





# **Mobilizing the Data Revolution to Support Inclusive Urban Development**

By Thomas G. Kingsley  
Senior Fellow, Urban Institute  
IHC Global Senior Technical Advisor

IHC Global

## **Abstract**

In 2015, the United Nations adopted an agenda for global development which posited 17 Sustainable Development Goals (SDGs) and recognized the importance of addressing the challenges of rapid urbanization. In 2016, the Habitat III conference in Quito, Ecuador, adopted a New Urban Agenda that serves as a framework to guide progress on Sustainable Development Goal 11, which is to make cities sustainable, inclusive, safe, and resilient. Proponents of the global agenda have called for a “data revolution” to further the achievement of the SDGs, but have not offered much guidance on how that should occur as it pertains to urban development.

This paper suggests how the data revolution could be mobilized to achieve the goals on the urban side of both of these agendas. It offers ideas on how data can be used to drive policies and programs that will be both efficient and effective in addressing the enormous challenges of urbanization that must be faced between now and mid-century. But it does so in a manner that treats inclusion and justice as more central goals than they have been in the past.

The first part of the paper explains the urgency of this work and suggests a basic approach to mobilizing the data revolution to transform capacity to achieve urban goals in developing countries today. The second part offers more specific recommendations to countries that are positioned to take advantage of this approach on how they might go about doing so. The third suggests how the international policy community might expedite the adoption of the approach in countries around the world where it is likely to yield high payoff.

## **Table of Contents**

Executive Summary .....	1
Urgency and Approach .....	3
Approaches to institutional development and transformation.....	3
Positioning the data revolution as a driver of the transformation agenda.....	4
A range of interventions – Smart Cities and beyond .....	5
Smart Cities and Inclusion .....	6
Recommendations to Countries .....	8
Expediting Adoption of the Approach across Countries .....	15
References.....	18



## Executive Summary

The High-Level Panel on the Post-2015 Development Agenda, tasked by former United Nations Secretary General Ban Ki-moon in 2012 with making recommendations for a new global development agenda that would guide development over the next decade, first wrote about a ‘data-revolution’ in its final recommendation report, noting that “*The revolution in information technology over the last decade provides an opportunity to strengthen data and statistics for accountability and decision-making purposes*”, and that “*A true data revolution would draw on existing and new sources of data to fully integrate statistics into decision making, promote open access to, and use of, data and ensure increased support for statistical systems*” (United Nations 2013)

In the years that have followed, the 2030 Sustainable Development Agenda,<sup>1</sup> and other global frameworks such as the New Urban Agenda,<sup>2</sup> have taken this call to heart, emphasizing the importance of utilizing data to drive decision making and achieve global progress. However, despite the heightened recognition of the importance and necessity of data in these and other international policy agreements, little guidance has been given on how to move the ‘data revolution’ beyond ‘data collection’, and in fact mobilize it to drive effective policies and programs.

Furthermore, while much focus has been placed on the potential of the data revolution to advance efficiency and productivity, less attention has been given to its potential to advance inclusion and equity, especially in cities, which are home to both enormous challenges and immense opportunities when it comes to achieving global progress. This paper explores *how* to harness the power of the data revolution to drive societal change and progress, and the importance of doing so in cities.<sup>3</sup>

One of the key ways the ‘data revolution’ has taken shape is through what has come to be termed the “Smart Cities” movement: efforts—both implemented by ICT firms and city governments—to harness data and technological advances to make cities function in a more integrated and efficient matter. Many ‘smart city’ technologies have been focused on improving efficiency of city services, such as transportation and digital reporting. However, when the data revolution is implemented with a goal of advancing justice alongside efficiency, ‘smart city’ technologies can be applied in ways that make cities more equitable and contribute to the implementation Sustainable Development Goal (SDG) 11, which is to make cities and human settlements inclusive, safe, resilient, and sustainable. As an example, governments can work with communities to develop registries that establish

---

<sup>1</sup> The 2030 Sustainable Development Agenda was adopted by 193 countries on September 25<sup>th</sup>, 2015 at the United Nations High Level Political Forum for Sustainable Development. The Agenda includes 17 Sustainable Development Goals (SDGs) aimed at guiding development for the next 15 years in order to end poverty, protect the planet, and ensure prosperity for all. The 2030 Sustainable Development Agenda is presented in United Nations, 2015.

<sup>2</sup> The New Urban Agenda is a document adopted by 170 countries at the United Nations Habitat III conference in Quito October, 2016, that sets the global standards to guide sustainable

urban development efforts over the next 20 years, and serves as the blueprint for nations on how to achieve urban development that is in line with Sustainable Development Goal 11 (urban development that is sustainable, inclusive, safe, and resilient). The New Urban Agenda is presented in United Nations, 2016b.  
<sup>3</sup> Many of the ideas in this paper are discussed in more depth in Kingsley, 2017.

reliable records on the identities of poor and vulnerable citizens, which can enable them to access a number of otherwise inaccessible government services. The data revolution is not a tool to be utilized only by governments, however; numerous cases show that local communities around the world have gathered and utilized their own data to advocate for better services and negotiate with governments.

This paper makes seven specific recommendations for mobilizing a data revolution to achieve the Sustainable Development Goals in cities. While this paper focuses specifically on the ‘urban SDG’ (SDG 11), it acknowledges that all of the SDGs are relevant to cities, and that SDG 11 intersects in important ways with other SDGs, such as SDG 1- Ending Poverty, and SDG 5- Achieving Gender Equality. In making these recommendations, the author recognizes that all will not occur simultaneously and that incremental approaches will be necessary. The recommendations are:

1. Priority must be given to looking beyond the use of data for tracking purposes to the development of data that has specific implications for SDG achievement in cities—data that can *make change happen*.
2. Country and city leaders (as applicable) should assign responsibility for data development and use to Chief Information Officers.
3. This network of information officers should organize comprehensive data development programs, focusing efforts first on secondary cities, where these programs may be the most feasible and have the greatest impact.
4. Government information systems should be strengthened, with a view towards using them specifically to inform housing and urban development decision-making.

5. Data produced by outside actors, whether by private sector or civil society, should be accessed and utilized by appropriate urban institutions responsible for SDG achievement.
6. Specific institutions should be established within government whose purpose it is to facilitate the application of data to advance inclusion and justice.
7. Household surveys, which currently make up a large part of most governments’ ‘data responsibilities’, should continue to be utilized in ways that fit into and strengthen the overall data development framework created by Chief Information Officers.

Recommendations are also given for the international policy community on how to support countries in implementing data revolutions that advance achievement of SDG 11. These recommendations involve setting up an international collaborative that could promote this program, advise countries seeking to implement it, develop and disseminate guidance materials, and conduct field demonstrations in secondary cities.

The ‘data revolution’ has enormous potential to transform the way development is done and facilitate the furtherance of sustainable and equitable urban development. In cities, particularly, intentional use of data to advance better development that promotes inclusion, resilience, safety and sustainability is becoming increasingly critical as urban growth continues to accelerate. By strategically and purposefully implementing frameworks for data development and use that treat inclusion and equity as central goals, to be manifested through investment, spatial, and service delivery policies, cities and countries can ensure that they harness the full power of the data revolution to achieve progress on urban-related SDGs



## Urgency and Approach

We are on the eve of fundamental change. Between 2015 and 2050, the urban populations of the world's developing countries will grow by more than 70 percent, from 3.0 billion to 5.2 billion (5.2 billion is larger than world's total population in 1990 - the rural populations of these countries will actually decline somewhat over this period). In short, we will be creating new urban societies at an unprecedented scale.

What will they be like? Looking at urbanization in these countries over the past decade, there is evidence that the process has brought dramatic improvements in well-being for many people in many places, but there are also indications it has led to disturbing outcomes for some. With roughly three million new migrants moving to cities each week, urban areas have struggled to keep up with the pace of growth, and many cities face a lack of affordable housing, outdated or inadequate city infrastructure, and rising crime rates caused by instability and lack of economic opportunity. Over one billion people live in slums worldwide, marked by informal and substandard housing, lack of clean water and sanitation, and insecure tenure. Furthermore, a changing climate exacerbates the risks posed by natural disasters for the urban poor, and rising seas threaten 634 million people that make their homes in low-elevation coastal zones. Cities hold enormous potential for innovation, economic growth, and sustainable development, however, as the pace urban growth accelerates, so will the risks of failure.

It is clear that to address a challenge of this scope (to get it right), it will not be enough just to do more

of what we have been doing. The task will demand transformative improvements in institutional capacity and effectiveness in these cities. Achieving marked improvements in the way they function is sure to require, among other things, innovative new applications of data and Information/Communications Technology (ICT).

### ***Approaches to institutional development and transformation***

In light of the daunting task, the question arises: How to begin? This paper does not intend to address that question in depth but rather to acknowledge briefly that there are institutional challenges that will need to be addressed in order to truly harness the power of the data revolution, and that advocacy and bureaucratic change will usually be necessary elements.

To advance the application of the data revolution to urban issues, the public sector and stakeholders outside government (civil society, NGOs, communities, private sector, etc.) will all be involved. But the mix and roles of the two depend on the development/political stage of the country at hand and will shift over time. Even so, regardless of specific circumstances, a critical reminder is that use of the data revolution to improve conditions for the poor and in cities more generally, over the long-run, there is no alternative to the creation of effective institutions of governance. Community groups and other nongovernmental advocates can make sustainable progress to alleviate poverty only by working with others, importantly local and national governments (keeping the pressure on and collaborating in the work of reform) to create more effective institutions.<sup>4</sup>

---

<sup>4</sup>Formal local governments are established in ways that give them tremendous competitive advantages in performing four

basic functions. Further, only they have the mandate to collect the revenues needed to pay for this work. It should be self-

It is apparent that in most countries, at whatever stage of development, mobilizing the data revolution to support change will require new ways of working. These will undoubtedly pose many challenges, some specific to each place and some more widely present. Nonetheless, change is necessary to mobilize the data revolution and such change is not an easy task, so how to begin? The most effective way to secure serious transformation in government capacity may be to develop it incrementally. For example, the World Bank (2017, p.22) documents how Indonesia's Bureaucracy Reform focused on building "islands of effectiveness:" successfully increasing pay and accountability for performance in a few priority agencies, then benefiting from the demonstration effect in gradually rolling these practices out to others. And in any one area it is possible to start small and expand achievement over time. Even in early stages, it may be possible to make modest revisions to the charters and operations of public institutions that both enhance efficiency now and imbed new incentives that lay the foundations for broader change; alterations that begin to undercut incentives and habits that perpetuate "old ways" of doing things and advance a "new way" of addressing the urban challenges they confront.

### ***Positioning the data revolution as a driver of the transformation agenda***

Given increasingly well publicized examples, key decision makers are likely to recognize how data and ICT solutions can dramatically expedite change in the way society's institutions work. Similar to institutional transformation itself, however, nongovernmental actors are not capable of

implementing a data revolution on their own. Community groups and others in civil society can do valuable work with data, but they cannot independently establish a true data revolution by today's definition – the kind that can support truly transformative changes in local capacity and society as needed to address the real challenges of urbanization and alleviate poverty. Doing that depends on the existence of automated (computer based) records that can only be developed and maintained by governments.<sup>5</sup> These include records on land ownership, business licenses, crimes, hospital visits, building condition, births and deaths, water supply customers and delivery systems, and so forth.

In this environment, there are three possible strategies for those who want to implement a data revolution as a fulcrum for transformation: (1) mobilize and work with nongovernmental actors (community groups, NGOs, etc.); (2) work with government officials; or (3) work with both together in an integrated way. There is now substantial international experience indicating that the third is the only viable strategy.

A second vital lesson here particularly relevant for cities is that the data/ICT efforts cannot get too far out in front of the non-data side of institutional change. The World Bank, in fact, has done extensive research showing that a large share of the "e-government" projects instituted in developing countries through the first decade of this century have failed.<sup>6</sup> Its analysis identified a number of short term factors contributing to this outcome (faulty procurement processes being notable among them). However, underlying most was

---

evident that all four of these functions together are critical to addressing poverty: (1) keeping the official records and enforcing the rules; (2) providing services (e.g., education, health care); (3) developing/maintaining public physical investments (e.g., roads, water supply, public buildings); and (4) mobilizing and leading efforts to improve community conditions

and prospects (e.g., economic development, neighborhood improvement).

<sup>5</sup>Kingsley, Coulton and Pettit, 2014

<sup>6</sup>See, in particular, Box 3.5, the High Failure Rate of E-Government Projects, World Bank, 2016, p.165.

that the ICT projects were being imposed in a broader institutional environment that was not yet prepared to take advantage of them.

Society-wide, the Bank reviews the essential “analog foundations for a digital economy.”<sup>7</sup> Countries that have been able to digitize their economies most effectively are those that have also markedly upgraded their business climate, human capital and governance. These of course are integral to the achievement of SDG 11. Within government, successful data/ICT reforms have had to precede, or occur in parallel with, such things as regulatory reforms, process redesigns, staff education, civil service reforms and the general weeding out of corrupt practices.

All of these things **do not** have to be in place ahead of time. What is needed is only the beginnings of an environment in government that will permit institutional reform, including supporting reliable record keeping and allowing some practical and innovative applications of the data to improve operations. Then it will be possible for advocates and others to think creatively and proactively about how data and ICT innovations can be woven in as key drivers of an action agenda to secure transformation – *an agenda that leads, but is consistent with, the country’s institutional progress.*

### ***A range of interventions – Smart Cities and beyond***

What types of interventions are likely to be required in this agenda? Over the past decade, a group of ICT firms and related institutions have been working with cities around the globe to implement some of them as a part of what has come to be termed the “Smart Cities” movement. The “Smart Cities” movement focuses on harnessing data and

technological advances to make cities function in a more efficient, integrated, and sustainable matter. The “Smart Cities” movement has made many valuable contributions, but it has so far focused on only part of the full range of interventions that will be needed.

Smart Cities professionals have tended to focus on ICT solutions to the straightforward types of problems that can be fully addressed by their own tools; e.g., applications that use already machine-readable data sets to do things like provide real-time data to citizens on transit schedules, street-by-street status of snow removal, etc. They emphasize the efficiency of these assignments; of getting in and out quickly and without complexity.

At the other end of the continuum, however, are a set of broader and more complex urban problems. These are the ones whose solutions are more likely to lead to the transformational improvements in institutional capacity emphasized in this paper. A good example is designing new land development strategies for mixed-income housing settlements – a task which requires integrating solutions to the challenges of providing housing, education, infrastructure, health care, workforce development, etc. in cities.

These necessitate simultaneous innovations in a mix of fields: things like regulatory reforms, process redesigns, and changes in personnel policies. But the transformation gets its real push when the data/ICT innovations are built in to drive and manage the change in each of the other elements. For example:

- Good data and predictive analytics are relied on to realistically assess the structure and magnitude of demand and devise substantially more cost effective planning solutions than possible in the past

---

<sup>7</sup>Chapter 5, “National Policies” in World Bank, 2016, p. 248.

- GIS specifications of plans are shared within the development implementation team (land development planners, road builders, water utilities managers, and school and health facility providers) to markedly improve and coordinate their collaborative efforts (getting all of the sizes and locations right, optimizing the timing of development sequences, etc.).
- Automated records (physical, financial and other) on the newly created land ownership parcels in the new settlements (including those for the poor) become the basis for security of tenure in the long term, but they also make possible expediting initial property transfers and coordinating the timing of initial service provision. The same records then become the basis for efficiently operating a number of other administrative functions (e.g., the property tax system).

Having all of the above in machine readable and interoperable form makes it possible to redesign related basic administrative and management processes in all agencies, most often markedly cutting delivery times, optimizing resource allocation, and reducing overall staffing requirements and administrative costs. It can also serve as the foundation for revolutionizing the way ongoing operations are carried out over the long term in some areas. For example, automated records on exact locations of customer connections and the physical elements of water-supply/wastewater systems become the basis for an incredibly more effective approach to water loss reduction and ongoing systems maintenance. Sensors are introduced that identify leak magnitudes and other emerging physical problems in real time, and these data support preventative maintenance activity that can yield orders of magnitude reductions in the costs of operations.

This may be the key to high payoff throughout - not looking at data/ICT solutions separately and in

parallel, but rather *integrating them in coherent programs of action that support changes in other areas, together yielding the broader transformation.* The “Smart Cities” movement has generally not taken on such broader assignments on their own, but we should not expect them to. Needed for these is leadership from top management and collaborative cross-sector partnerships that will create the right contexts for Smart Cities contributors, helping them to focus on what they can do best as members of the team responsible for the broader program.

### ***Smart Cities and Inclusion***

The Smart Cities movement has come under some criticism of late because, granted its achievements related to functional efficiency, it does not have much of a track record in addressing the issues of urban inclusiveness, equity and justice. It seems quite likely, however, that this is because these latter issues involve broader and more complex forms of problems that relate to cross-sectoral social, economic, and political issues (not the usual specialty of “Smart Cities” on its own), rather than any aversion to their taking on such issues on substantive grounds. In fact, there are indications that the movement is looking for meaningful ways to apply their tools to these issues.

By including ‘inclusion’ as a key element of SDG 11, as well as by developing a separate goal that focuses on inclusion and justice more broadly, SDG 16 (Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable, and inclusive institutions at all levels), the UN has given special emphasis to the urgent unmet needs of the justice agenda in cities. Do the techniques of the data revolution have potential for addressing them? Some may be doubtful because they are misled by a perception of cultural differences between Smart Cities professionals and grass roots advocates for the poor. But that should have no influence on the work if the ends are the same. Only a moment’s thought

should be enough to show how data/ICT approaches can contribute to resolving issues of inequity and injustice present in virtually all cities and in so doing advancing also more cohesive and prosperous cities. There are two basic avenues for change:

(1) Applying these tools and techniques to help reform operations within government; and (2) helping the poor and their advocates apply data and ICT directly themselves in the fight against injustice and for greater fairness.

In the *first category - reforms within government* - three different types of ICT solutions can yield important payoffs for justice.

- Developing registries that *establish reliable records on identities of the poor and property ownership*; systems whose very existence achieves goals, especially benefitting the poor. These, for example, include systems that give people digital identification numbers, allowing them to establish bank accounts, apply for public programs and engage in a host of business transactions that would not have been possible otherwise.<sup>8</sup> They also include land registries whose reliable records on property characteristics and ownership are the basis for providing secure tenure and ultimately make all housing more affordable.<sup>9</sup>
- Building government information systems to *implement and enforce the administration of justice per se*. This means automating the records of law enforcement agencies, the courts, and other institutions in the justice system and combining them to form effective systems that can manage all processes

equitably as well as efficiently. For example, establishing automated court calendars facilitate more efficient and reliable scheduling of court cases; among other things, eliminating the interminable delays that often plague the courts of even the most advanced countries. The data can be used by internal managers to improve the performance of their staffs; among other things, making it more difficult to operate in ways that exert bias in handling the cases of any vulnerable individuals or groups. Releasing the data to the public can provide even more powerful incentives to administer the system fairly.

- Building effective public sector information systems that *support and encourage an equitable allocation of resources*. The poor are typically underserved along many dimensions in urbanization; for example, in the provision of water supply. Computer based information systems operated by a water/waste-water utility can identify levels of service now being provided to various groups and locations (e.g., slums) and thereby can quantify deficits. The same system can then be used as the basis for planning new services to eliminate the deficits, track and manage the projects that will install and operate the new capacities, and report to the public on results and ongoing performance.

It is worth saying again that all such systems can support better management internally (providing government managers the tools they need to hold their own staffs accountable for results) but also, with sufficient organized pressure for open data, they can become the basis for outside groups holding

---

<sup>8</sup>Substantial advances with such registries have been made in developing countries of late. See Spotlight 4, “Digital Identity,” in World Bank, 2016.

<sup>9</sup>Advances in cadastral systems in recent years are reviewed in Erba et al, 2016.

governments accountable overall and, thereby, for incentives that automatically reduce the potential for corruption and inequity as well as inefficiency. If set up properly, it is these registries and information systems that make it much more difficult for civic leaders to forget that the poor exist, to understate their numbers, or to pretend that practical tools and policies cannot be developed to address their needs.

The *second category - helping the poor and their advocates apply data and ICT directly themselves* – recognizes that strengthening ICT capacity in government is necessary but not sufficient. Also, it is not enough to invite community groups and poor residents to participate in local planning and budgeting. They need to be better equipped to make their own case before they come to those tables, and data can do that for them. First, there are many developing world examples, where surveying their own conditions has given the residents of informal settlements power to influence real change in their communities.<sup>10</sup> But their influence can be enhanced even more if other groups have been set up to support them. In the US, community leaders in over 40 cities have established non-governmental “local data intermediaries” who collect administrative data from multiple local agencies and build regularly updated information systems on changing neighborhood conditions across topics. Groups in low income communities use this data to better plan their own activities as well as influence the directions of government programs and policies.<sup>11</sup>

The point is that achieving SDG 16 will require moving beyond looking at injustice generically. It is important to identify specific injustices, analyze how

they work, and then devise approaches to addressing them (which quite often can include creative and systematic applications of data). We need to look at each injustice in context, individually and *analytically*, to devise the most effective approach to remediation in light of the timing and circumstances at hand. The design of the justice agenda needs to be entrepreneurial, strategic and opportunistic.

## Recommendations to Countries

Based on our conclusions about approach reviewed above, we offer seven specific recommendations to countries on how they should mobilize a data revolution to expedite achievement of SDG 11 and specifically to create more just societies. The work naturally focuses on building basic capacities within government initially--capacities that, once built, will later allow grass roots community groups, NGOs and other representatives of the poor to fully participate in using the data revolution directly themselves to advance their interests. It is a stage where the country’s CEO (president or prime-minister) has accepted basic responsibility for achieving the SDGs and recognized that data/ICT innovations may be among the most attractive vehicles for doing so.

### *1. Give priority to the development and use of data in designing and implementing initiatives to achieve the SDGs in cities – to making change happen, rather than just tracking it*

Much of what has been written about the data revolution so far only implies mounting expanded surveys to track progress under each goal. Although surveys are essential, they alone are insufficient.

---

<sup>10</sup>The work of SPARC in the Mumbai slums is one of the most prominent examples (see Briggs, 2008) but there are others (Edwards, Greene and Kingsley, 2016).

<sup>11</sup>This is the work of the National Neighborhood Indicators Partnership (NNIP). See Kingsley, Coulton and Pettit, 2014; in particular, chapters 2 and 5.

Central emphasis needs to be given now to supporting the people responsible for goal achievement (leaders and managers of the agencies, nonprofits, community groups, etc. assigned to do the work)--giving them the data and analytic tools they need to make better decisions and coaching them on how to use them. In this approach, the responsible actors will develop a sense of ownership for a data-driven approach and become strongly motivated to succeed.

A major effort has already been underway in the UN system to develop measures to track SDG accomplishments after the fact.<sup>12</sup> That work should continue, but higher priority should now be given to building the other side of the data revolution in urban development – to building the capacity of the responsible institutions and communities to develop and use data in their work to achieve the goals pertaining to urban development.

***2. Clearly assign responsibility for data development and use to governments' CEOs. Create a network of Chief Information Officers (CIOs) to take the lead in implementation, giving priority to building capacity at the local level.***

Since governments are the entities that have accepted primary responsibility for achieving the SDGs, government CEOs (national presidents and prime-ministers, regional governors and local mayors) should place responsibility for the data revolution in their own offices. They should appoint a member of their staff (perhaps designated as Chief Information Officer, CIO) to lead this effort, working closely with line agencies to accelerate data development and use in a way that focuses on goal achievement. The

network of CIOs, collaborating across levels of government could, in itself, be a powerful force for change. The visibility and political priority signaled by locating responsibility this way may overcome reluctance among layers and sectors of resistance to creating and sharing data on performance. The CIOs should work closely with the state statistical offices in all aspects of planning and implementation.

In each country, the central government's CIO should establish a peer network made up of the CIOs at all levels and other relevant stakeholders. The network would meet to create and share innovations, plan and monitor capacity building efforts, and develop and disseminate guidance materials on best practices. Because of the accelerated growth of urban areas over the next 15 years, what happens in cities is certain to dominate national SDG achievement. Accordingly, the CIO network should give priority to advancing data support for urban programs and initiatives. This will involve strengthening data capacities at all levels of government, but it will no doubt require emphasis on strengthening them at the local and metropolitan levels. And it will also involve building the capacities of urban community groups and residents to use data in holding governments accountable and generally achieving their own objectives.

***3. Organize comprehensive programs to strengthen data development and use capacities in a select group of secondary cities***

The CIO network's general work would help all cities, but to expedite achievement it should more directly engage leaders in selected high-priority urban

---

<sup>12</sup>See Expert Advisory Group on the Data Revolution for Sustainable Development, 2014, United Nations, 2016a, and HLG-PCCB, 2017.

areas to catalyze capacity building. Since the relevant existing institutional and other characteristics of individual urban areas are very different from each other, the program should develop capacity building plans for those areas individually.

For these concrete demonstrations of this work, it makes sense to target “secondary cities” Secondary cities are sizeable and rapidly growing urban areas: places with economic dynamism where outcomes are likely to have disproportionate impacts on SDG achievement, but where policies and cultures are not yet so rigidly fixed that policy innovations cannot make a transformational difference in results. Secondary cities thus exclude the largest metropolitan areas where it is often more difficult to alter change trajectories and which are often growing at a very rapid rate. We define secondary cities as those that fall in the 300,000 to 500,000 size range.<sup>13</sup>

The CIO network (whether it is country-wide, city-wide or however constituted, mindful that these initiatives can begin without an entire network being in place) could begin by reviewing the characteristics of the country’s secondary cities and selecting a number of them as initial sites for this program because they are considered to be places where it would be both feasible and have the greatest impact. Even when led by central city CIOs, it will be important for this work to consider the metropolitan context, since data/technology applications to address the problems of informal settlements outside of the city’s boundaries could be critical to improving outcomes inside the city. Alternatively, the CIO

network might set up an arrangement under which cities and/or metropolitan councils of governments would compete to participate.<sup>14</sup>

In each selected area, the effort would start by conducting a “Data Capacity Assessment (DCA).” A nationally standardized protocol should be established for these Assessments. They would be conducted by assigned CIO network staff, working in collaboration with a local entity assigned responsibility for leading the effort (this could be the central city mayor’s office or a Metropolitan Planning Organization – MPO – where one exists).

The first step would be to create a listing of major local institutions that will play a role in goal achievement: public agencies, NGOs, CBOs and others responsible for implementing the required initiatives, but also local universities and others who can help in tracking and analyzing performance. Then, interviews would be conducted and other materials reviewed to document the data holdings and data use capacities of the key institutions. Reviews of these assessments would identify strengths and weaknesses across institutions and thus serve as the basis for devising a prioritized “Data Capacity Building Plan (DCBP)” for the area at hand. If the local Assessments and Plans are done consistent with central government CIO standards, central funding and technical assistance would be provided to help implement the capacity building actions called for in the plan.

---

<sup>13</sup>While there is no commonly accepted definition, a number of sources talk of secondary cities as having populations of less than 500,000 (see, for example, Lozet, 2017). Estimates of the number of cities by size from United Nations, 2014.

<sup>14</sup>A good example of a successful program where metropolitan agencies competed to receive national government funding for

regional planning and improvement is the Sustainable Communities Initiative operated by the U.S. Department of Housing and Urban Development (HUD, 2010)



More concretely, the work of these engagements in individual cities/metros would entail the following: (1) a scoping of local institutional capacity to prioritize the work; (2) assisting selected individual institutions in developing, strengthening and applying automated information systems (e.g., land planning departments, road planning agencies, water utilities, public health agencies, school systems, and agencies responsible for issuing building permits, issuing business licenses and maintaining cadastral records); (3) facilitating and demonstrating the value of integrating and sharing data across agencies; (4) developing new community-oriented local data intermediaries outside of government (like the partners in NNIP noted under recommendation 6 below) to support the strengthening of local data capacity of community groups and NGOs generally over the long term; (5) establishing mechanisms to advance open data and other means of securing government transparency and accountability; (6) using local data intermediaries and other mechanisms to make data accessible to community residents (the poor and their advocates) and help them use it directly in their own interests (especially in slums and other low income areas); and (7) generally building a culture of proactive data use in local governance and public life.

***4. In all participating urban areas, strengthen and expand government information systems and use them purposefully in housing and urban development decision-making***

As identified and prioritized in the Data Capacity Building Plan, this would include building new administrative information systems for specific agencies responsible for housing and urban

development, or strengthening existing ones as appropriate. Data in the enhanced systems would be used to: (1) analyze problems and opportunities facing the agency and set priorities for response; (2) assess the benefits and costs of alternative courses of action, leading to the choice of strategies with the highest payoffs; and (3) manage the implementation and operation of the program; as well as (4) track performance.

But this work would also require investment in the types of “registries” recommended earlier (whose very existence achieves goals, especially benefitting the poor). As mentioned in the first section, these include systems that give people digital identification numbers, allowing them to establish bank accounts, apply for public programs and engage in a host of business transactions that would not be possible for them otherwise. And, they also include land registries (cadasters) with reliable records on property characteristics and ownership.

As to digital identification systems, CIOs should be aiming for the development of one consistent system country-wide to gain obvious advantages from national interoperability. (In all of this, rigorously protecting the confidentiality of personal records will be, of course, essential).<sup>15</sup> For land systems, however, workability may demand some variations in detailed data definitions and design (metro, or regional level) to recognize historic differences in how land records have been maintained.

All of this work should proceed mindful of the history of past failures of e-government projects.<sup>16</sup> Again, those failures occurred primarily because of inadequacies of the institutions in which the new

---

<sup>15</sup>Again, see Spotlight 4, “Digital Identity,” in World Bank, 2016.

<sup>16</sup>See discussion in World Bank, 2016, 165.

systems were to be installed. In some cases, the institutions were part of repressive regimes that sought to use digital advances to constrain inclusiveness rather than further it. In others, the internal incentives had not yet been aligned to take advantage of what the new systems had to offer. There were also failures due to overly rigid technologies that precluded sufficiently flexible functionality and interoperability, but recent digital advances should make those issues less prevalent than they were in the past. Nonetheless, hard thinking about institutional reforms must go hand in hand with system improvement initiatives and, in some instances, the time still may not yet be right for the technology.

***5. Secure access to relevant data being produced by others as a part of the digital revolution and channel the data to the appropriate urban institutions to apply in city-related SDG achievement***

A good example here is satellite images, already being used in analyzing weather patterns and for many other private-sector purposes. But they can also be used to quantify and map the pace of land development (in slum areas and elsewhere) within metropolitan areas - information that is critical to sound metropolitan land and infrastructure planning.<sup>17</sup> Other examples include:

- Aggregated social media data, used to provide early warnings of emerging public health problems (epidemics) and to assess changes in public attitudes that affect demand for various social services and other programs.

- Real-time data yielded by smart meters and sensors in water supply systems, used to dramatically reduce water loss by rapidly detecting and correcting leakages and other causes of loss.

The CIOs and their staffs and collaborators should track and help promote the broader digital revolution in all sectors of the economy. They should always be on the lookout for new data from these sources that could make important contributions to goal tracking and achievement in housing and urban development. It would make sense for the national CIOs to take the lead in this aspect of the work, as they should be able to develop the clout and skills needed to obtain data access for the entire country and then share with the relevant regional, metropolitan and lower-level organizations who are doing the work (more efficient than having lower-level governments negotiate their own access agreements with multiple providers).

Another theme for the CIOs should be the promotion of “open data” at all levels. Open data have been defined as “data that are freely available online for anyone to use and republish for any purpose”.<sup>18</sup> With respect to the advancement of SDGs, this mostly pertains to government data sets that are made available to the public in full over the web in a machine-readable form. Many were dubious about open data a decade ago, but the idea is now spreading, albeit slowly, in much of the developed world. Governments remain understandably nervous about the risks of sharing their data so broadly, but outside pressures to do so and a greater understanding of the

---

<sup>17</sup>For recent advances in the application of satellite imagery in urban development, see Lamson-Hall, 2016.

<sup>18</sup>World Bank, 2015.

internal benefits appear to be gradually changing their incentives.

## **6. Establish new institutions and mechanisms to facilitate the application of data to advance inclusion and justice in urban development**

The end of the first section of this paper concludes that the tools and techniques of a data revolution should be highly applicable to accomplishment on the ‘justice’ side of the urban agenda, which we interpret broadly to include equitable investment and service delivery that reflects the needs and priorities of the most vulnerable as well as of the broader society and that does so in an objective and even-handed way. Accordingly, appropriate recommendations in this section simply entail the implementation of the approach outlined there. As noted, actions fall in two categories: (1) applying data and ICT tools and techniques to help reform relevant operations within government; and (2) helping the poor and their advocates apply data and ICT directly themselves in the fight against injustice.

**Reforms within government.** We have already said more about an approach to establishing registries pertaining to both people (identity systems) and properties (cadasters) under recommendation #4 above. As to building and reforming regular operating systems within government, the case can be made that the CIOs should give priority to ICT innovations that emphasize inclusion and justice (consistent with SDG 11 and 16); especially to efforts that create win-win results by achieving justice and functional objectives at the same time.

We noted that information systems that **implement and enforce the administration of justice per se** could be an important data source, together with other demographic and physical data (e.g., sewers, water pipes, etc.) that describe the city’s population.

Once in machine readable form, the data can be deployed in state of the art management information systems formats to accomplish basic program functions: (1) analyzing problems and opportunities; (2) strategic planning (including assessing benefit and costs of alternative courses of action); (3) managing the implementation and day to day program operations; and (4) tracking performance and providing feedback to support improved practices.

The second major category we pointed out includes systems that **support and encourage an equitable allocation of resources**. In the first section of this paper, we noted that the poor are typically underserved along many dimensions in society. The example we gave there was water supply, but a myriad of others are relevant; e.g., quality education, business licenses, decent health care.

The work in these cases always starts by developing a computer based record (or set of estimates) of current service provision. This shows who is now being served (by household-type and location) so deficits can be identified and quantified. This record then becomes the basis for revising priorities in service allocation. Having all of this in an automated system, of course, provides the opportunity for much improving the quality of service provided to existing beneficiaries (e.g., adequacy of amounts delivered and timing) as well as providing new service to the poor and other vulnerable groups.

Data are then recorded on all aspects of subsequent performance. These data can be used by internal managers to hold their own staffs accountable, but releasing it (key indicators and/or full datasets) to the public is the foundation for broader public accountability. Observers often undervalue the use of such data in simple day-to-day management (e.g., projecting today’s workload accurately and assuring that the right number of staff show up to handle it). Yet performance improvement by such measures can often yield vast budgetary savings (of critical

importance in the resource starved environment of developing cities today).

***Helping the poor and their advocates apply data and ICT directly themselves.*** An increasing number of efforts are being mounted in developing world cities to help the poor and (their organizations) collect data and use it both to better plan their own initiatives and to hold government agencies accountable. Some of these have been highly productive as effective organizing vehicles, as well as being informative and influential. Unfortunately, the vast majority have operated in the “retail” mode – small amounts of data with procedures that are difficult to replicate. We endorse more efforts like these but, in this paper, we give more emphasis to investment in data-related institutions and infrastructure that will allow the poor to get much more impact from the time they spend in their data work – moving to more “wholesale” engagement, production and distribution.

To make this happen, local funders need to invest in “institutional infrastructure;” supporting the building of data capacity of many community organizations at once, rather than just one at a time. There are several examples, but an important one is the work of the National Neighborhood Indicators Partnership (NNIP) in the US (briefly noted in section one).<sup>19</sup> In the early 1990s, civic leaders in a number of cities responded to this need. They supported the creation and ongoing operation of nongovernmental “local data intermediaries” that fostered collaboration between government and communities and across agencies within government in their individual cities. These NNIP partners first secured data sharing agreements that allowed them to assemble data from

many different agencies and harmonize it. They then would get the data out to community groups and help them use it in a variety of ways (coaching, providing tools, facilitating interactions with government, etc.). Direct interactions between intermediary staffs and residents – jointly probing the meaning and implications of the data in specific neighborhoods – have been regarded as important capacity building experiences. (NNIP partners now operate in 36 major cities).

### ***7. Strengthen surveys to frame and track progress***

Surveys cannot deliver all or even most of the needed benefits from a data revolution on their own, but they are still vitally important. A country’s decennial census and more frequent sample-based household surveys provide an essential foundation. They collect some data that cannot be obtained effectively in any other way and provide important control totals for other data sources. The main point here, is that survey sample sizes should be expanded as needed to enable them to offer results for urban areas, separate from rural, at the national and regional levels, and as far as possible, for individual urban areas.

CIOs in all countries should work closely with their state statistical offices to strengthen these survey programs and expand sample sizes and geographic detail, advocating for adequate long-term funding. These surveys should continue to provide the basic census-type indicators along with some additions, but should not be expected to carry a much broader load.

---

<sup>19</sup>Again see Kingsley, Coulton and Pettit, 2014; in particular, chapters 2 and 5.

## Expediting Adoption of the Approach across Countries

Many developing countries are attempting to build aspects of the data revolution into their operations to advance achievement of the SDGs. But this work is uneven at best – not likely to result in transformational change if left to unfold on its own, at least as described. However, the international policy community could take special actions to support the approach and expedite its progress across countries, heightening the prospect of its achievement world-wide.

The description of the program at the country level (in section two) shows how different strands of the data revolution can be brought together in a particular country, depicting a more coherent and forceful understanding of the potentials than if those strands had been described as individual stand-alone elements. Much work still remains to be done to determine how the international policy community can support such efforts in a systematic way. However, here we introduce the basic components that would likely have to be a part of such an effort.

It is important to note that both the SDG Agenda and the New Urban Agenda explicitly endorse the advancement of technology to achieve their aims.<sup>20</sup> The program suggested above should be seen as fully consistent with this theme and should therefore warrant support from donors and philanthropies. As

we see it then, the main components of an international support program would include the following:

### ***1. Establish an international collaborative to develop, market and support the program in countries where it is likely to prove effective***

To develop a support initiative for this program, the first step would have to be establishing an organizational base. This would necessitate assigning responsibility to one lead institution internationally, or more likely, structuring a new “collaborative” to take lead responsibility for this work; a collaborative composed of a small number of international stakeholder entities experienced and well respected housing and urban development organizations (private groups as well as multi- and bi-lateral donors could be formally affiliated). This collaborative might be housed as a part of one donor organization but, it might also be set up as a separate entity.

Once established, the work would begin by the collaborative undertaking of some additional fact finding to supplement the existing knowledge base where necessary. From that base, it would then entail developing a work program for the other activities of the initiative as described below.

### ***2. Disseminate information about the approach, generally promote its adoption, and establish an ongoing advisory structure.***

---

<sup>20</sup>Para 70 in the SDG Agenda states that, “We hereby launch a technology facilitation mechanism . . . to support sustainable development goals” and that it will establish a “Multi-Stakeholder Forum on Science, Technology and Innovation” (which will meet once a year) to carry out that aim (United Nations, 2015). Para 150 of the New Urban Agenda explicitly pledges alignment to this SDG mechanism and para 156 states further, “We will promote the development of national

information and communication technology policies and e-government strategies . . . The use of digital platforms and tools, including geospatial information systems, will be encouraged to improve long-term integrated urban and territorial planning and design, land administration and management, and access to urban and metropolitan services” (United Nations, 2016b)

The collaborative would design and implement a promotion program to inform countries about the program and encourage their participation. This would involve a series of separate convenings and also participation by staff of the collaborative in regular conferences of a variety of existing organizations concerned with urban development problems and programs. Staff would make presentations on the data revolution initiative at these conferences and prepare informative articles for the journals and newsletters of these organizations.

One or two years out, the collaborative for the initiative would begin to hold its own annual conferences and publish and widely disseminate writings (articles, blogs, case studies, etc.) on its activities and developments in the field.

This component would also entail meetings with relevant groups (including, for example, associations of city CIOs, data and ICT professionals, and city management professionals) to secure their ongoing participation as members of the permanent advisory group for the initiative.

***3. Develop and disseminate guidance materials, automated tools and training curricula that together begin to define best practices for the field.***

In this function, the collaborative would first be charged with reviewing/collecting existing substantive materials on best practices in the development and application of data and ICT in urban development. These would include standard protocols, guidebooks and automated tools related to conducting data capacity assessments and to the application of data in

planning, implementing and managing urban programs.

Then, the team would work from this base to develop new materials that advance the state of the art in these areas. For example, after trying out different options, this could include developing a standard guidebook on conducting data capacity assessments, with suggestions on how to adapt them to differing country circumstances. The new materials would also offer guidance on the features of the most effective available administrative data systems for managing and operating key urban institutions (e.g., water utilities, health centers, land/infrastructure planners), again with information on how to make adaptations to fit the circumstances of different countries and urban areas.

The team might also establish systems for rating the quality and reliability of digital system vendors and offer advice on best practices in procurement. They would stay at the forefront on the development of automated tools for urban program decision making (e.g., modules on fact-based scenario assessment for metropolitan structure planning)<sup>21</sup> and prepare new tools and guidance accordingly.

The collaborative would then be responsible for disseminating these materials effectively to in-country users and broadly promoting their application. To do this, it would employ a variety of methods ranging from web based dissemination to personal contact. This would take advantage of the rich network of relationships emanating out of the initiative's ongoing advisory committee, and the variety of dissemination and communication strategies discussed above. The effort would also be made to integrate new data development and application specialists into other

---

<sup>21</sup>See Holway et al, 2012

existing international professional organizations (e.g., water system engineers, urban land planners).

Technical assistance and training based on the new materials could be offered directly as a part of this initiative. However, it might be more reasonable for this initiative to concentrate on strengthening outside TA/training capacities to take on the direct work (internal efforts would focus on preparing the curricula and, perhaps, “training the trainers”).

#### ***4. Conducting Field Demonstrations in Secondary Cities and Metros***

The collaborative would also use available data to conduct an analysis of relevant characteristics of countries to categorize them as to their likely need for, and receptivity to, a program of this type. It would then conduct a tailored outreach initiative to introduce this program and its advantages to the leaders of national governments in countries the analysis suggests should be a good fit.

Where countries prove receptive, the offerings of the collaborative would include more intensive engagements. To demonstrate the payoff from these approaches, and to learn how to implement them most effectively, the initiative would mount a series of field demonstration programs in selected individual secondary cities/metropolitan areas.

These would operate as suggested under recommendation 3 in the broader country program described above. The specific elements of the work are worth repeating here.: (1) a scoping of local institutional capacity to prioritize the work; (2) assisting selected individual institutions in developing, strengthening and applying automated information systems (e.g., land planning departments, road planning agencies, water utilities, public health

agencies, school systems, and agencies responsible for issuing building permits, issuing business licenses and maintaining cadastral records); (3) facilitating, and demonstrating the value of, integrating and sharing data across agencies; (4) developing new community oriented local data intermediaries outside of government (like the partners in NNIP) to support the strengthening of local data capacity generally over the long term; (5) establishing mechanisms to advance open data and other means of securing government transparency and accountability; (6) using local data intermediaries and other mechanisms to make data accessible to community residents (the poor and their advocates) and help them use it directly in their own interests (especially in slums and other low income areas); and (7) generally building a culture of proactive data use in local governance and public life.

Perhaps only 3-5 urban areas would be selected for such engagements in the first round (based on information about their interests and basic capacity levels). In each, a team from the collaborative would work with local leaders to prepare a work plan and establish institutional relationships needed for start-up. The local team would include representatives from a variety of agencies and institutes, but one (ideally something like a Metro Planning Agency in the US) would be authorized and funded to take the lead and coordinate the work. The collaborative’s team would assemble relevant external data and conduct a reconnaissance assessment of cross-cutting conditions and trends before visiting the area. It would then travel to the area and begin working with the assigned local team. Their mode of assistance would be primarily one of “coaching” the locals in conducting the work (so the locals would build skills and develop a full sense of ownership for it), rather than doing the work themselves.

## References

- Baltimore Neighborhood Indicators Alliance. 2016. *Baltimore's Sustainable Future: Localizing the UN Sustainable Development Goals, Strategies, and Indicators*. Baltimore, MD: University of Baltimore, The Baltimore Goals, and Sustainable Development Solutions Network.
- Briggs, Xavier de Souza. 2008. Chapter 5, "The Grassroots-to-Grasstops Dynamic: Slum Redevelopment and Accountability in Mumbai," in *Democracy as Problem Solving*. Cambridge MA: MIT Press.
- Edwards, Ben, Solomon Greene and G. Thomas Kingsley. 2016. *A Political Economy Framework for the Urban Data Revolution*. Washington DC: Urban Institute. April 2016.
- Erba, Diego Alfonso, and Mario Andres Piumetto. 2016. *Making Land Legible: Cadastres for Urban Planning and Development in Latin America*. Cambridge, MA: Lincoln Institute of Land Policy.
- Expert Advisory Group on the Data Revolution for Sustainable Development. 2014. *A World that Counts: Mobilizing the Data Revolution for Sustainable Development*. New York: United Nations.
- HLG-PCCB (High Level Group for Partnership, Coordination and Capacity Building for Statistics for the 2030 Agenda for Sustainable Development). 2017. *Cape Town Global Action Plan for Sustainable Development Data*. New York, NY: United Nations.
- Holway, Jim, C.J. Gabbe, Frank Herbert, Jason Lally, Robert Matthews, and Ray Quay. 2012. *Opening Access to Scenario Planning Tools*. Cambridge MA: Lincoln Institute of Land Policy.
- HUD (US Department of Housing and Urban Development). 2010. "Notice of Funding Availability (NOFA) for HUD's Fiscal Year 2010 Sustainable Communities Regional Planning Grant Program." Washington DC: US Department of Housing and Urban Development
- Kingsley, G. Thomas. 2017. *A Broader View of the Data Revolution and Development Agenda*. Washington DC: Urban Institute.
- Kingsley, G. Thomas, Claudia J. Coulton and Kathryn L. S. Pettit. 2014. *Strengthening Communities with Neighborhood Data*. Washington, DC: Urban Institute Press.
- Lamson-Hall, Patrick, Shlomo Angel, Alejandro Blei, Manuel Madrid, and Nicolas Garcia Sanchez. 2016. *The Quality of Urban Layouts*. New York, NY: Marron Institute of Urban Management, New York University.
- Lozet, Florence. 2017. *How Migration Can Benefit Secondary Cities*. Brussels: Cities Alliance. November 13.



- United Nations. 2014. *World Urbanization Prospects: The 2014 Revision*. New York, NY: Department of Economic and Social Affairs, United Nations.
- United Nations. 2013. *A New Global Partnership: Eradicate Poverty and Transform Economies through Sustainable Development*. The Report of the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda. New York, NY: United Nations.
- United Nations. 2015. *Transforming Our World: The 2030 Agenda for Sustainable Development*. New York, NY: United Nations.
- United Nations. 2016a. *Report of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators*. New York, NY: Economic and Social Council, United Nations. February 19.
- United Nations. 2016b. *Habitat III – The New Urban Agenda*. New York, NY: United Nations.
- United Nations Development Group. 2015. *Localizing the Post-2015 Development Agenda*. New York, NY: United Nations.
- World Bank Group. 2015. *Open Data for Sustainable Development*. Washington DC: The World Bank
- World Bank. 2016. *Digital Dividends: World Development Report, 2016*. Washington DC: The World Bank





