Leone. It was established collaboratively in 2016 between the Bartlett Development Planning Unit at the University College London and the Institute of Geography and Development Studies at Njala University. The centre conducts research, holds training and workshops, and is primarily focused on "capacity building, knowledge management, and policy influencing." SLURC's primary aim is to improve the well-being of the residents of informal settlements, working closely with organized groups of the urban poor to co-produce knowledge about their neighbourhoods and city. In doing so, it strives to achieve the following objectives:

- "strengthen the research and analysis capacities of urban stakeholders in Sierra Leone;
- significantly improving the quality and quantity of available knowledge on the informal settlements in Sierra Leone;
- make urban knowledge available and accessible to those who need it, prioritizing residents of informal settlements; and
- deliver world leading research in order to influence urban policy and practice. "[36]

From these objectives, we can discern three of the aspirations described in the previous section: to collect urban knowledge (vision 1), to mobilise urban knowledge to shape cities (vision 2), and to offer a platform for the dialogue about different urban stakeholders (vision 4). Crucially, these objectives are linked with an explicit normative vision to centre the needs and aspirations of urban poor groups in the city, that may be typically overlooked within spaces of decision-making.

Objective 2: "significantly improv[e] the quality and quantity of available knowledge" clearly indicates an intention to collect and produce urban knowledge (vision 1), particularly about informal areas. SLURC does this through its research program, which is guided by five themes: urban health; urban livelihoods and the city economy; urban vulnerability and resilience; land and housing; and urban mobility. One example of SLURC's actions toward this objective is its work in the urban health theme. Currently, "health" in Sierra Leone is approached primarily through a spatial and GIS-based assessment of services and infrastructure. To complement this existing body of knowledge around health, SLURC seeks to explore the social determinants of health affecting informal settlements. When COVID-19 hit, SLURC played a critical role in advocating to city officials that the virus is not simply a "health" issue, but rather a complex, intersectional reality, particularly with regards to vulnerability.

As such, SLURC challenged the "one-size-fits-all" approach that cities typically prioritise when it worked with authorities to

Figure 6. SLURC works closely with residents of informal settlements, hosting activities such as the planning activity pictured here. (Image courtesy of SLURC)

Figure 7. The City Learning Platform; one a number of initiatives SLURC hosts to bring together government and other urban actors to collaborate and vision for Freetown's future. (Image courtesy of SLURC)


Figure 8. Community engagement meeting. (Image courtesy of SLURC)


Figure 9. SLURC also hosts various training workshops. (Image courtesy of SLURC)

prepare a COVID-19 action plan, emphasizing that in addition to being robust and effective, the action plan must also be socially just.

Objective 3: "making urban knowledge available and accessible to those who need it, prioritising residents of informal settlements" and 4:"delivering world-leading research in order to influence urban policy and practice" demonstrate a commitment to mobilising urban knowledge in order to shape Freetown both from the bottom-up and from the top-down (vision 2). In particular, SLURC has worked closely with the Federation of the Rural and Urban Poor (FEDURP)– organizations of informal settlement dwellers across Sierra Leone—to co-produce research which can inform policy and practice. As colleagues at SLURC note, one of SLURC's key research approaches is therefore "not only to work with community residents in collecting data, but also building their capacities to understand the places they live, and how to take actions to respond to the situations they find themselves in." Collaborative mapping through GIS, compiling informal settlement profiles, and the production of neighbourhood plans has supported and enhanced the capacities of these groups to shape urban governance.

This commitment to co-learning both generates crucial knowledge which can support urban policy-makers, but also is understood as a means of empowering these local communities and building the capacities of urban stakeholders to collaborate to guide planning and policies. SLURC has also played a key role within local and national government working groups, and in international forums, where their research findings have encouraged evidence-based decision making, which is deeply embedded in the complex urban challenges of informality. Simultaneously, the training and workshops hosted by SLURC also signal a desire to influence practice. Training packages have included a Participatory Spatial Research Methods workshop, a course in Development and Planning in African Cities, and training on Gender and Livelihoods. These long-standing capacity building and community mobilisation efforts enabled communities to better respond to the pandemic by sharing information through existing channels of communication and in informal spaces whilst awaiting an official government response.

Finally, cutting across its four stated objectives, are efforts to establish durable platforms for the exchange of knowledge and ideas linked with crucial urban challenges facing informal settlement residents (vision 4). SLURC has worked with other development partners and organizations to support the establishment of 'Community Learning Platforms' (CoLP) and the 'City Learning Platform' (CiLP). These two structures exist to generate spaces of learning and sharing across diverse forms of knowledge—from policy experts, academic research, to the lived and experiential knowledge of informal settlement residents. The City Learning Platform is a space to coordinate diverse urban actors to discuss experiences and develop proposals for the upgrading of informal settlements in the city of Freetown.

Crucially, the CiLP is closely linked with representatives from the community learning platforms, to ensure that discussions and decisions are closely aligned with the priorities within these neighbourhoods. These platforms have supported the exchange of knowledge in the city and have also been leveraged during the COVID-19 response to support local communities. This case study has provided an example of how an observatory's visions translate into activities and impacts. In line with its guiding objectives, SLURC has established itself as a centre of research excellence, which contributes substantially to the existing knowledge about urban life in Sierra Leone, particularly in informal settlements. In doing so and through its training programs, SLURC influences both policy and practice to achieve its mission of improving the well-being of the residents of informal settlements.

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SCALE: AT WHAT LEVEL DO OBSERVATORIES OPERATE?

Our research also identifies the level of operation observatories are targeted to, hinting at a varied geography when it comes to their 'placement' across scales of urban governance. In particular, we identified seven possible focuses, ranging from neighbourhood level, to city (or 'local'), metropolitan, regional (i.e. provincial or state in some countries), national (or federal), macro-regional (such as Europe and Latin America) and international (across a multitude of regions). Speaking of scale of operations is an important element of how the 'story' of observatories is told, but also a tangible indication of the entry points they have in questions of urban governance. For example, institutions working at the neighbourhood level that we have engaged with for this report are closely connected with local communities and community-based organizations, often tailoring their programs and practices to suit the immediate need and scale of those very specific contexts. An example of such an organization is the Sierra Leone Urban Research Centre (SLURC) that currently works in informal settlements in Freetown, Sierra Leone, with the aim to escalate its activities to a national level as the opportunities and scope of projects expand. SLURC however also speaks to the non-exclusivity of these scalar foci, and to the importance of attending to scalar dynamics in these considerations: the research centre has in fact recently 'scaled up' its work through a 'city learning platform' and begun a tight engagement with the City of Freetown, whilst also benefiting from an original foundation and ongoing research program that is closely based on international academic grants and exchanges like that with UCL in the United Kingdom.

Here, then, we would like to focus on the most evident and explicit scale of action publicly embedded in observatory missions and operations, whilst attending to the ways this primary focus (where available) intersect with secondary geographies of urban knowledge mobilisation either emergent or also set up by the observatory's mission. Broadly, we would argue that five of the thirty-two observatories have chosen to specifically focus on the city within which they are situated. The Urban Flows Observatory, for example, aims to collect city-wide data for the city of Sheffield in England while the City Observatory is established as a repository for urban information for the city of Glasgow in Scotland. The Dublin Dashboard deploys specialized instruments to collect real time information for the city of Dublin in Ireland under the SMART city research program by Prof Rob Kitschin, and the Urban Resource Center in Karachi, Pakistan, contains within its reserve archival records of the city of Karachi and works in an activist sphere to propose policy change for the citizenry. Finally, the Laboratorio para la Ciudad (Lab CDMX) was setup to create a meeting place and dialogue for the citizens and the government of Mexico City.

One level 'up', we find institutions working at the metropolitan scale, typically covering multiple local authorities and/or multiple cities. Examples of such observatories include the Greater Toronto Urban Observatory (GTUO) that primarily produces reports on metropolitan Toronto, and the Seoul Institute, which has worked on policy analysis and recommendation for metropolitan Seoul since 1992. Interestingly this level of work tends to fast spill over to adjoining cities which play an important part in the functional area of the metropolitan scope covered by the observatory. For instance, GTUO has been known to offer some supplementary reporting on Montreal and Vancouver as well, not just on Toronto, and the same is applicable to some studies of the Seoul Institute.

Once again these main foci do not prevent other national (e.g. for our Sheffield and Glasgow-based cases) or even international (e.g. in Dublin, via European research funding) linkages. At the same time, they also speak to the relative importance of the recognition of a 'city' in the establishment and operation of an observatory, but also underscore how this is by all means no a precondition for what an 'urban' observatory is: rather, specific 'cities' are but part of a wider story of urban knowledge and urban settlements, processes and geographies. Metropolitan issues, perhaps, remain in this sense relatively under-represented in the explicit mission of observatories or subsumed under wider spatial purviews.

From this perspective, our study shows two observatories, GCRO in South Africa and Karachi Urban Lab in Pakistan, that operate predominantly at the regional (provincial) level. GCRO is tasked with collecting and analysing data on the Gauteng 'City-Region' which covers major South African cities like Johannesburg and Pretoria, and is designed to inform the development of South Africa's "economic heartland". The Karachi Urban Lab, instead, predominantly examines Karachi but extends to the wider Sindh and Balochistan provinces to promote sustainable urban-rural development. These are in themselves sizeable urban areas accounting respectively for over 12 million (Gauteng) and 15 million (Karachi) urban dwellers. Yet these are also cases that point at the midway reality that a regional focus might afford: whilst GCRO has by far and large provided either city-region and metropolitan points of view in their studies, the Karachi Urban Lab has also expanded to broader work on for example gender or violence across urban Pakistan.

The drive to a national focus is a substantial one for our sample of observatories. Of the thirty-two case studies, ten work primarily at the national scale. Examples include the Korea Research Institute for Human Settlements (KRIHS), which predominantly analyses national policy and seeks to make the National University of Singapore, has had an obviously national viewpoint to research sustainable urbanism from a predominantly Singaporean nationally-relevant urban policy recommendations accordingly, and the Centre for Cities, which directs its activities towards enabling economic prosperity for cities of all sizes across the UK. A national focus can also be in-built through the founding institutions behind an observatory. For example, the Centre for Liveable Cities in Singapore, which was founded by the Ministry of

National Development and initially co-hosted with the National University of Singapore, has had an obviously national viewpoint to research sustainable urbanism from a predominantly Singaporean point of view. Yet we can also note cases in which an all-of-country approach is taken by observatories not situated explicitly within that specific geography: this for example the case of the MIT China Future City Lab, which seeks to address the challenges associated with China's rapid urbanisation but is based in the United States of America.

Observatories operating at what we could call a 'world region' scale (i.e. regions like Europe, Southeast Asia, North Africa), by nature, traverse specific national boundaries and therefore tend to engage with multiple socio-political contexts. This, in our cases, happens also in cases where observatories still remain 'centred' upon a specific city or metropolitan framing. The Manila Observatory, for example, is based in Metro Manila, Philippines and gathers atmospheric and environmental information for the country as well as the South Eastern Asia Region. Yet we also see the emergence of explicitly regional institutions. This is for example the case of the work on social reform run in the Observatory on Latin America.

Lastly, but equally important, is the necessary recognition that many of these institutions are more-than-local by definition. Nine of the observatories we reviewed operate at the international level working globally across cities and urban contexts. The Future Cities Laboratory, for example, is a Singapore-based research collaboration with ETH in Zurich. The World Council on City Data is a repository of urban information and data based on a common set of indicators with over twenty cities participating internationally. Interestingly, we have come across a number of explicitly international cases which are also set up as international institutions in the way they are run with a multiplicity of operating bases across different countries. For example, the World Resource Institute's Ross Centre for Sustainable Cities is head-quartered in Washington DC, United States of America but runs operations in five countries: Brazil, India, China, Mexico and Turkey. Mistra Urban Futures was between 2010 and 2019 an international collaborative research and knowledge centre with platforms in seven cities across both the Global North and South seeking to understand what a sustainable and just city means in different contexts.

Overall, a key learning point emerging from this diversification is that there are today a wide variety of scalar foci embedded in these boundary-spanning institutions, which are far from simply localised entities. Their primary focus almost always allows for either wider or more specific engagements across scales but also testifies to a growing community of practice that, when connected, allows for an urban conversation that attends to a multitude of viewpoints on today's urban condition.

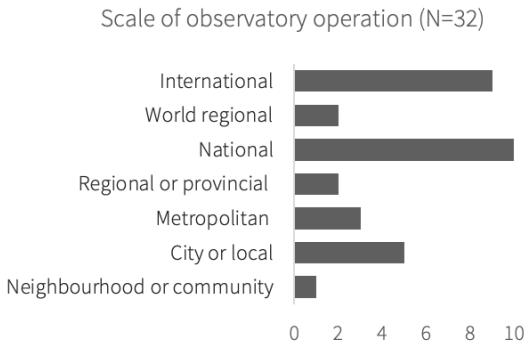

Figure 10. Observatories operate at a range of scales, from neighbourhood and community level to international.

CASE SNAPSHOT: MISTRA URBAN FUTURES

Active from 2010-2019, Mistra Urban Futures was a centre for knowledge and research on sustainable urban development primarily based in Gothenburg, Sweden but based on an explicitly international research organisation focused on "city platforms" located in cities across the Global North and South. Founded by a consortium of public bodies and research organisations, the centre was hosted by Chalmers University of Technology on behalf of the consortium. Towards the end of its ten-year funding period in 2019, Mistra Urban Futures was eventually integrated into the Gothenburg Centre for Sustainable Development.

As a multi-sited research centre, Mistra Urban Futures sought to bring together actors across research, practice, and society to co-create knowledge and understanding towards realizing just, green, and accessible cities. The program was explicitly transdisciplinary as well as international in nature, with its first six years involving research undertaken concurrently in the different cities. This was mainly carried out individually by the city platforms with the goal, in the final four years of the program, to pivot towards developing a "cross-city comparative research initiative [by] using different forms of transdisciplinary co-production that no one had done before in any coherent or systematic way" – as Mistra Urban Futures researchers told us. From this perspective, the program had an in-built comparative and internationalist ethos that demonstrates the value of blending scales of 'observation'. For example, the "Realising Just Cities Framework" was a series of ten comparative projects that explored what "just cities" might look like around the world, and rather than imposing a "standard, laboratory-style natural science experimental design where everybody is doing exactly the same in a test tube-like, reproduceable, replicable way." Departing from this perhaps more common approach, researchers from Mistra Urban Futures decided instead to focus on "processes, learnings, and sharing those learnings". Whilst not defined explicitly as an observatory, Mistra Urban Futures thus evolved not only institutionalized monitoring of urban processes but made of learning itself the object of much of its systematic observation, presenting an interesting case of analysis of knowledge processes in themselves, not just of urban information more generally.

The local application of this knowledge-intensive process is also telling of this case study. The cities chosen for partnerships and research platforms in Mistra Urban Futures were mainly secondary cities in both the Global North and South in order to understand "what just cities mean" in diverse socio-economic, environmental, and geopolitical contexts. Blending local learning was in Mistra Urban Futures a role assigned to international research platforms and events, designed to offer conversations that were both locally relevant and international comparative. Projects of this type included, for example, "Implementation of the New Urban Agenda and Urban Sustainable Development Goal," "Cultural Heritage and Just Cities," "Solid Waste Management," "Knowledge Exchange," and "Participatory Cities." In light of this context, Mistra Urban Futures provides an illustrative case for us to understand how an observatory operates jointly at localised and international scales.

Researchers involved in this program pointed at Mistra Urban Futures's "in-house methodology" as an effort to bring together various stakeholders to co-create knowledge and promote dialogues about urban sustainability. Throughout an emphasis on these co-productive processes, Mistra Urban Futures researchers could remain "politically neutral" in relation to different political parties represented in local authority councils. The rationale underpinning this logic has been, in the eyes of the project, one that is centred on the idea that bringing together diverse urban actors towards a common goal of achieving a more sustainable future will guide them towards the realisation that "what they have in common is often more important than that which divides them."

Localisation in an internationally driven program played an important role. Each city platform engaged with a different set of

Figures 11 and 12. Examining food security and value chains (Shimla, left) and solid waste management (Kisumu, right) for the comparative cross-city projects conducted by Mistra Urban Futures. (Images courtesy of David Simon)

stakeholders with unique dynamics that are contextually driven. As such, Mistra Urban Futures colleagues emphasize the "crucial importance of having each team work through issues themselves to find a modus vivendi" rather than forcing a template for knowledge co-production onto all the city platforms. The relationships between the various stakeholders are formalised by founding documents that regulate the relationships and resource contributions from partnering institutions, both in-kind and financial, thereby establishing a level of institutional and political commitment from the partner institutions. By establishing shared institutional priorities and interests at the outset, researchers were seen to be protected by a degree of political cover should they bring unpopular findings back to the institutions with which they are working. Thus, the institutional arrangements made at the outset of each project facilitate the independence of the research projects.

Despite the level of stakeholder buy-in that results from formalising the relationships and visions for each project at the outset, Mistra Urban Futures researchers nevertheless faced the challenge, as a boundary-spanning organisation, of lacking the enforcement power to change the institutions with which they worked once research findings are presented. In fact, a recurring theme in post-project evaluations flagged to us in interviews with the program team was that project partner institutions had in several cases not internalised the wider lessons of how they might change their own procedures by "main-streaming" the lessons of co-production learned during the city platform projects. So, while the project may have yielded for instance an inner city redesign, the methods of co-production and co-design that resulted in the new plans were not always carried forward. Even with the time and effort spent on each project, Mistra Urban Futures researchers recognized that the limits of an observatory, or indeed of most urban research programs more in general, are that researchers cannot compel their partner (or counterpart) institutions to change their practices. "That's part of the homework that each institution has do to for itself," said colleagues at Mistra Urban Futures.

The case of Mistra Urban Futures stresses, then, how an observatory-like institution has to balance attending to local context while driving a larger global research agenda and presents an example of what an institution operating at the international scale might look like. It embeds its teams in each city and develops contextually specific modes of working while still pursuing the common research agenda of realising just cities. In gathering this data and developing its research agenda with the stakeholders with which it co-produces knowledge, Mistra Urban Futures researchers perform an advocacy role and initiate dialogue between stakeholders. They also engage in capacity development as well as policy development. In Mistra Urban Futures' operations, it attends to both local and international concerns, and in doing so, connects the local to the global. The ability to bridge local experience to international context as a means to advance a progressive research agenda stands out as valuable learning from the case of Mistra Urban Futures, but also goes hand in hand with a realistic assessment of the arms-length (at best) position of these kinds of institutions when not directly embedded in government or other centres of political power.

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GOVERNANCE STRUCTURES

Within our sample of thirty-two observatories, governance structures that determine how these institutions function are once again varied. We propose systematizing the comparison of observatory governance in relation to, first, the hosting institution housing the core operations of the observatory, and second, an insight into the varied set of formalised institutional partners that operate in relation to our set of thirty-two observatories. In doing so we aim to speak of the placing of these organizations within particular 'sections' of urban governance, underscoring varying degrees of governmental or academic institutionalisation, or indeed of more explicitly constructed independence from these two spheres. We recognise, of course, that there are other valuable and significant modalities to 'place' an observatory in urban governance as for instance within organised non-governmental advocacy groups or indeed in the private for-profit sector – two areas we return to in the conclusion as important realities requiring further exploration.

University-Hosted Observatories

Research-intensive universities typically possess the expertise needed to generate the specialised outputs associated with observatories. Thus, observatories are often born and housed within universities, both public and private, with 55% of the analysed observatories falling within this category and making it the most common hosting body. The Manila Observatory is hosted by the Ateneo de Manila University; and the Cape Urban Observatory is hosted by the University of Cape Town. In some cases, such as Mistra Urban Futures and GCRO, observatories are hosted jointly by multiple universities. In the case of GCRO, the observatory is based within the University of Witwatersrand but has shared academic proprietorship with the University of Johannesburg – in effect bridging the two major academic institutions of the city within which it physically sits. This arrangement has been orchestrated to avoid dominance of the research brand by either university and to include diversity within the different specialties of shared urban knowledge production[37]. The observatory also partners with local and provincial government. However GCRO's physical and administrative placing within the academy rather than in government , as with the cases of AURIN or Manila, enables it to develop and divulge research insights independent from the politics playing out in government at any given time, at least to a large extent[38]. Of course, some nuance is needed here in avoiding pigeon-holing all of these (and other) observatories in one category.

Government-Hosted Observatories

All but five of our case study observatories are hosted by governments, from local government 'up' to the national level, representing perhaps a minority of cases in our sample. Lab CDMX, for example, was hosted by the Government of Mexico City (until its closure in 2018); the Al-Madinah Local Urban Observatory is housed within the Department of Regional Planning in Al Madinah Municipality; and the Centre for Liveable Cities in Singapore is nested within the national government as a collaboration between the Ministry of National Development and the Ministry of the Environment and Water Resources. Interestingly for its twin-country set up, the Observatory for Decentralised Cooperation presents a unique institutional arrangement with its location within both the Barcelona Provincial Council and Municipality of Montevideo. These are however not uncommon occurrences: many local authorities around the world have been developing observatory-like institutions to better understand information about their growth, performance and a number of specific local challenges. The issue that emerges of course in many of these cases is one of institutional independence from political drivers and pressures, as well as one of capacity to take critical stances about pressing local problems that might not be readily addressed by their host administrations. Yet it is also important to note the heightened complexity for these government-hosted institutions to access academic resources, networks and procedures, such as the ability to both acquire peer reviewed material (often behind costly academic paywalls), take active part in initiating research exchanges, grants or in educational programs. On the other hand placing within government can facilitate the implementation of monitoring-based data and exchanges into implementation through policy, regulation and even infrastructure development.

Government and University Co-Hosted

AURIN presents a unique co-hosting arrangement in which the observatory is physically housed in a university but on behalf of the Australian federal government not just as main funder but near direct report. With its main office set up in the main campus of the University of Melbourne AURIN is currently, and has historically been, headed by a professor from the university and staffed by personnel appointed via this institution. Yet, as a part of the federal government's set of data infrastructures developed through the National Collaborative Research Infrastructure Strategy, it is run in concert with federal government agencies, working for the benefit of not only academics (who can access the over 5,000 datasets it contains for free) but also government and some private sector. Centrally, AURIN is designed to work as a network linking a number of academic institutions providing input into its spatial analysis datasets of urban areas in Australia, including a number of other major national universities in other states (like the University of Queensland or the University of New South Wales). As such it is managed by a board whose members are drawn from network universities, not just in Melbourne, private sector, local councils and overseen by federal government. There are perhaps many similar examples around the world of co-hosted arrangements, as for instance was originally the case with Singapore's Centre for Liveable Cities (co-hosted with the National University of Singapore). Yet the analytical challenge here for us is one of tagging explicitly cases that are truly co-hosted, rather than for instance simply government-funded but academically run – likely the case for hundreds of grant-based examples from around the world.

Independent and Private Observatories

Eight of the observatories analysed could be tagged as independently hosted. Such institutions are not housed within a host institution but rather exist as a separate entity and as such take many varied forms. This governance arrangement does not preclude relationships with governments or universities. In fact, in several cases, it gives these observatories a degree of autonomy that necessarily may not exist in other institutional arrangements. The Seoul Institute and KRIHS, for example, were established to research policy and make policy recommendations for the metropolitan and national government, respectively, but are not physically hosted by the government and are instead housed in independent research centres. Meanwhile, the Indian Institute of Human Settlements has a decidedly pedagogical focus, however rather than being housed within an existing university, it was founded in 2015 as its own national education institution intent on transforming urban education, research and practice in India. As such, it has extensive partnerships with universities, governments, and private institutions domestically and internationally, which enabled it to create a "globally-benchmarked, future-oriented, interdisciplinary curriculum." Finally, the Centre for Cities is an independent think tank that produces urban knowledge for several cities in the United Kingdom and partners with businesses, universities, and cities.

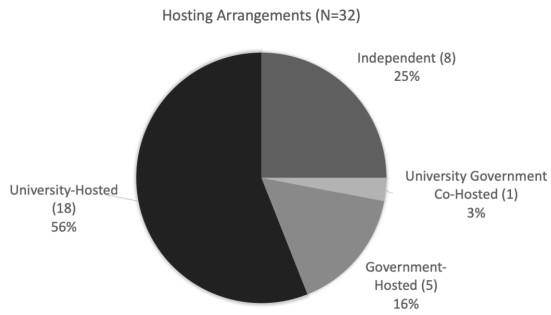

Figure 13. University-hosted observatories are the most common with over half of observatories situated in this arrangement.

Of course, this typology should not be understood as strict divisions: there are plenty of cases where these types merge or institutions emerge at the boundaries, thus offering further insight in the complex positioning of observatories, or observatory-like institutions, in urban governance. For instance, the Future Cities Lab has an unusual arrangement because unlike the other observatories analysed, it is co-hosted by multiple institution types. The National Research Foundation of the Singapore Government and ETH Zurich, a university, co-founded the Singapore-ETH Centre, which houses the Future Cities Lab. It is the only observatory with this governance structure of all thirty-two case studies.

It is also important to underline that, for the purpose of this study, we have focused on publicly facing institutions, but it might be interesting and valuable to expand this inquiry to cases that sit, at least partly, as bridging entities co-hosted within the private sector. For instance, once again in Singapore, international built environment consultancy Arup has recently launched a Future Cities Hub co-funded and hosted with the Singaporean government's Economic Development Board (EDB), with some analogous functions to some of the institutions described here. This section has provided an overview of institutional arrangements at the time of writing. It is of course also worth also noting here that these structures can and may change over time, as institutions evolve and become embedded in different ways in to their local and national systems, so what we offer here is very much of a snapshot into a particular historical moment and one that likely might be obsolete in a few years' time.

Funding the operations

The variety of institutional settings that observatories are based in are as complex as their funding underpinnings. With a note of caution to the reader not easily generalise the information presented here, and underscoring the caveat that much of what happens on the financial side of many of these institutions is not as easily disclosable as outputs or scalar foci, this section of our report discusses the different types of funding observatories might receive for their core operations and how it might generally affect their approach. Needless to say, this is a very preliminary foray into an area widely side-lined by the (already limited) literature on observatories and something that require, to our judgement, far more in-depth exploration.

Funding types

Broadly, at this stage, we could argue that our research identified four main funding types, with many observatories receiving funding from several of these at the same time: governments, universities, philanthropies, and private institutions. "Governments" as funders have included in our cases funding from all levels of government, such as the Montevideo Municipal Government, and governmental agencies, such as the Swedish International Development Cooperation Agencies (SIDA) in two of our cases. "Universities" account for both public and private institutions of higher education, for example the University of Melbourne or Massachusetts Institute of Technology. "Philanthropies" are private institutions that grant (and in many cases donate) money for a charitable causes, such as Bloomberg Philanthropies or the Ford Foundation. Finally, "private institutions" is ascribed to non-public, non-philanthropic bodies, such as private companies or civil society groups. Notably, while many observatories are backed by a single type of funding institution, some rely on multiple funding institution types. The Dublin Dashboard, for example, receives government as well as university funding, while the Centre for Cities receives government, private, and philanthropic funding and the Indian Institute for Human Settlements receives government and private funding.

Perhaps importantly in terms of impact into policy-making in cities, the majority of observatories studied here (65%) receive some degree of funding from government. Governments provide funding to observatories, from the city scale, such as Lab CDMX which was entirely set up as an experiment of the Government of Mexico City. This applies to the national scale, such as KRIHS that is funded by the Korean National Government, but also to the world-regional scale, for example with the Dublin Dashboard receiving grant support from the European Research Council. The next most common funding sources for our case studies, perhaps unsurprisingly, are universities (at 48%), such as the Greater Toronto Urban Observatory, which is funded by the University of Toronto. In our sample core funding provided by private institutions is just at 19% of cases, including for instance the Urban Resource Centre funded by a private collective of citizens, and philanthropic support is at 16% of cases, such as LSE Cities whose establishment has been supported by Deutsche Bank's Alfred Herrhausen Society investment in its core program for the Urban Age.

In addition to the external funding bodies that support the observatories, at least 10% of observatories have a commercial aspect that helps to fund their operations. The Urban Expansion Observatory[39] and LSE Cities[40] offer consulting services, the fees for which can then be deployed to fund their research. Meanwhile, the World Council on City Data charges certification fees for cities to achieve their ISO 37120 certification in Indicators for City Services and Quality of Life[41].

Funding conditions

Funding can range, as colleagues at the WRI Ross Center put it in one of our interviews, from "flexible to inflexible" and depends on the funding body. Flexible funding has minimal conditions, allowing the observatories mostly to decide how to allocate it. Observatories that receive funding from the Swedish International Development Agency (SIDA), for example, such as the Afghanistan Research and Evaluation Unit and Mistra Urban Futures, must generally have a poverty reduction element to their agenda, in line with SIDA's mission, but they are free to dictate how their activities align with that broad agenda. Similarly, the International Development Research Center (IDRC) of Canada allocates funds to the Karachi Urban Lab under the remit to find solutions to global development challenges, but the Karachi Urban Lab chooses how exactly it addresses this remit. Finally, GCRO, which receives government funding, is free to determine its own research agenda and can also respond readily to short term demands from government because it does not spend its time and effort sourcing funding[42].

Inflexible funding, by contrast, carries specific conditions for how the funding can be spent and is typically project-based. Telecommunications company Telefonia O2, for example, gave funding to the Centre for Cities to produce a report on how cities in the U.K. can become better connected[41]. Similarly, FedEx collaborated with and gave funding to the WRI Ross Center for a project focused specifically on improving the efficiency of public transportation[42]. Finally, KRIHS receives government funding, but – unlike GCRO – on a project-to-project basis so is beholden to the research agenda put forth by the requesting government agency[43]. Rather than funding that is broadly thematic ("poverty alleviation," "more equitable society") or geography-based ("developing countries," "European Union"), inflexible funding is tied to a targeted purpose and typically carries with it greater reporting and accountability demands than flexible funding[44].

Overall, the economic landscape underpinning observatory operations is no small matter and one that deserves much attention, especially as we venture in more and more uncertain and austere times as a result of the global downturn prompted by COVID-19. What we have offered here is but an initial snapshot into a particularly thorny question and certainly one that has likely sizeable implications on the ways in which observatories operate and engage with urban governance. Yet, even in this preliminary survey, this reality also underscores the complex web of institutional and public-private relations that observatories remain deeply embedded into. This has significant implications relevant to, and which can be leveraged for, urban transformation, prompted by urban knowledge exchange and mobilisation that stand at the heart of the workings of observatories like those we have depicted in our report.

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CASE SNAPSHOT: GAUTENG CITY-REGION OBSERVATORY

The Gauteng City-Region Observatory (GCRO) was established in 2008 as a partnership between the University of Johannesburg, the University of the Witwatersrand, and the Gauteng Provincial Government. Its mission is to improve cooperation between levels and branches of Provincial Government, as well as between the local governments that collectively form the Gauteng City-Region in South Africa. Through better planning and management, the GCRO hopes to foster a "functionally integrated, spatially coherent, economically competitive, creative, innovative, environmentally sustainable and socially inclusive" future for the region. While originally established as a research centre producing outputs which hoped to find "interested and absorptive audiences in government," more recently, their "convening role" as an intermediary has expanded – the result of GCRO accumulating credibility in the eyes of the researcher community and of colleagues in government.

A unique governance structure enables the GCRO to carry out its dual function as a research centre and as a boundary organisation between research and government. Both universities, the provincial, and local governments of Gauteng are represented on the GCRO board. It receives core funding from the government and in-kind support from both universities. This consistent support has enabled the GCRO to avoid the significant effort involved in fundraising and what colleagues at GCRO describe as "the distortive effects" of modelling their research agenda and operations after the funders' vision. It also simplifies the relationship with government, who do not have to work from the observatory. Instead, GCRO can be "maximally responsive" to short term requests and demands from government. Some activities resulting from this collaborative arrangement include providing direct assistance to government through on-request policy work, connecting government to academic expertise, and conducting longer-term applied research both on request from government and through self-initiated projects.

Physically housed within the University of Witwatersrand, GCRO maintains a critical distance from government. This positions it as able to coordinate efforts between various policy actors – an important role for a boundary-spanning organisation like GCRO, given that government in Gauteng has historically found co-operative governance to be "extraordinarily difficult to do" despite having been transcribed into policy for many years. The challenges faced by governments in enacting cooperative governance perhaps "exposes levels of anxiety" about having to navigate multiple, competing agendas at work simultaneously. In this context, GCRO's convening role is "tricky" and yet also crucial for pushing forward valuable projects.

An example of GCRO exercising its intermediary role can be seen it how it approaches the fractured transport system in the region. Each municipality is responsible for its own transport system, and no single ticketing system operates across the whole region. Now, however, new legislation and authorities have opened an opportunity for the transport system to be better integrated, and GCRO hopes to position itself as a source for governance-related questions and useful research as a new arena for cooperative governance emerged.

Figure 14. The Gauteng City-Region Observatory has been active in the Gauteng city-region since 2008. (Image courtesy of the Gauteng City-Region Observatory)

Importantly for its established credibility with government, GCRO has strategically positioned itself as a partner, rather than critic, of the government. In doing so, government views the observatory with a level of trust, which has been built slowly over time. Rather than critiquing the government, which GCRO leaves to other research centres in the region, the observatory instead generates and disseminates research they "hope will be helpful" and will influence the region towards its vision for the future. This careful consideration in managing GCRO's relationship with government across all levels has yielded great trust in the observatory. Illustratively, the GCRO initially had an agreement with the Premier of Gauteng to embargo research findings before release. Now, however, the Premier encourages GCRO to publish openly – a development that the observatory credits to the tone of voice used in their analysis, opting for "modulated analysis" instead of critique.

The trust that has been fundamental to GCRO's operations extends to the individual level, resulting in repeat instances of individuals within the observatory "who are able to persuade or have been approached by government to set up frameworks for things that may be politically difficult." One example of this involved the development of a water security plan for the region. Gauteng is a water-scarce region, with projections of intensified water stress as climate change progresses and as the population of the region expands. In light of these circumstances, GCRO took the lead in developing a water security plan with the backing of the premier.

Critical to the development and subsequent support of the plan was the presence of an individual within the observatory who is "well-known for being highly skilled and highly trusted." As a result, she was afforded the opportunity to move forward with the plan.

Another illustrative case revolved around green infrastructure – something for which GCRO has advocated for several years and in which government was not historically interested, seeing it as "middle class" concern. As opinions have shifted towards recognising that green infrastructure is "absolutely essential" for equitable and resilient cities, GCRO worked with the receptive domains of government to understand and frame green infrastructure as something more broadly acceptable.

While originally conceived to be only an online space in which university researchers would come and lend some of their time, GCRO colleagues note that part time engagement wouldn't do the trick. Instead, "you've got to have people who are full time, part of the core, who are able to drive this work in appropriate ways." By landing on this particular model with staff fully dedicated to a particular agenda, GCRO is able to then "generate an identity, a set of relationships, and networks that enable them to specialise in that particular direction."

In the context of the COVID-19 crisis, the significance of interpersonal relationships came to the fore. Although GCRO typically works with the provincial government, the pandemic stemmed newfound and deepening relationships with other levels of government, including municipal and national. As such, staff were suddenly thrust into the "micropolitics of data" and rapidly learned to negotiate a "very delicate and sensitive political landscape" – resulting in the development of what might be considered new "social technologies." Further, as a result of their ongoing research activities for over a decade and the strength of their pre-existing data, GCRO was able to contribute key insights for decision-makers throughout the crisis – both proactively and in response to specific decision-makers' queries and needs – rather than relying on "shaky" data from elsewhere. In fact, in response to the crisis, GCRO has begun producing a new output, called "data insights," which are "presentation-style documents intended to be policy-facing" for the purpose of providing data, particularly spatial, to elicit quick responses from decision-makers. This once again demonstrates how the continuous relationship GCRO has fostered with government results in mutually beneficial and tailored work produced by the observatory.

This case sheds light on GCRO's distinctive role between academia and government, and its evolution over time, and how its governance structure affects its operations. The case also foregrounds the significance of personal relationships in observatory operations – an omni-present, yet oft neglected aspect to institutional performance.

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04 INTERNATIONAL EVIDENCE: OBSERVATORY OUTPUTS

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OUTPUTS TYPES AND TARGET AUDIENCES

Observatories produce diverse outputs, ranging from documents, such as policy briefs, academic publications, and spatial analytics to education and training materials and advisory services. Typically, they generate multiple output types, with 88% of our case studies doing so. These multiple output types correspond to the varied stakeholder groups towards which observatories direct their outputs.

A majority of observatories cite researchers and practitioners as intended targets and thus produce research reports to inform future research and practice. In fact, of the thirty-two observatories examined, 65% produced research reports publicly available on their websites, making research reports the most commonly produced output. Notably, those that do not produce research reports tend to conduct research based on contextual surveillance, census data, and spatial analysis. Examples include AURIN, which has a dashboard function that enables users to create spatial visualisations primarily drawn from census data; the Dublin Dashboard, which uses historic and real-time data in interactive maps designed to enable informed decision-making; the Urban Flows Observatory, which deploys sensors around Sheffield to deepen understanding of the physical processes at work in the city; and the Urban Expansion Observatory, which uses satellite imagery to track urban expansion in over 200 urban sites around the world.

Interestingly, but perhaps understandably for its socio-political context, the only observatory not to report policy-and decision-makers explicitly as a target audience is the Beijing City Lab. While it orients its outputs towards the research and science community, describing itself as a "research network" and listing its three goals to be serving as a networking platform, disseminating knowledge, and sharing data, its outputs nevertheless are openly available to be used for informed decision-making.

Of the observatories examined, 16% serve in some educational role akin to that of universities, or indeed via their host universities, offering either or both Masters and PhD programs. Interestingly, observatories with this function all produce academic publications and actively seek to network urban knowledge and drive knowledge exchange. LSE Cities works "to consolidate a growing network of urban experts," while the Beijing City Lab describes itself as "China's first open urban research network." Mistra Urban Futures partners with transdisciplinary research platforms in cities across the Global North and South and is guided by a belief in "co-production of knowledge as a winning concept for achieving sustainable urban futures and creating accessible, green and fair cities." The Indian Institute for Human Settlements identifies three network types that are critical to their mission: networks of knowledge, networks of practice, and networks of people.

An additional 13% of the observatories explicitly offer advisory and consulting services. LSE Cities and the Indian Institute for Human Settlements generally offer consulting services to government officials, practitioners, development agencies, NGOs, and private firms, while the Centre for Liveable Cities and KRIHS both cite governments and researchers as key targets and provide advisory services for cities in developing countries, possibly suggesting that the observatories work to position Singapore and South Korea as world-regional leaders in urbanisation. In fact, KRIHS actively links developing country partners to Korea's development funding agencies through its Global Development Centre. Of course, there are many cases that might less explicitly do so as well through research contracts of a variety of forms – an area certainly worthy of further exploration.

Open access to observatory outputs also emerged as a key trend across observatories with 84% of them making their outputs publicly available. This demonstrates a commitment to observatories' function of distributing the information they gathered. In fact, GCRO creates "deliberate strategies of making [its] work as visible and as accessible as possible"[47]. At least 35% of observatories produce outputs in multiple languages, thus further easing accessibility. Mistra Urban Futures, for example, translated a summary for policy makers of its flagship book Rethinking Sustainable Cities (2016) into Swedish, Hindi, Spanish, and English for their city platform partners around the world. It also ensures all of its outputs are open access, including academic papers and books, for which they pay article processing charges, so paywalls do not prevent readership and thus guaranteeing access regardless of income or institutional affiliation[48].

CASE SNAPSHOT: KARACHI URBAN LAB

Figure 15. Screen capture of one of KUL's digital narratives, which juxtapose images with narrations of the significance of the images as told by the community members who took them. (Image used with permission from the Karachi Urban Lab)

Karachi Urban Lab was founded in 2018 and is housed in the Department of Social Sciences and Liberal Arts at the Institute of Business Administration Karachi. It seeks to foster connections between research, teaching, public policy dialogue, and advocacy and to promote sustainable urban-rural development with a particular focus on ""issues of social justice and equity in delivery of infrastructure services and housing." Its projects are collaborative and engage community members, activists, policymakers, and academics, both locally and internationally, and the Lab takes an active stance to give "marginalised voices a platform to articulate their views, their feelings, and their visions of the future."

The Karachi Urban Lab produces academic outputs, reports, videos, blog posts and upcoming podcast, and digital narratives, which are written pieces supplemented by extensive digital imagery with narration of the story behind each image (see figure 15). Importantly, the Lab is "committed to ensuring that the communities that are the subjects of study are always involved in [KUL's] projects as stakeholders through co-production of knowledge." The Lab shares its findings with stakeholders and is careful to show how the communities how they helped KUL and to ask, "What do you think about this data? Where are we wrong about this? Where are we right about this? How do you think we can take this forward? How can you use it?" And, as colleagues at KUL note, while some community members were initially hesitant to engage with KUL feeling consultation fatigue after having been contacted repeatedly by groups such as other NGOs, government representatives, and multilateral donors, they have ended up inviting the Lab back after seeing the quality of its outputs. KUL is highly active in "getting their voices out" through media campaigns, both print and social, and through these processes, and, as KUL colleagues point out, with patience and time, the Lab has developed relationships of trust with their interlocutors.

Doing so, however, brings forth an ethical challenge faced by the observatory regarding whether its research activities and outputs will endanger its stakeholders. One such example ties to issues of gender. Pakistan is a patriarchal society with "gendered hierarchies that are attached to patriarchal norms in which men do not allow their wives, daughters, or mothers to participate in public activities, such as resistance to evictions or displacements or discussions with government representatives." This creates a tension for the Lab, which wants to enable women to participate in these activities from which they are typically under-represented but at the same time does not want to become "instigators of change that puts women in a situation where they become objects of harm by men in their households." Thus, KUL must balance embedding itself within the communities with which it works without creating damage or upsetting the local order.

These ethical research dilemmas came to the fore again amidst the COVID-19 crisis. Like everywhere else in the world, Karachi underwent a lockdown at the outset of the pandemic, which immediately halted all on-the-ground research activities. While the lockdown itself has since concluded, KUL has not restarted its research activities, instead relying on information to come from interlocutors and community informants with which they

had connected before the pandemic. Colleagues from KUL describe feeling "deeply hesitant" in a moment during which asking questions becomes intrusive when their contacts are simultaneously facing "challenges of putting one meal on the table."

Additionally, KUL's outputs put them at odds with government, at times, when it questions the existing hierarchies and systemic structures, thereby making government representatives wary of involving themselves with the Lab. As a relatively new institution, colleagues at the Lab note that it is still finding its space within Karachi's landscape of government systems, communities, and other stakeholders, aligning itself with other non-governmental organisations like the Urban Resource Centre, which has existed for over twenty years. Currently, it is "watching and waiting for that moment" when government representatives will approach them to open dialogue. The Lab intentionally creates space for "balanced, substantive dialogues" by inviting representatives to speak with them and with communities. However, these invitations are often ignored out of government representatives' fear that they might be "called out or humiliated" – particularly with regards to corruption.

In the context of the pandemic, a dichotomy emerged between the state-sanctioned narratives about Pakistan through the crisis and what KUL's interlocutors observed occurring within their communities. An article published in the Wall Street Journal describes Pakistan as a "bright spot"[49] amidst the crisis, reporting that the country has successfully controlled the virus – a remarkable feat when compared to neighbouring India and to Brazil, which has a similar population size . The reality on the ground captured by KUL, however, tells a less uplifting story of state disorganisation, with residents of informal settlements unable to access food rations, health centres, or welfare checks, and "deliberate and very strategic" state-led obfuscation of data in order to "give it the leverage to do whatever it wishes and wants". In this context, the Lab plays an important role in challenging the prevailing narratives and gathering and analysing much-needed data in a state where urban knowledge deficits are sizeable, often being equated by KUL colleagues as "working 'in the dark'." Researchers and activities, as they note, are dealing with "ground realities that are deeply unclear and murky" further compound by a "particularly complex" realm of governance where it is often hard to "understand how local government and local governance dynamics can function".

From this case study, we can begin to understand some of the challenges observatories face with regards to their outputs, both practically and ethically, as well as how they've situated themselves within their local context. Like other observatories studied for this report, KUL provides free access to many of its outputs on its website, thereby demonstrating its commitment to disseminating its findings. It produces both written and multimedia work, such as videos and its digital narratives, which open avenues for engagement beyond the traditional "expert." It also presents a clear example of the role an observatory can play within a locality's larger knowledge ecosystem, particularly in a context with data deficits at the scale of Karachi's and in which data is, at times, hidden or mobilised against the public good.

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OBSERVATORY THEMES: OUTPUTS AND STRATEGIC VISIONS

Like the types and targets of observatory outputs, themes also varied, with most observatories addressing multiple themes. From the thirty-two case studies analysed, eight key themes emerged: "Governance"; "Economy"; "Housing, Land Management, and Infrastructure"; "Historical and Future Development"; "Social Justice"; "Health"; "Mobility"; and "Environmental Sustainability."

The most frequently cited theme across the observatories is "Environmental Sustainability," with 45% of observatories producing outputs or relating their mission to this theme. Observatories addressing this theme mentioned the environment, climate change, or sustainability in its mission or research themes. The Urban Flows Observatory, for example, aims to understand energy and resource flows in order to "help cities to thrive within the carrying capacity of the planet." Similarly, the Future Cities Lab seeks to "actively respond to the challenges of global environmental sustainability," while LSE Cities has a dedicated research stream about "cities, environment, and climate change."

"Housing, Land Management, and Infrastructure" and "Governance" are the next most frequently addressed themes at 36% and 32%. KRIHS exemplifies the "Housing, Land Management, and Infrastructure" theme, with its research themes categorized as National Territorial Planning Research, Land Management and Urban Research, Infrastructure Research, Housing and Land Research, Geospatial Information Research, while the Observatory for Decentralised Cooperation, with its focus on shared governance and implementation of the 2030 Agenda and the SDGs at the local level, stands out as an example within the "Governance" theme.

Of the observatories studied, 32% related their mission or research objectives to "Mobility," which captured observatories that monitored transportation and movement around the city. An example is the GCRO, whose research theme "Landscapes in Transition" is dedicated to "deepening its research into space and mobility."

The "Social Justice" theme was addressed by 26% of the observatories and is characterised by an explicitly pro-poor agenda and research focused on the "just city" and inequality, which ties closely to the UN's commitment to "leave no one behind" . The Urban Resource Centre provides a strong example of this theme because one of its guiding objectives is to "understand planning issues from the point of view of local communities, especially poor ones."

The "Historical and Future Development" theme was addressed by 19% of observatories. Observatories who addressed this theme trace change over time, looking both to the past and the future. The Centre for Liveable Cities exemplifies this theme because its guiding research questions are: "1) How has Singapore transformed since its independence in 1965? 2) How should urban development knowledge be applied to address current and future challenges for Singapore and other cities?" The Greater Toronto Urban Observatory is another example because its research maps neighbourhood change over time in Toronto as well as other Canadian cities in order to assess implications for the future of the region.

The least-frequently referenced themes are "Economy" at 16%, "Global Agendas" at 16%, and "Health" at 13%. The Centre for Cities provides an illustrative case of an observatory within the "Economy" theme because its mission explicitly states its intention to "help the UK's largest cities and towns realise their economic potential." Observatories who contributed to the "Global Agendas" theme gear their observatory functions towards addressing the Habitat Agenda, the MDGs, and/or the SDGs. Al-Madinah Local Urban Observatory addresses this theme because it theme because it explicitly incorporates MDG indicators into its monitoring activity. Finally, the Sierra Leone Urban Research Centre exemplifies the "Health" theme with its inclusion of a research stream dedicated to urban health.

Although the analysed observatories do not all consistently engage with the NUA and SDGs, their monitoring role and outputs associated with such activities nevertheless engage with

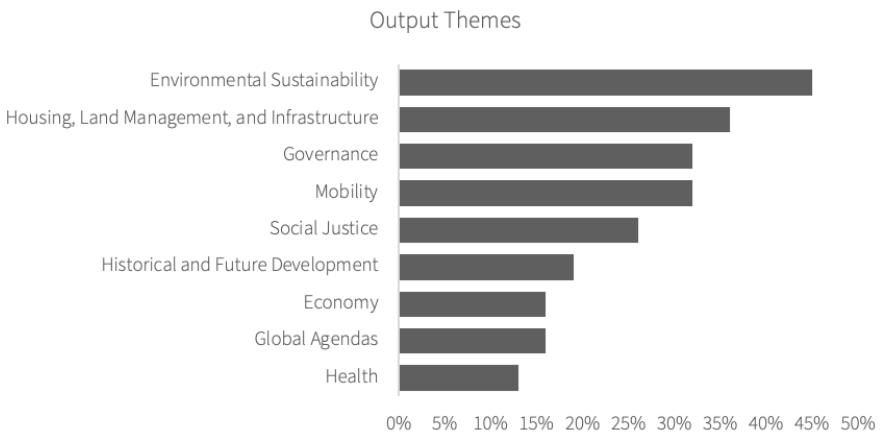

Figure 16. Of the non-exclusive output themes identified, "Environmental Sustainability" appeared the most frequently in 45% of cases.

topics and objectives closely aligned with them, in particular SDG 11. The Al Madinah Local Urban Observatory, for example, collects data for shelter and urban development indicators specifically designed around UN-Habitat's guidelines, while Mistra Urban Futures designed a whole project on comparative urban perspectives around implementing the NUA and SDGs. Meanwhile, LSE Cities, which produced a policy paper that explicitly engaged with the NUA, also more implicitly engages with the NUA and SDG goals and targets through its research on, for example, urban mobility transitions, which speaks directly to Target 11.2 "provide access to safe, affordable, accessible, and sustainable transport systems."[51] Similarly, the work of the Karachi Urban Lab, which does not explicitly engage with the NUA or SDGs, nevertheless contributes to their achievement, with research conducted, for example, on the intersection of gender, mobility and violence in Urban Pakistan – a topic that addresses targets of many SDGs, including SDG 10 "Reduce inequalities," SDG 11 "Sustainable cities and communities," and SDG 16 "Peace, justice, and inclusive societies." [52]

BALANCE BETWEEN QUANTITATIVE AND QUALITATIVE

Quantitative and qualitative research methods are both extensively employed by the examined urban observatories. While most mix qualitative and quantitative, some tended heavily or exclusively towards only one method and are worthy of note here as interesting insights into the type of narratives and mobilisation tactics when it comes to depicting their urban areas of reference.

Observatories tending towards quantitative research are characterised by an emphasis on collection and analysis of statistical data. The Centre for Cities in London, for example, analyses and produces research reports, policy documents, and data visualisations quantifying the economic potential of UK cities based on data such as exports per job, average weekly workplace earnings, and housing stock. Meanwhile, the Beijing City Lab foregrounds the use of geospatial analysis and analysis of big data as means to understand urban patterns and trends. Finally, the Manila Observatory conducts atmospheric and earth science research to produce "science-based" reports aimed at addressing sustainable development and poverty reduction, for example gathering and analysing black carbon data in Manila to raise awareness of the air quality crisis in developing and emerging countries in Southeast Asia.

Observatories tending towards qualitative research methods are less common than quantitative-tending ones. They are characterised by an emphasis on interviews, focus groups, and document analysis employed to contextually understand urban challenges. The Afghanistan Research and Evaluation Unit consistently includes interviews in its methodologies in studies ranging from an examination of informal credit practices in rural Afghanistan to one on the effects of illicit poppy cultivation on the transformation of southwestern Afghani deserts. Meanwhile, the Sierra Leone Urban Research Centre uses interviews and document analysis to, for example, scope the urban health landscape in Sierra Leone and to examine how social learning processes can build resilience in informal settlements.

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CASE SNAPSHOT LABORATORIO PARA LA CIUDAD

Laboratorio para la Ciudad (LabCDMX) was an experimental space and "creative think tank" active from 2013-2018 that was hosted by the Mexico City Government – the first of its kind in Latin America. It was started by invitation of a newly elected mayor of Mexico City interested in investigating and understanding "novel ways of thinking about participation" and urban innovation. The Lab consisted of about twenty staff, drawn from diverse backgrounds including urban geographers, political scientists, and data experts alongside artists, designers, activists, philosophers and beyond. This team sought to "bridge between civil society and government" and in doing so, had to work within the "diversity and divisiveness" of a megalopolis like Mexico City in which "incredible, daunting mistrust exists between civil society and government." By bringing together this mix of people to work in the experimental arm of the city's government, the Lab sought to shape policy in such a way that had not been possible to do so from the civil society side. And interestingly, as a result, research findings from Lab projects garnered greater trust from civil society than those led solely by government. Thus, the Lab's independence from government meant their research findings used to inform evidence-based policy-making was perceived to be more valid in the eyes of the public – highlighting the unique role in urban governance these boundary-spanning institutions play.

The Lab's research agenda was structured around six key areas: the Open City (democracy and urban governance); the Pedestrian City (pedestrian mobility and road safety); the Participatory City (participatory planning); the Playful City (bringing children's perspectives to urban development plans); the Creative City (creative capital in the design of the city); and the Global City (urban diplomacy). This agenda was devised to address the greatest challenges facing Mexico City, as identified through desk research of the priority issues being tackled by activists and foundations and through a participatory exercise in which over 30,000 citizens were given an "Urban Imaginary Survey." The survey asked citizens to describe what they perceive to be the greatest challenges faced by the city, but also the greatest opportunities. By asking for citizens to identify opportunities, LabCDMX sought to ensure it wasn't operating, as colleagues at the former Lab describe, "only in crisis mode, which is easy to do in a city with the size and intensity of Mexico City." Instead, the Lab also wanted to think about "sense of possibility" to not only help solve problems but also "take advantage of the opportunities." With the Creative City agenda, for example, the Lab sought "to move beyond [...]the strange legacy of modernism where we think that the city should be optimising for efficiency [...] and instead think about how can we bring a different lens into city-making?"

In order to execute this research agenda, the Lab made use of a suite of different methodologies – "one of the huge benefits of having not only a multidisciplinary team but actually a transdisciplinary team," said colleagues at the former Lab. Depending on the project, research methods may lean more qualitatively or quantitatively, however typically there was a combination of both. For every project, the first step in its execution involved a "policy sweep" to understand what the existing policy landscape was in Mexico City, followed by research into international best practices in order to avoid duplicating efforts that have already been made elsewhere. From these

Figure 17. Laboratorio para la Ciudad was an experimental project held from 2013-2018 in Mexico City. (Image used with permission from LabCDMX)

preliminary exercises, each experiment began with a "whole portfolio of best practices." Once the portfolio was developed, the methodology for each experiment was created based on the needs of the project. For one such experiment within the Playful City team, for example, the Lab was interested in understanding how practically to realise "the right to the city," which is granted to all citizens through the Mexico City Constitution and yet is difficult to execute. "The right to the city is a beautiful philosophical as well as human rights concept, but it's not easy to implement, so we wondered how can we implement the right to the city for children?" said colleagues at LabCDMX. To do so, the Lab created GIS maps, which showed the number of children per city block against indices of marginalisation, segregation, and access, or lack thereof, to public space. This mapping revealed hotspots in which children who faced high degrees of marginalisation and segregation also did not have access to public space within a 20-minute walk. Through this project, the Lab gained a particular interest in spatial justice, which later became a regular fixture of their analysis in future projects. After this initial mapping, Lab staff worked directly with the communities in these hotspots and involved children with the designers in order to get their feedback about what they wanted for the neighbourhood and what their ideas for new public urban spaces might be. By combining community asset mapping, demographic analysis, and GIS mapping, this example demonstrates the Lab's blending of qualitative and quantitative methods. This case study has highlighted two interesting aspects of observatory operations and research activities. First, by virtue of its boundary-spanning role, research findings by the Lab that were then translated into policy were regarded with greater trust by the general public than policy produced solely by government. This speaks to the unique way observatories operate within the knowledge ecosystem of a megalopolis like Mexico City – bridging local and community knowledge and the "expert, technocratic" knowledge of government. Second, the diverse composition of the Lab's staff manifested in the wide range of methods used by the lab, balancing both qualitative and quantitative. As colleagues of the former Lab put it, balancing both allowed the Lab to address challenges faced by Mexico City in terms of "official and 'objective data' as well as subjectively how people perceived their lives and realities on a very personal basis," thereby "tap[ping] into the talents of citizens and enabling citizens to have a say in how their city ends up." This again speaks to the Lab's boundary-spanning role between civil society and government and highlights the value of balancing both qualitative and quantitative methods.

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INTERNATIONAL AND COMPARATIVE APPROACHES

The level of international and comparative activity occurring at each of the thirty-two case study observatories ranged from little to no explicit activity to primarily international and comparative scope charted in the mission of some observatories. This is perhaps one of the most striking differences from across our sample of observatories, delineating a mixed geography of observatory focus and varying degree of explicit engagement with the observatory's surroundings.

A majority of the observatories we scoped engage in international or comparative activity, with 74% of observatories doing so. Examples include the World Resources Institute, Mistra Urban Futures, MIT China Future Lab, and the Observatory on Latin America. Based in Washington D.C. with international offices across India, China, Brazil, Turkey, and Mexico, the World Resources Institute is international by nature and produces publications with international case studies and comparative analysis. As detailed in our case snapshot above, Mistra Urban Futures co-produced transdisciplinary projects with city platforms in South Africa, Argentina, the U.K., Kenya, and India, emphasising its focus on sharing learnings and processes rather than setting a standard for comparison between city platforms. The MIT China Future Lab produces both international and comparative outputs, particularly under the "New Cities" theme, which explicitly states one of its research goals as "Global observatory and international comparative studies of new city developments." Finally, attributable to its nature as a world-regional observatory, the Observatory on Latin America is necessarily both international and comparative in its activities.

Some observatories, while still engaged internationally, focused more on comparative activities, such as the Beijing City Lab, which networks internationally but focuses its research within China, producing comparative studies between Chinese cities. Seven of observatories appeared not to conduct explicit international or comparative work (if not for some smaller outputs) and several of these have stated to focus solely on their localized areas of study. Notably, four of the six observatories in this category such as The Urban Flows Observatory, the Dublin Dashboard, The Urban Resource Centre, LabCDMX – are situated at the local level with an explicitly city-oriented mission. Yet even a nationally comparative enterprise like AURIN, which gathers data for all major metropolitan areas in Australia, has little to no comparative international data.

In turn, for two of the observatories, enabling comparison between cities internationally is the primary purpose. The Metropolis Urban Observatory is intended to "offer reference frameworks for metropolises as concerns the need to include the metropolitan perspective in urban governance." The observatory produces research reports that compare cities by using a set of metropolitan indicators established by Metropolis, with each report focusing on a specified issue, such as digital transformation or gentrification. It also holds an annual meeting of city managers from around the world in order to bring them together to discuss and compare their experiences. The World Council on City Data is a platform for standardized urban metrics designed to provide a method for evaluating and comparing cities based on indicators, with now an explicit attempt to gear its comparative data to the local implementation of an international agenda such as that of the SDGs.

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CASE SNAPSHOT: LONDON SCHOOL OF ECONOMICS CITIES PROGRAMME (LSE CITIES)

LSE Cities is an international research centre at the London School of Economics and Political Science (LSE), that performs research, education, advisory, and outreach activities both in London and abroad. A now internationally well-known urban research centre, LSE Cities seeks to understand the spatial, social, economic, and political dynamics shaping global cities with a focus on issues of inclusivity and social justice, environment and climate change, and good governance. Originally established in 2010, the centre grew from the Urban Age Programme a joint initiative of LSE and the Alfred Herrhausen Gesellschaft. As colleagues at LSE Cities say, "at the heart of LSE Cities is the recognition that place-making, the physical configuration of the environment, is an enormously important and political task and that at the level of deciding on infrastructure, design, architecture, one must consider the political implications." LSE Cities is for us another case of an institution that performs observatory-like functions (similar to IIHS for example) within wider institutional initiatives such as training and other forms of urban research.

LSE Cities has been recognised time and time again for its capacity to muster, mobilise and communicate data about cities around the world that has much to do with monitoring their evolution and state. For instance, the Urban Governance Survey, developed by LSE Cities, UN Habitat, and the United Cities and Local Governments network, which was first launched in the summer of 2014. The survey examined multiple aspects of municipal planning, management, and governance covering 78 cities from all world regions in its first round and 127 in its latest iteration. This example underscores the 'partnered' mode of operations of LSE Cities, which very often involves actors and institutions outside of academia but also stresses once again the importance of understanding observatory-like functions in the context of wider and perhaps more academic endeavours.

The capacity to leverage monitored data about cities and urban processes into conversations and debates has been important for the operation of LSE Cities. For instance, results of the Urban Governance Survey informed the 2014 Urban Age Conference in Delhi, India.

LSE Cities has held sixteen Urban Age conferences in fifteen different cities since 2005. Conference locations have included Rio de Janeiro, Mexico City, Istanbul, Mumbai, Johannesburg, and others. Each conference is framed by an urban challenge, with past themes including: cities and health, the impacts of grand scale urban transformations, and the urban development in countries that are facing high rates of urbanisation. These conferences serve as sites for urban leaders, policy makers, academics, and practitioners to meet, to exchange ideas, and to have "very open and proactive engagement teasing out where the differences are." Building on the success and strengths of the

Figure 18. Kampala Old Taxi Park ©Mudondo Evaline

Urban Age Programme, the Urban Age Task Force, launched in 2019, now partners with city governments to formulate methods for achieving environmentally, socially, and spatially sustainable urban change and is currently working with City administrations in Addis Ababa and Athens.

The research activities at LSE cities are decidedly international and comparative in their approach. Projects are carried out internationally in places such as Kuwait, India, and Myanmar, and also comparatively, for example an international comparative study of urban mobility transitions in London and Berlin or a comparative study of urban infrastructure interface governance in Addis Ababa and Dire Dawa, both in Ethiopia.

Once again, observatory and monitoring functions sit within wider academic roles. LSE Cities has an increasingly prominent educational stream to its work, providing Executive Master of Science in Cities and short courses for urban professionals, which focus on understanding urban society and urban change, or more general Urban Studies. These programs provide a framework for the Urban Century's future thinkers and as part of the internationally recognised London School of Economics, attract students from around the world. Interestingly, this pedagogical work is still deeply rooted in many of the analyses and urban research strands that we could tag as 'observatory-like functions', stressing the capacity and perhaps productive potential of these to underpin forms of training and capacity building that can drive change in urban governance and decision-making, and yet have received again limited attention when it comes to discussing urban observatories.

From all of these activities, we can see that the very core of LSE Cities is an international and comparative project. Partnering with governments, conducting research, convening conferences, and hosting students from around the world define its identity. This distinctly international and comparative nature and the longevity of its operations have yielded a vast wealth of knowledge and expertise.

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05 URBAN OBSERVATORIES AND THE COVID-19 CRISIS

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IMPACTS AND RESPONSES TO COVID-19

In addition to the deleterious health and economic impacts of coronavirus, COVID-19 has also been an epidemic of misinformation and rumours that has brought the need for evidence-based decision-making to the fore. As boundary institutions situated at the intersection of research and decision-making, observatories played an integral role in providing reliable and actionable knowledge, information, and data in order to aid urban responses to COVID-19 in the wake of this "infodemic"[53]. By examining urban observatories within the context of the pandemic, we're able to see how these institutions localise the features, activities and outputs discussed in prior sections of the report, thereby locating our descriptions and definitions in a real-time and ongoing global event. Much like case studies help to demonstrate, for example, how the SDGs can be localised, we'll illustrate here the ways in which observatories can respond to shifting and unexpected urban dynamics in the context of a crisis. This section will therefore make a value proposition for founding urban observatories where they don't yet exist and further supporting them where they do as a means towards achieving a more sustainable future.

The non-exclusive and, in fact, complementary activities performed by observatories has yielded a productive mix in the context of a crisis where urgent information is needed. GCRO, for example, has provided support and advice to multiple levels of government using its data visualisation and analytics capacity, with over half its staff shifting to do so. At the outset of the pandemic, GCRO was swiftly able to draw on its extensive research into quality of life in the city-region to develop spatially specific vulnerability indexes that identified communities most at risk to the virus. This assisted government in planning mitigation measures in those areas. Thereafter, the GCRO became closely involved in analysing data to identify transmission hot-spots and understand how the pandemic was unfolding differently in varying contexts and communities. The GCRO was called on to advise government structures at all levels and was a member of the Premier's COVID Advisory Committee. In these roles, the GCRO found itself fulfilling a discreet intermediary role between functional areas of government. It's strong baseline data and skilled staff equipped GCRO to quickly pivot and play this critical advisory role for government in response to the pandemic. Like GCRO, IIHS stepped in to assist with responding to COVID-19. When over six million people were stranded without access to state-provided food support in Delhi, a city where IIHS has been active for over a decade, the Institute mobilised its staff skilled in GIS and data analytics to quickly establish an emergency response, followed later by partnerships with state agencies to set up longer term social protections. Additionally, building on IIHS' 5-year long engagement with the state government of Tamil Nadu on urban sanitation, IIHS secured personal protective equipment (PPE kits) for at-risk sanitation workers, provided food rations, and created enterprise-based livelihood support programmes for the urban poor. Both of these cases lay bare the capacity-filling and strategic support roles that observatories have come to play and the crisis itself revealed the states' reliance on these boundary-spanning institutions.

In addition to their ability to act on pre-existing knowledge and expertise, as in the cases of GCRO and IIHS, observatories can also tap into repositories of expertise outside their respective institutions thanks to their knowledge exchange and networking activities, which connects them with skilled individuals and specialised organisations. Observatories in the crisis have often sought to create conversation platforms about the evolving situation and its impacts on the shape of urban development worldwide. The World Resources Institute Ross Center for Sustainable Cities (WRI Ross Center) and the Centre for Liveable Cities (CLC), for example, have been hosting a number of COVID-related webinars. And, in fact, CLC's webinars have become part of an ongoing series called "Cities Adapting to a Disrupted World" in which topics discussed include how cities can thrive in the context of new technologies, social shifts, and the climate crisis. Another example of the impact of these networks in action are Metropolis's Cities for Global Health project and Emergency Governance Initiative for Cities and Regions, established in partnership with LSE Cities and United Cities and Local Government. Cities for Global Health is a repository to which members and non-members alike can submit their COVID responses to share with one another, while Emergency Governance Initiative for Cities and Regions aims to build vertical and horizontal governance capacity in response to complex emergencies and global challenges. By animating its network to establish these information-sharing initiatives, Metropolis encourages policy mobility and cross-boundary engagement. These new mediums of information sharing instigated by the crisis also highlight a shift towards decentralising information-sharing from large, in-person exchanges to sharing platforms accessible anywhere.

In addition to the value of their pre-existing activities, so too does observatory positionality enable them to produce specific responses attuned to the needs of the localities in which they operate. WRI Ross Center and the Urban Expansion Observatory, for example, both operate at the international scale and produced

COVID outputs with decidedly comparative perspectives to them. Like CLC and Metropolis, WRI Ross Center also tapped into its network of experts to produce a series of blog posts and webinars and provide commentary on topics such as COVID-19's effect on public transport, social systems, and the negative knock-on effects in other systems when social systems are strained. As an international organisation with locations in multiple countries, WRI Ross Center is uniquely positioned to engage in global conversations informed by local realities, thereby connecting local and global networks of information. Urban Expansion Observatory, meanwhile, released an interactive map showing the impact of the pandemic on city lights at night in eleven major cities using pre-existing infrared imaging from December 2019 to March 2020 as a proxy for showing the decline in economic activity during this timeframe. The map, then, demonstrates the value that observatories present in terms of capacity to collate and present existing sources of data, NASA in this case, in a timely fashion. At the other end of the spectrum is SLURC, which focuses its attention on the community scale. SLURC worked with city officials in their preparation of a COVID-19 action plan, putting the community realities of informal settlements at the fore of city-level decisions and challenging the "one size fits all" solutions cities typically prioritise. In doing so, SLURC advocated for recognition that COVID-19 is not simply a health issue but rather a complex reality with compounding, interconnected factors contributing to vulnerability. Simultaneously, SLURC leveraged existing platforms from pre-pandemic community mobilisation and capacity building activities to support communities in their COVID-19 responses. In both instances described, SLURC's boundary-spanning role is important not only for the information it provides but also for the ways information is gathered and mobilised.

Shifting our focus from how the positionaling of observatories shaped their COVID responses, we now turn to a discussion of the outputs produced and mobilised in a time of crisis. As was evident in the earlier review of GCRO's response to the pandemic, the baselining approach taken by observatories could ensure some degree of resilience of these data systems to the 'next' crisis, be that a similar pandemic, a very different natural disaster, or an unexpected major infrastructural fault, allowing transferability of evidence between contexts. Like the GCRO, AURIN is also designed to keep the pulse of specific urban areas, however in this case in Australia. Its spatial intelligence workbench supported at least three COVID-related research pieces on the impacts of the pandemic on Australia within the first months of the crisis. Similarly, the Newcastle Urban Observatory was able to quickly adapt its real-time data capture infrastructure to create a dashboard focused specifically on tracking the impacts of COVID-19 policy responses and enabled policymakers to trace variations in factors, including social behaviours, improvements in environmental indices, and mobility. Crucially, long-term, trust-based relationships between Newcastle Urban Observatory and public authorities resulted in the quick adoption of the COVID-19 dashboard by key public stakeholders[54] – a phenomenon that mirrors the GCRO's experience.

A commonplace action taken by observatories in light of the COVID-19 crisis has in this sense been that of quickly disseminating information and share emerging outputs of relevance to the crisis that are produced both within and outside the observatories. The Dublin Dashboard, for example, tweeted about a new COVID-19 Health Surveillance Monitor developed at its hosting institution Maynooth University in conjunction with government and a private sector mapping agency. The dashboard shows various graphs and spatial representations of the virus's distribution around Ireland. By using Twitter as a platform to share health surveillance information, the Dublin Dashboard empowers local actors to use the tool to understand COVID-19's impact on Ireland. LSE Cities in London, the Indian Institute for Human Settlements in Bangalore, Metropolis in Barcelona, and the Urban Resource Centre in Karachi also use Twitter and Facebook to share COVID-relevant videos and articles written both at and outside their respective institutions. Meanwhile, the Centre for Cities in the UK and the Seoul Institute in South Korea have both curated special blog series focused on COVID. The Centre for Cities' blog includes a general overview of COVID's effects on the UK with particular attention paid to the economy, living situations, worker responses to COVID, and vulnerability variability between cities. Blog posts feature a range of topics centred on COVID's effects on the economy, for example, interrogating if COVID will accelerate the demise of high streets or about the relationship between pre-COVID employment outlooks and cities' ability to cope with lockdown. Likewise, the Seoul Institute released a special issue of policy reports, research reports, and trends from other world cities focused on infectious disease. Topics include new approaches to policy responses to large-scale urban disasters, COVID-19's effects on small businesses and tourism in Seoul, and recommendations for preventing the spread of COVID-19. For the Karachi Urban Lab, its relationship with the media has proven itself to be a key mode of information dissemination with regards to articulating their agenda and their findings throughout the crisis. Notably, the Lab explicitly engages with Urdu media as a means to connect directly to communities in contrast to most academics in Pakistan who take an English-oriented position, which can be perceived as elitist. By working with both the Urdu and English media, the Lab uses language as a basis for reaching a wider audience when disseminating information.

Observatories faced challenges deploying new research methods in the face of the pandemic, particularly with regards to working remotely, making use of new technologies and new use of existing technologies. In the case of SLURC, for example, there has been a heavier reliance on mobile phones for data collection and sharing as well as platforms like Zoom for engagement. Reliance on these forms of communication are likely to stay, however the infrastructure to support them and methods based on them still needs improvement. Likewise, in Pakistan, research activities have halted as a result of the pandemic, so the Karachi

Urban Lab depends on video, telephone, and handwritten dispatches directly from community contacts. Not only are there new methods, tools, and forms of engagement that emerge from the crisis, so too are there new voices and voices not typically captured in urban conversations as a result of COVID, for example unions of informal workers in India whose voices are now coming to the fore through their work with IIHS.

Using these technologies, however, comes with a suite of ethical dilemmas faced by the observatories. Of primary concern is the intrusiveness of sourcing data remotely from communities under duress from the pandemic. While voluntarily shared, researchers at the observatories nevertheless cite hesitation about using the data gathered from their interlocutors. Another concern pertains to the creeping expansion of digital surveillance, particularly given that COVID-19 has given governments essentially free license to control populations and rapidly acclimate them to a "new normal." And yet despite these concerns, colleagues at IIHS noted that there are concurrent instances of digital empowerment, for example in Delhi, where an SMS notification from the provincial government about new digital ration cards led to over one million registrations in a matter of days. The current opening for greater digital surveillance certainly opens up greater challenges to the way we gather information and share stories of and data about the crisis.

At the heart of the situation, the pandemic revealed a tension between what is perhaps an overload of data and information emerging from the crisis and the need for reliable and credible information in decision-making when tackling what is a multifaceted crisis, not just a health hazard, in urban areas. Looking forward, a role that may be well-suited for these boundary institutions: that of the broker mediating between the speed of demand and the need for establishing solid longitudinal data. As these cases have shown, there is a pressing need for institutions which can support evidence-based decision-making at the city level, made all the clearer by the pandemic. In light of this demonstrated need, initial calls for the need for various layers of government to pay attention to (or even establish) urban observatories in their own localities are clear.

CASE SNAPSHOT: NEWCASTLE URBAN OBSERVATORY

Newcastle Urban Observatory (NUO) is part of the observatory network established across the United Kingdom with a focus on contextual surveillance that aims to apply scientific techniques to measuring urban interventions. NUO, which is based at Newcastle University, captures and monitors billions of data points from deployed sensor networks and other third party sensors networks and makes these publicly available55. When the pandemic hit, a team of data specialists were able to curate a COVID-specific dashboard using NUO's pre-existing Internet of Things sensing infrastructure to track the impacts of government policy interventions and any associated social changes by comparing historic and real time urban data.

In response to COVID-19, NUO presented three attributes that demonstrate the value of observatories in a time of crisis. First, it was able to quickly repackage existing data and capitalise

on the expertise of its staff to curate, analyse, and visualise data specifically as they relate to coronavirus and its impacts, recalling the experiences of other observatories like AURIN and GCRO. In fact, the first version of NUO's COVID-specific dashboard was developed in less than 48 hours. An example output from the dashboard was a visualisation showing the effects of lockdown measures on regional traffic, highlighting the steep decline immediately after the March lockdown and a slow creep back up by April. This rapid repurposing of existing data infrastructure thus gave decision-makers access to evidence immediately without the wait time associated with set up and with data collection.

Second, the continuous nature of NUO's data monitoring activities provided decision makers with real-time data, which gave them accurate and current evidence upon which to act. When coupled with the "long-term data baselines" gathered over NUO's five years of existence, "interdependencies and linkages in complex systems" begin to emerge, thus establishing a more comprehensive understanding of the situation at hand. The blend of baseline and real-time data offered by NUO means that authority responses to crisis situations can take a more nuanced approach that contextualises the immediate circumstances within pre-existing conditions.

Third, the close relationships the observatory had fostered with local authorities long before the pandemic created a situation in which mutual trust enabled open collaboration. In their words,

Figure 19. Newcastle Urban Observatory uses an extensive sensor network to monitor billions of data points. (Image courtesy of Newcastle Urban Observatory)

NUO's "open collaborative approach has facilitated development of an effective platform for coproduction and knowledge exchange". The result of these "long-term working relationships" is that the observatory was motivated to help authorities in their response to the pandemic and accordingly aligned and curated data based on the needs of local authorities, thereby avoiding the typical barriers to the free flow of information between researchers and decision-maker". Having worked together in the past meant that the councils were confident in the quality of NUO's work, and their awareness

of the types of data NUO captures led councils to fit the data within the organisational planning context. To put it succinctly, the COVID-19 dashboard was a "pro-active agile development concept that complemented local crisis planning and local urban governance". Thus, as a result of the observatory's existing relations, its activities perfectly complemented the needs of decision-makers in a time of crisis.

In summary, in a time of crisis, NUO offered analytical expertise, baseline data, an established data collection infrastructure, and a resource for open collaboration with city officials. The value of these qualities are that government authorities in Newcastle and its surrounding regions were able to quickly make informed decisions based on a strong evidence base that could be compared to historical data trends. Pre-existing relationships with city officials minimised any hesitancy to rely on NUO's data and instead fostered a mutually reenforcing collaboration in which the observatory was attuned to the needs of city officials and likewise, city officials were receptive to the analysis provided by the observatory. NUO thus presents an illustrative case highlighting the value of an observatory for informing urban governance during a crisis when quick decision-making based on strong evidence is needed.

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06 CONCLUSIONS: MAKING THE CASE FOR URBAN OBSERVATORIES

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The ways in which urban knowledge mobilisation has been institutionalised in cities around the planet are vast and varied. We have sought here to take a peek at this complexity and its characteristics through the microcosm of 'urban observatories', which have been developed specifically to mobilise the various kinds of knowledge that exist in and about cities. Bringing together thirty-two cases from the Global North and South our report has aimed at offering a more intimate snapshot of observatories and their operations and, where possible, capture their voices and on-the-ground experiences. We highlighted that despite a possibly singular categorisation as "urban observatories", or even the more generous tag of "observatory-like functions", these institutions expressed their roles as boundary-spanning organisations in a variety of different ways. In turn though, this preliminary investigation has underscored how these institutions embody complex scalar relations between layers of urban governance from the neighbourhood to the multilateral. They have underlined the importance of attending to the information-based dynamics that emerge from different knowledge systems embedded in and across cities. They have demonstrated their role in local monitoring, which enables cities to effectively track their performance against targets such as those outlined in SDG 11 and NUA. They have testified to the importance of their institutional role and boundary-spanning engagements, not just their outputs, and stressed how these positions have become even more critical in a time of sizeable disruption like that ushered in by COVID-19.

We have highlighted how observatories serve as intermediaries between research and decision-making but, significantly, also between communities and decision-makers. Their advocacy work often elevates voices that have historically been marginalised or even altogether excluded from urban governance. These activities demonstrate the intrinsic value of observatories stands not just in what they produce, quantitively or qualitatively, but in their nature as institutions that bridge multiple types of knowledge, very often also with a normative underpinning aimed at promoting more nuanced and inclusive understandings of cities. This particular role became abundantly clear in the wake of the COVID-19 crisis as observatories called attention to the vulnerabilities to the virus, and its disastrous political-economic consequences, that marginalised urban communities have witnessed. These vulnerabilities were not new but rather came to the fore in the context of the crisis and as a result, the observatories, such as SLURC or the Karachi Urban Lab, were able to intervene to raise awareness that cities are only as resilient to disasters as their most vulnerable communities. Similarly, and once again as no novelty but rather as a heightened role throughout the 2020 crisis, observatories frequently step into urban governance conversations as drivers of evidence-based conversations on the state of our cities. Whether during COVID-19 or more 'normally' before the outbreak, stressing the need for tangible urban data and information to drive decisions as to how cities should evolve, be managed and change. Examples like the Newcastle Urban Observatory, GCRO or the WRI Ross Centre have made tangible (and differently put) cases for the value of information as driver of urban discussions – and for the importance of balancing qualitative and quantitative points of view. Realities like Mistra Urban Futures or the Metropolis Urban Observatory also stressed, at least to us, the value of international circuits of urban knowledge. Yet, as many of the other cases we have witnessed also stressed, they have also pointed at the need for these networks to 'localise' and draw in reciprocal way connections between grounded experiences and more-than-local mobility of urban knowledge. Likewise, experiences like those of IIHS, LSE Cities and the ETH Future Cities Lab stresses the importance of taking the 'urban observatory' point of view beyond realities explicitly named as such and seeing observatory-like functions embedded in wider institutional contexts like universities, training centres and think tanks. Thus, observatories stand out to us as playing a key role in bringing other forms of knowledge into conversations with decision-makers as opposed to relying solely on the traditional "expert" advice that has historically been used to inform city-level decisions.

Looking towards the future, our preliminary investigation also points to a clear need to account for the explicit urban governance functions played by observatories and institutions with observatory-like functions. This means, in our view, appreciating more directly how observatories have been taking up important advocacy and capacity building functions, often crucial to lend a hand in striving against urban inequality in rapidly urbanising regions of the world but also in many well-established Northern and Southern 'global' cities that are facing deepening inequalities.

Although variable in their form and function, this study has demonstrated that observatories play an important role in producing knowledge that is relevant for urban governance – a role for which need will only increase as the world continues to urbanise. Additionally, this study has provided insight into the various funding and operations of observatories across the spectrum from long-standing players to relative newcomers. These learnings are significant against the context of the number of observatories that have shut down due to unreliable funding. By nature of being a comparative, landscape review, this study

has demonstrated that observatories play an important role in producing knowledge that is relevant for urban governance – a role for which need will only increase as the world continues to urbanise. Additionally, this study has provided insight into the various funding and operations of observatories across the spectrum from long-standing players to relative newcomers. These learnings are significant against the context of the number of observatories that have shut down due to unreliable funding. By nature of being a comparative, landscape review, this research leaves many avenues open for further study, including, for example, further investigation into how observatories relationship build; the role observatories play in situating non-expert knowledges in urban development processes; and how observatories use data to focus the attention of decision-makers on the needs of the vulnerable. Given that "environmental sustainability" was the most frequently addressed theme in observatory outputs, a study of the influence of observatory research on cities' environmental performance would also warrant further attention.

Notable in this urban governance perspective is the apparently equal importance of the relationships of trust that observatories have been building with stakeholders. Observatories have emerged as reliable sources of evidence for decision-making through the quality of their data and analytical capabilities, and simultaneously have fostered personal connections with decision-makers such that the observatories are in tune with decision-maker needs and can therefore tailor their activities accordingly, as in the case of GCRO and NUO. This is not to say that observatories shape their findings to be in line with what decision-makers hope to hear but rather that they are in tune with the specificities of the challenges that decision-makers seek to resolve. And by having a critical distance as institutions separate from decision-makers, observatories can offer complementary external perspectives. In addition to relationships built with decision-makers, so too have observatories fostered trust with individuals and communities who inform observatories' research, often in a co-researching capacity, as in the case of IIHS, KUL, and SLURC. Doing so has introduced invaluable insights into the multiple and diverse experiences of a single locality, tying directly back to the first learning described. Through these relationships and the knowledge produced by them, observatories play an important role in bringing complex urban realities into the evidence-base used by decision-makers.

Another significant finding of the study is the observatories' role in providing strong and continuous data that in some cases supplements state data, or in other cases is the only source of data where the state lacks capacity. The significance of this finding is that without the combination of historical data that can be used for comparison and robust present-day data, decisions cannot be made based on substantial evidence. This function will only grow in importance as cities seek to track their progress against targets, such as for improving environmental sustainability and health and wellbeing or reducing urban inequality. This function is also important in contexts where state-gathered data, or a lack thereof, is used against its citizens. Data politics is, and will continue to be, a central topic in discussions of urban governance, and observatories play an important role in mediating data depth, accuracy, and analysis as both constructive critics and in strategic support of government.

Yet this consideration also ushers in a dimension of the story (or perhaps more accurately 'stories') we recounted here. Understanding the place of observatories in urban governance calls upon tricky considerations as to their relationships of funding, philanthropy, investment and the wider power relations embedded in government, scientific advice or urban research more generally. Whilst we have only managed to skirt briefly onto this political-economy of urban knowledge, we would argue this is a critical area not only for further inquiry but also for conversation and exchange between observatories themselves. It is already apparent from the interviews and case studies that we conducted for this discussion paper that navigating this dimension of urban governance is no easy matter for observatories, but also a possible prolific area where to strengthen their positioning locally, nationally and internationally.

Finally, the increasing centrality of knowledge networking in urban governance, both within cities and between them, emerged as a recurrent theme. Some observatories release their outputs in multiple languages, while others make their outputs publicly available, and still others do both. This suggests that observatories seek to make their outputs accessible to a wide range of stakeholders and inclusive in their knowledge dissemination. It also enables cities to learn from each other. And while learnings from one locality cannot be directly translated to another, it is nevertheless helpful for cities to have the challenges and successes of other places as reference when attending to their own.

Overall, then, the preliminary investigation we have sought to present here gestures toward important dynamics not just of knowledge mobilisation but of urban governance that observatories are steeped into through a variety of very diverse contexts. Capturing their voices and experiences, and even gathering some of them for reciprocal exchanges in a time of crisis, has also underlined very clearly to us the potential for capacity-building inherent in what is perhaps a uniquely varied community of practice adept to urban knowledge mobilisation and centred onto a careful attention for the ways our cities and most pressing urban challenges are unfolding around the world. It is our hope this spirit further extends in the years to come, and that these initial thoughts are but the start of a larger conversation.

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APPENDIX A: GLOSSARY OF KEY TERMS

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TERM	DEFINITION
BOUNDARY-SPANNING (FUNCTION/INSTITUTION)	an entity or activity whose primary purpose is to bridge between two different contexts/institutions[56 57 58]
DATA	characteristics, usually numerical, that are collected through observation[59]
INFORMATION	contextualised data
KNOWLEDGE	information synthesised in such a way that it presents a more comprehensive understanding of a phenomenon
KNOWLEDGE BROKERING	an intermediary function (and institution/individual as "knowledge broker") that aims to develop and leverage relationships among producers and users of knowledge[60 61]
URBAN OBSERVATORY	a boundary-spanning institution whose role is explicitly focused on urban knowledge about one or more urban settlements, performing an explicit monitoring role in terms of keeping a regular record of a range of urban issues
(URBAN) OBSERVATORY FUNCTIONS	boundary-spanning practices aimed at facilitating the exchange of (specifically 'urban') information between different institutions, oriented toward performing an explicit monitoring role in terms of keeping a regular record of issues in one or more urban settlements

APPENDIX B: LIST OF OBSERVATORIES ANALYSED

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Institution	Main Location
Afghanistan Research and Evaluation Unit (AREU)	Kabul, Afghanistan
Al-Madinah Local Urban Observatory	Medina, Saudi Arabia
Australian Urban Research Infrastructure Network (AURIN)	Melbourne, Australia
Beijing City Lab	Beijing, China
Cape Urban Observatory	Cape Town, South Africa
Centre for Cities	London, United Kingdom
Centre for Liveable Cities	Singapore
The City Observatory	Glasgow, Scotland
Dublin Dashboard	Dublin, Ireland
Future Cities Lab	Singapore & Zurich, Switzerland
Gauteng City-Region Observatory (GCRO)	Gauteng, South Africa
Greater Toronto Urban Observatory (GTUO)	Toronto, Canada
Indian Institute for Human Settlements (IIHS)	Bangalore, India
Karachi Urban Lab	Karachi, Pakistan
Korea Research Institute for Human Settlements (KRIHS)	Sejong-si, South Korea
Laboratorio para la Ciudad (LabCDMX)	Mexico City, Mexico
London School of Economics: Cities (LSE Cities)	London, United Kingdom
Manila Observatory	Manila, Philippines
Metropolis Urban Observatory	Barcelona, Spain
Mistra Urban Futures	Gothenburg, Sweden
MIT China Future City Lab (MIT CFCL)	Cambridge, United States of America
MIT Senseable Cities	Cambridge, United States of America
Newcastle Urban Observatory	Newcastle, United Kingdom
Observatory on Decentralised Co-operation	Barcelona, Spain
Observatory on Latin America (OLA)	New York City, United States of America
The Seoul Institute	Seoul, South Korea
Sierra Leone Urban Research Centre (SLURC)	Freetown, Sierra Leone
Urban Expansion Observatory (UXO)	New Panvel, India
Urban Flows Observatory	Sheffield, United Kingdom
Urban Resource Centre	Karachi, Pakistan
World Council on City Data (WCCD)	Toronto, Canada
World Resources Institute: Ross Centre for Sustainable Cities (WRI Ross Center)	Washington, D.C., United States of America

APPENDIX C: BINARY AND DESCRIPTIVE FEATURES ANALYSED

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BINARY FEATURES	
LEVEL OF OPERATION	Neighbourhood
	Local / City
	Metropolitan
	Regional / Provincial
	National
	International
	World Region
HOST	Self-hosted
	University
	Local Government
	Regional / Provincial Government
	National Government
	Private Institution
HOST NETWORK	Local
	National
	International
FUNDING	Government
	University
	Private Institutions
	Philanthropic Institutions
OUTPUT TYPOLOGY	Research Reports
	Academic Publications
	GIS Datasets
	Blogs/Podcasts
	Magazine/Journal
	Policy Documents
	Training
	Education
	Social Feed (Twitter/Instagram/Facebook/etc.)
	Conferences/Exhibitions/Summits/Events (International)
	Conferences/Exhibitions/Summits/Events (Local)
ACCESS TO OUTPUTS	Open
	Closed
EVIDENCE	Case Study
	Strategic Masterplans
	GIS/Spatial Mapping
	Research Publications
	Statistical Evidence
	Indexes
	Rankings
	International Capacity Building
	Compiled Technical Outputs
	Survey
	Datasets
	Multi-lingual Reports
	Contextual Surveillance

DESCRIPTIVE FEATURES	
BACKGROUND	Name of Observatory
	Year Founded
	Location: City
	Location: State/Province
	Location: Country
	Website
LEVEL OF OPERATION	World-Regional (UN-DESA)
	Country Economy (UN-DESA)
ARCHETYPE	Archetype/Typology
HOST	Hosting Institution
FUNDING	Funding Institution
PARTNERS	Partnering Institutions
VISION	Vision (as officially stated)
ADDITIONAL INFORMATION	Notes
	Functions (inferenced)
	Vision (inferenced)
	Contact Personnel

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