Urban Futures

An Atlantic Perspective

Neal Peirce
Adam Freed
Anthony Townsend

Wider Atlantic Series

About GMF

The German Marshall Fund of the United States (GMF) strengthens transatlantic cooperation on regional, national, and global challenges and opportunities in the spirit of the Marshall Plan. GMF does this by supporting individuals and institutions working in the transatlantic sphere, by convening leaders and members of the policy and business communities, by contributing research and analysis on transatlantic topics, and by providing exchange opportunities to foster renewed commitment to the transatlantic relationship. In addition, GMF supports a number of initiatives to strengthen democracies. Founded in 1972 as a non-partisan, non-profit organization through a gift from Germany as a permanent memorial to Marshall Plan assistance, GMF maintains a strong presence on both sides of the Atlantic. In addition to its headquarters in Washington, DC, GMF has offices in Berlin, Paris, Brussels, Belgrade, Ankara, Bucharest, Warsaw, and Tunis. GMF also has smaller representations in Bratislava, Turin, and Stockholm.

About the Wider Atlantic Program

This report was prepared for GMF's Wider Atlantic program, a research and convening partnership of GMF and Morocco's OCP Foundation. The program explores the north-south and south-south dimensions of transatlantic relations, including the role of Africa and Latin America, and issues affecting the Atlantic basin as a whole.

On the cover:

Office buildings and a city park in Shanghai, China © chinaface

Urban Futures

An Atlantic Perspective

Neal Peirce
Adam Freed
Anthony Townsend

June 2013

Wider Atlantic Series

Table of Contents

Preface

Over the last three years, GMF has partnered with Morocco's OCP Foundation on a multi-faceted program exploring key issues around the "wider Atlantic." Our aim is to extend the transatlantic debate to embrace the Atlantic Basin as a whole, north and south, including Latin America, the Caribbean, and Atlantic Africa, together with North America and Europe. The program has two tracks: A major convening activity, *The Atlantic Dialogues*, held annually in Rabat; and a parallel studies effort focused on emerging policy questions. Previous Wider Atlantic studies have explored Atlantic geopolitics, food security, maritime and energy developments, and the role of Asian actors in the Atlantic space.

Against this background, we are very pleased to publish this new report. *Urban Futures: An Atlantic Perspective* by Neal Pierce, Adam Freed, and Anthony Townsend, takes a different approach to the future of Atlantic societies, and is the product of close collaboration with GMF's very active Urban and Regional Studies Program. To a great extent, the development and interdependence of societies on both sides of the Atlantic, north and south, is being driven by developments in and around cities. This set of analyses explores patterns of urbanization, and emerging networks linking urban actors in an era of "smart cities" and growing interest in lessons from other regions. The report also reflects on how the international role of cities and regions can influence Atlantic futures.

We are very pleased to have this study as the latest contribution to our Wider Atlantic series. Comments on the report are most welcome, and may be addressed to the authors, or to me, at GMF.

Ian O. Lesser
Executive Director, GMF Transatlantic Center,
Senior Director for Foreign and Security Policy
Brussels

Executive Summary

I t is widely known that urbanization is one of the most dramatic trends of the last century. The percentage of the world population living in cities has risen from approximately 30 percent in 1950 to more than 50 percent in 2008; by 2050, this percentage is expected to increase to 72 percent.[1] This demographic trend, compounded by globalization and rapid technological advances, has fundamentally altered the position of cities on the world stage. The German Marshall Fund's Urban and Regional Policy Program has engaged three experts to explore the evolution of the importance of cities as global policy actors, innovators, and collaborators. While a global phenomenon, the authors identify specifically how this trend unfolds in the cities of the Northern Atlantic Basin (or Global North) versus the cities in the Southern Atlantic Basin (or Global South). Despite the important differences between the cities of the Atlantic Basin, technology and the impact of global issues on the urban environment are bringing these cities closer together.

The chapter by Neal Pierce provides an overview of the new role cities are playing on the global stage, traces the demographic shifts that are shaping our urban landscape, highlights key trends affecting and empowering urban areas, and poses as-of-yet unresolved questions about the developing relationship between cities, nation-states, and global institutions and corporations.

The subsequent two chapters delve more deeply into two of critical trends identified in the overview: 1) the increase in learning and direct collaboration among cities through networks; and 2) the growing use of technology and data.

Adam Freed's chapter shows the renewed importance of city networks as a critical platform for exchange and cooperation

1   "World Urbanization Prospects: The 2011 Revision," United Nations Department of Economic and Social Affairs, Population Division, March 2012

among cities that are grappling with similar global challenges. City leaders themselves are driving this trend as demonstrated by the increase in participation of networks around the issue of sustainability and climate change. By tracking some of the initial outcomes of this particular collaboration among cities and identifying the critical ongoing challenges, the chapter demonstrates a shift of power and activity on global climate action from nations to cities, and raises the question whether cities are poised to take on the same leadership role in other policy areas. Freed also shows that some of the most successful city networks, including the C40, act as an important bridge and learning platform between the two different urban contexts of the Global North and South.

In the third chapter, Dr. Anthony Townsend explores the idea of the widely used term, "smart cities." As he shows, technology has long been a critical component of urban policymaking; however, over the past decade the use of technology has expanded dramatically in two potentially beneficial, but arguably opposed directions. First, technology has been applied in a top-down fashion to create new efficiencies in urban management, such as through the establishment of a new data-driven operations center in Rio de Janeiro. Second, technology is also being used to identify and map the preferences, needs, and priorities of city residents so that these can be integrated in a bottom-up manner into the urban development process. Dr. Townsend's article explores the benefits and shortcomings of each approach, as well as the potential for tension between them. What is clear is that the widespread use of technology by both city managers and city residents will continue to shape urban development patterns and management systems, particularly in the rapidly growing cities of the Global South.

As all three authors note, the significance of the rising global influence of cities might not be explained by the extent to which cities carve out a sphere of power for themselves on the governance stage, but by their ability to learn from each other, construct a viable venue in which to make collaborative decisions, and voluntarily implement what is decided upon. At the same time, the inevitability of urbanization, and the necessity of redirecting governance to the extent necessary to give them the authority to solve their own problems, means that city leaders will have to

both empower themselves to be global actors and harness their power toward a common vision that involves all actors. Whether as global policy actors, innovators, and collaborators, the cities of the Atlantic Basin do share common ground in their ability to learn from each other, even if what they learn and how they apply it may differ based on their unique contexts.

Introduction

I t is widely known that urbanization is one of the most dramatic trends of the last century. The percentage of the world population living in cities has risen from approximately 30 percent in 1950 to more than 50 percent in 2008; by 2050, this percentage is expected to increase to 72 percent.[2] This demographic trend, compounded by globalization and rapid technological advances, has fundamentally altered the position of cities on the world stage. Although cities have historically served as important economic, social, and cultural centers, cities in the 21st century are asserting their position as key actors, innovators, and collaborators on issues of not just local, but national and global importance.

Why is this happening? First, as technology compresses geography and opens virtual boundaries, the spatial understanding and importance of the city changes. In this context, the traditional geographic boundary of the city is less significant because its ability to influence economy, society, and culture is unlocked through technology. Even city size seems to matter less, as even innovative policies and solutions from the smallest of cities are now publicized and promoted online as models of "good practice." Twenty years ago, only the work of major world cities or global cities could be lifted up. Now, the discourse focuses on "scaling up" ideas to solve problems at a larger scale. This dynamism of the 21st century reaches down to cities themselves. A city in Mexico might now be inexorably tied to one in South Africa, by virtue of their digital infrastructure, social media penetration, and ability to network across national boundaries to solve problems.

Second, many of the critical global issues of the 21st century, such as the energy transition, social and economic inequity, climate change, and the threat of terrorism, fundamentally impact the economic competitiveness of cities. Traditionally, solving these issues has

2 "World Urbanization Prospects: The 2011 Revision," United Nations Department of Economic and Social Affairs, Population Division, March 2012

been the task of national governments or global institutions. Yet we now see mayors, city administrators, and regional leaders voicing their perspectives and powerfully advocating for solutions. At the same time, fixed solutions do not suffice for today's critical global issues — the actors behind them must be dynamic and always be in a process of learning and experimentation. Cities, by their nature, are dynamic and evolving environments, requiring leaders to constantly pivot and adjust. One could argue that the most successful urban leaders may be best equipped to tackle pressing global issues. In his forthcoming book, *If Mayors Ruled the World*, distinguished political theorist Dr. Benjamin R. Barber, makes similar observations.

The German Marshall Fund's Urban and Regional Policy Program has engaged three experts to explore the evolution of the importance of cities on the world's stage. While this is a global phenomenon, the authors identify how this trend unfolds in the cities of the Northern Atlantic Basin (or Global North) versus the cities in the Southern Atlantic Basin (or Global South). Despite the important differences between the cities of the Atlantic Basin, technology and the impact of global issues on the urban environment are bringing these cities closer together. Whether as global policy actors, innovators, or collaborators, the cities of the Atlantic Basin do share common ground in their ability to learn from each other, even if what they learn and how they apply it may differ based on their unique contexts.

Transatlantic city to city learning is a core component of GMF's Urban and Regional Policy Program's mission. As Tim Campbell, a former program fellow, documents in his book *Beyond Smart Cities*, this type of learning is inexorably tied to innovation. History provides numerous examples of cities learning from one another and developing local solutions. The first instances of public housing the United States, for example, were built in Chicago and modeled directly from examples in London that similarly attempted to accommodate increasing immigration and urbanization.[3] Indeed, as the scholar Marjatta Hietala relates, "many of the problems that have been tackled through institutionalized and personalized

---

3   Jane Addams Hull-House Museum, http://www.uic.edu/jaddams/hull/newdesign/ja.html

networks throughout 19th and 20th century Europe are today topical across the developing world."[4]

Though the city learning networks of today are greater in scale and complexity, the authors of the following three chapters point to examples of how this has led to the emergence of cities as global policy actors, innovators, and collaborators. The presence of cities on the global stage and their collective role in utilizing this role toward the solving of problems is the intriguing and defining opportunity within this debate. As Neal Pierce explains in chapter 1, urbanization brings with it a host of opportunities, challenges, and tradeoffs. On a crowded global governance stage, it also means tension. But many organizations have already sprung up to ease the transaction time of these connections and to support cities as they attempt to learn from each other.

In chapter 2, Adam Freed discusses the renewed importance of city networks as a critical platform for exchange and cooperation among cities that are grappling with similar global challenges, especially the issue of climate change. As he shows, many sustainability or climate city to city networks already exist, which have raised the profile of the issue as a critical urban challenge and encouraged joint learning or policy examination. Importantly, the cities that engage in this topic view climate change as a global issue that also presents profound local consequences and opportunities. As Freed explains, the lessons that could be gained from the experience of these networks are valuable and should inform future collaborations. Freed's article introduces several of the key city networks that have developed in recent decades before focusing in detail on what has arguably been one of the most influential and successful examples: the C40 network of cities addressing climate change. By tracking some of the initial outcomes of this particular collaboration among cities and identifying the critical ongoing challenges, the article demonstrates a shift of power and activity on global climate action from nations to cities and raises the question whether cities are poised to take on the same leadership role in other policy areas.

---

4   Hietala, M. (2012) "New Challenges for Urban History: Culture, Networks, Globalization," Culture & History Digital Journal 1(2)

As Anthony Townsend explains in chapter 3, the technological advances of the 21st century are changing how cities interact with one another, and altering also how leaders interact with and manage their cities. In their eagerness to adopt new "smart city" know-how, cities are also increasingly willing to engage with non-state actors such as nonprofits, international NGOs, and multinational corporations. Townsend explains that this process is often fraught with tension and surprises. Change, for example, often comes unexpectedly by emerging from citizen rather than top-down action.

All three authors note that the significance of the rising global influence of cities might not be explained by the extent to which cities carve out a sphere of power for themselves on the governance stage, but by their ability to learn from each other, construct a viable venue in which to make collaborative decisions, and voluntarily implement what is decided upon. At the same time, the inevitability of urbanization, and the necessity of redirecting governance to the extent necessary to give them the authority to solve their own problems, means that city leaders will have to both empower themselves to be global actors and harness their power toward a common vision that involves all actors. The complexity of the urban agenda will require these partnerships.

The process of peer learning is an evolutionary one, and city partnerships will coincidently acquire multiple identities. It is within this space that considering certain geographic contexts would be appropriate. The Atlantic Basin, for example, could become a strategic framework around which the cities of North America, Africa, Europe, and Latin America coalesce and use to gain influence. However, the authors also recommend that urban leaders in Africa, or in North America, or in Asia, look outside of their borders and aim toward a global conversation as they reach towards appropriate policy solutions. At the same time, city leaders will have to tread carefully to ensure that their venture onto the global stage does not cause them to leave their citizens behind, and that they remain responsive to local conditions.

Many questions remain, however, of the actual significance of the growth in power of global cities, what institutions will be created to bring stability to their role, the opportunities and risks

of multi-stakeholder partnerships, and how effective city actors can be in influencing global policy and solving the challenges that accompany rapid urbanization. While national governments will continue to have a monopoly over foreign policy, to what extent can city actors use informal channels or collaborate with existing institutions? Adding to this uncertainty is that the history of the urbanized world remains short, and its institutions remain young, but the pace of change is intensifying.

Cities on the Global Stage

Neal Peirce

T here's little doubt — indeed it is an almost global consensus — that a worldwide "age of the city" has dawned.

But how will it unfold? How will the massive wave of urbanization alter relationships — and the balance of effective power — between cities and their nation-state governments? How might it impact worldwide diplomacy? Or reflect the formidable power of global corporations and the influence of nonprofits? Or possibly affect the often scattered powers of multiple cities within single metropolitan regions?

The opportunities of an urban world future need to imagined, defined, and explored. Presently there is no "grand coalition" of cities from the Atlantic Basin, and the urban areas of North and South America, Europe, and Africa are not yet seen as a clear global community. At the same time, international associations of cities are increasingly influential, and these coexist with several effective continent-wide networks, such as in the case of Europe's "Metrex." Further, there are many associations of cities within specific countries. But neither mainstream literature nor significant debate has focused — at least to date — on multi-continent associations that are anything less than fully global.

The following chapter charts the rise of cities and urban regions — from dramatic population growth to ever-greater influence in their nation states — at this moment of history.

The Urban Population Explosion

This is certain to be the *Century of the City.* From 1950, when 750 million (or 30 percent) of a world population of 2.5 billion lived in cities, the urban total in 2008 passed 3.5 billion, more than 50 percent of the 6 billion people on earth that year. As the flow of migrants continues, the population of cities such as Delhi, Dhaka,

Jakarta, and Mexico City is approaching the 30-million range — more than the entire population of Canada.[5]

World cities (most spectacularly those of Asia, but also Africa and Latin America) are now predicted to grow a stunning 72 percent by 2050, rising from today's 3.6 billion to 6.3 billion inhabitants — more than the total population of the world in 2002.[6] The urbanization trend has been depicted as the most important since the rise of agriculture and the decline of nomadic living. Already, in addition to such well-known megacities as Tokyo, New York, London, Mumbai, Mexico City, and Karachi, the earth has some 1,000 cities with more than 250,000 inhabitants. In sheer population terms, the top 25 today include only a handful of the most famed developed world cities — Tokyo, New York, Los Angeles, Paris, and Chicago. By contrast, the group is dominated by such developing world cities as São Paulo, Cairo, Beijing, and Istanbul, along with Lagos, Jakarta, Shanghai, and Manila. As educational levels and wealth grow across the continents, it is inevitable that connections between these cities will become ever more close and dynamic through digital communications, the interchange of populations, and growing economic interdependencies. The 20th century dominance of North American and European cities will soon become a historical memory, and cities from disparate corners of the world can be expected to form new types of alliances as they grow in power and influence.

Most major nation states, and some broader regions of the world, have created associations of cities and alliances to compare needs and practices and form common policies and impress them on nation state governments. A leading group in Europe, for example, is METREX — the European Metropolitan Regions and Areas — which aims specifically to "contribute the metropolitan dimensions to policies, programs and projects on a European scale." Hannu Penttila, former Executive Director of the Helsinki Metropolitan Area Council and former president of METREX, confirms that in many cases the European regions have to deal with major policy and political differences with their nation state governments. Yet,

5   Ruble, Blair, "Policy Brief," Woodrow Wilson International Center for Scholars, Dec. 7, 2012. Ruble directs the Wilson Center's Program on Global Sustainability and Resilience.

6   "World Urbanization Prospects: The 2011 Revision," United Nations Department of Economic and Social Affairs, Population Division, March 2012

in a pattern likely to be repeated worldwide, Penttila reports that as the Helsinki area has grown economically, in population, and as a leading force in Finland, the historic rural resistance to city issues in Finnish government has subsided.[7]

Cities are already the world's economic powerhouses, and generate an overwhelming and growing share of global GDP. They harbor the world's prime intellectual, artistic, commercial, political, and administrative talent. For two centuries, every nation that has developed a strong middle class and become wealthy has done so through the strength and vigor of its cities. If the serious environmental, economic, and human challenges the 21st century are to be successfully addressed, the reservoirs of human intelligence and ingenuity assembled in cities will be the keys to solutions.

As urban specialist Peter Engelke notes in a draft report for the Atlantic Council:

> The massive global urbanization process that has been unfolding since 1950 and that will continue to unfold for decades to come will be critical to the future of our species. Cities and urban regions will be major focal points of key global trends, stresses, and challenges facing policymakers — from resource scarcity, food and water shortages, and climate change mitigation and adaptation to promoting technical innovation and sustainable economic growth.

Engelke continues to note that cities will become "increasingly important non-state actors on the global scene. They are likely to mount an important and effective challenge to our conventional notions of national and political governance."

Cities' Critical Role

The possibility of a global city-state age, coexisting with and in some ways eclipsing the power of nation states, has been evident for at least two decades. The reasons for this concentrated urbanization are numerous. Cities benefit dramatically from an array of contemporary phenomena: global and instant telecommunications and money flows, rapid air transport of peoples and goods,

---

7   Interview with the author, Dec. 12, 2012.

fast trade exchanges, crumbling trade barriers, power through economics trumping power by military force, and economic power moving inexorably away from rural into urban centers. Loosened immigration laws bring cities the fresh skills of newcomers (albeit with the risk of ethnic conflicts). The proximity and the shoulder-rubbing of people from diverse backgrounds that are endowed with wide ranges of skill sets creates a chemistry of creativity almost impossible to emulate in rural settings.

City assets are critical, in turn, to entire nation states' well-being. Cities provide the major sources of GDP, tax revenues, creativity, innovation, and adaptation to shifting global competition. More broadly, cities are critical to the welfare of the entire world, as their policy choices — in greenhouse gas reductions, economic inclusion, energy and water use, waste disposal, health services, and more — impact the entire globe.

There's a negative side to consider as well. The global economy has recently gone through its first broadly shared recession (starting in 2008). The demand for resources — food, water, energy, and basic materials — will grow faster than in the 20ᵗʰ century and strain our common supplies. Commodity prices have seen a dramatic surge in prices since 2000. Increasingly interrelated shocks — fuels, basic foodstuffs — pose special perils for the urban poor, and an economic shock anywhere in the world may have global reverberations.

Compounding current and future challenges is the issue of rapid and uncontrolled formation of informal (slum) neighborhoods, a compelling problem from Southeast Asia to Africa to Latin America. The future of these slums, which rose to full attention during the 2000s as a result of numerous books, studies, and conferences, has immense implications for global security and well-being. A recent Atlantic Council policy paper noted some of the dangers: "Failure to address the plight of some 1 billion slum dwellers (forecasted to become 2 billion by 2050) will increase the likelihood of global pandemic formation and transmission, encourage the trade in illicit goods (drugs, small arms) and human

beings (sex slavery, peonage), and increase chronic violence and organized crime."[8]

As these opportunities and dangers make clear, cities need to be in constructive dialogue, to learn from each other and in turn make their voices heard not just in the affairs of their own countries, but globally. Their success in doing so will have immense implications for the world's well-being,

Dialogue among the long-term "established" cities of the world — such metropolises as Paris, Chicago, Amsterdam, Melbourne, Tokyo, Johannesburg, Beijing — will not be sufficient or inclusive enough for the times. Studies by the McKinsey Global Institute identify 600 dynamic global metropolises likely to lead the world economy to 2025 and beyond. The predicted list for 2025 includes an especially dynamic "Emerging 440" cities — over half in China alone — that are projected to generate roughly half of global economic growth from now to 2025. McKinsey projects these 600 cities will account for $23 trillion —47 percent of global GDP growth — between 2010 and 2025. Included are some 20 megacities such as Shanghai, Sao Paulo, Istanbul, and Lagos. But more than 400 are "middleweight" cities with populations of 200,000 to 10 million. These cities are spread over every continent except Oceania. Notably, China alone accounts for 242 of the fast-growth middleweights.[9]

Some of the names of the fast-rising newcomers are familiar enough — Belo Horizonte, Brazil, and Bangalore, India, for example. But the roll call of the next decades is predicted by McKinsey to include the likes of China's Harbin, Fushun, Quinhuangdao, and Lanzhou, Mexico's Pueblo, India's Ahmedabad, Angola's Kumasi, and Qatar's Doha. Compared to today, the global city map — and discussions — of 2025 are likely to have a dramatically different cast.

The top metro cities of the United States and Europe are not excluded; indeed McKinsey projects they will add trillions in economic value by 2025. However, the dynamism of the Far East,

---

8   Garrett, Banning, Peter Engelke, et al, "Urban World 2030 and the Global Future," Atlantic Council, May 25, 2012.

9   "Urban World: Mapping the Economic Power of Cities," McKinsey Global Institute, March 2011.

and to lesser degree Latin America, will clearly lead the world, with the United States and European nations playing a much less dominant role than they have in recent centuries.

Ideally, international economic bodies and adept national governments would be negotiating clear economic cures, erecting firewalls against economic and resource emergencies. But the world's cities cannot count on any such safeguards. They are increasingly on their own in a tumultuous and tough-to-predict global economy. Their ability to communicate, test and share strategies, and respond to shifting economic, social, and environmental conditions has never been more pressing.

Lead Experiment: Climate

Climate change and its multiple impacts threatens to become the overwhelming challenge of the 21st century. Further, it is a policy area in which cities are positioned to play a critical role, both in combating the dangers of greenhouse gas emissions and carbon build-up in the atmosphere, and in undertaking massive re-engineering to adapt to it the probable impacts of climate change, most dramatically in sea level rise. In this context, it is not surprising that cities have made climate the top issue on which they are seeking to have their voices heard on the world stage and in international negotiations. Concurrently, cities are asking national governments for far more power, resources, and expert help in fashioning local responses.

Unless nation state climate efforts become more aggressive, it is likely that cities will remain important, if not key, actors in the climate efforts of the century. Conservatively, they emit at least 40 percent of greenhouse gases such as carbon dioxide, methane, nitrous oxide and fluorinated gases.[10] If one counts the city-based consumption of electricity, food, and other commodities that require burning of fossil fuels, the figure may exceed 80 percent of global emissions.[11]

---

10 Rosenzweig, Cynthia, "All Climate Is Local: Mayors are often better equipped to cut greenhouse gases," *Scientific American*, Sep. 2011.

11 Daniel Hoornweg, Lorraine Sugar, and Claudia Lorena Trejos Gomez, *Environment and Urbanization*, Sage Publications, Apr. 13, 2011.

The two top organizations of cities engaged in the effort are C40 (originally titled the Large Cities Climate Leadership Group) and ICLEI (initially titled the International Council for Local Environmental Initiatives). Both were deeply involved in mobilizing mayors and other local officials to press for more effective global accords to deal with climate change at the United Nations Climate Change Conference — more commonly known as the Copenhagen Summit — in 2009.

C40 membership includes such major metropolises as Berlin, Hong Kong, Jakarta, Johannesburg, Los Angeles, London, New York City, Sao Paulo, Seoul, and Tokyo — at last count, actually 59 cities. ICLEI has worked with more than 1,000 local governments around the world on agendas to cut back city-generated greenhouse gas emissions and improve local environmental stability. Both organizations believe they have an important role to play as cities, now representing more than 50 percent of world population, consume roughly 75 percent of the world's energy. C40 cities alone, for example, represent some 20 percent of total GDP.[12]

Nonetheless, the compelling problem of how to meaningfully engage central governments persists. During the 2009 Copenhagen Summit, nation state governments paid polite attention to cities but excluded them from a direct role in negotiations. Some 80 mayors were present to press negotiators to reach significant targets and set clear action paths. At the end, city leaders expressed extreme disappointment in the process and the limited outcome that the nation state representatives were able or willing to reach toward achieving an international accord on carbon reduction.

Cities also sought a major voice at the Rio+20 conference, a discussion of international environmental issues. New York City's Mayor Michael Bloomberg, chair of the C40 group, pressed the issue of city inclusion and especially inclusion of mayors within national delegations. Even as national and global efforts to curb greenhouse gas emissions have faltered, Bloomberg asserted that cities across continents have moved aggressively to the forefront of climate change action. This is significant, he suggested, since burning of carbon fuels by cities accounts for the vast majority of global greenhouse emissions and clogs city streets, pollutes air, and

---

12   Author interview with Amanda Michel of C40, Aug. 29, 2012.

harms the health and shortens the lives of residents. Bloomberg argued that cities themselves are pursuing noteworthy policy changes, noting New York's pacesetting PlaNYC — the "greenprint" for his city's future — and significant carbon reduction efforts also underway in such cities as Lagos, Buenos Aires, Jakarta, Johannesburg, Hong Kong, Berlin, and Seoul.[13]

While cities were not included on the nation state delegations to the Rio+20 conference, local officials did have many opportunities for dialogue. Nonetheless, it may be some time before they open their official delegations to mayors and other city leaders. Part of the reasoning is clear: "We're the nation states — the cities are our subunits, not equals." If mayors are admitted, why not the private sector, civil society, and other groups?

The Rio+20 conference did, however, provide broad opportunities for mayors and other city leaders to make their voices heard. United Cities and Local Governments (UCLG) — the umbrella group of international city groups formed in 2004 — joined many others in lamenting the lack of specific multilateral agreements and conferences coming out of the sessions. Nonetheless, the official Rio+20 Outcome Document, UCLG noted, expanded nation-state recognition of the role that local and regional governments play in policy areas such as environmental sustainability, repairing of imperiled ecosystems, and lessening of high levels of poverty (especially within the rapidly developing cities of the Global South).[14]

The next critical international event, in 2016, will be called Habitat III — officially a successor to earlier U.N.-sponsored conferences on human settlements held in Vancouver in 1976 and Istanbul in 1996. Habitat I led to the creation of the U.N. Habitat organization — the Nairobi-based United Nations Human Settlements Programme. Habitat II, following up on the Rio Earth Summit, focused on adequate shelter and sustainable cities. Habitat III, approved despite U.N. General Assembly concerns about tight

13 Bloomberg remarks at forum at United Nations headquarters, New York City, Dec. 15, 2011.

14 "Local and Regional Governments Role in the Rio Outcome Document: A UCLG Analysis," Summer 2012; also author interview with Josep Roig, Secretary-General of UCLG, Sep. 5, 2012.

U.N. budgets, is already seen by proponents of cities as a decisive opportunity to redefine cities' roles for the century.

One idea, raised by a variety of attendees at recent world forums, and a key consideration at a discussion at a UN-Habitat Day observance at UN headquarters in 2011, is to make Habitat III truly reflect global opinion. A key tool proposed is the use of social media and other current interactive communications tools to tap, in advance, "grassroots" input from across the continents on critical issues to be debated and acted on. It is worth noting that the official Habitat conferences (I, II, and the upcoming III) are assemblies of nation state delegations — not the less formal dialogue-focused World Urban Forums, open to any and all interested registrants, held every two years (most recently Rio de Janeiro in 2010 and Naples in 2012). Especially as global cities rise in influence, their lack of an official voice at the Habitat conferences may become a point of contention.

Cities and Nation States: Tension Inc.

Nation states stepped onto the world stage as feudalism crumbled in the 16th and 17th centuries. They reigned triumphant, engaging in series of wars that culminated in the historic global conflicts of the 20th century. As colonial powers, they set the boundaries for new nations in the continents they conquered. To this date, nation-state leaders are not anxious to share power with mayors, however large their cities. Nation states' basic structures, with individual departments that are responsible for topics ranging from security to agriculture to commerce, are not well suited to coexist harmoniously with cities. Central ministry bureaucracies often find cities an annoyance, because it is difficult to control them from the center.

As urbanist Tim Campbell explains:

> "National policy, economic adjustment, and conditionality require cities, lying at the tail end of a long chain of institutions, to synthesize the often separate policy and reform agendas of national authorities. The process often results in what Lloyd Rodwin used to describe 'apoplexy at the center and anemia at the periphery.' Cities are expected to meld policy reforms and exercise powers of

implementation that (national government) ministries themselves are often unable to perform."[15]

Another factor is that national leaders not infrequently see the mayors of major cities as their potential political rivals, whom should not to be favored or well financed. City politics are often to the left of their central governments, another reason why their influence may be muted. The United States is a prime example: city mayors, sensitive to crime threatening their citizens, are strong supporters of strict gun control laws. More than 700 belong to a coalition named "Mayors Against Illegal Guns." Nonetheless, the state and federal governments, their legislatures influenced by special interest group politics, constantly constrain cities' powers to restrict gun sales and ownership.

At an international mayor's conference in Chicago in 2010, some delegates proposed the application of international law to get around the powerful U.S. gun lobby, which opposes virtually all curbs on gun trading. Opponents say the flood of U.S.-made pistols, rifles, and assault weapons fuel the bloody Mexican drug wars. The "extremely violent" Mexican drug gangs, Mexico City Mayor Marcelo Ebrard Casaubon reported, were getting 85 percent of their weaponry from transfers across the U.S. border. Ebrard joined then-Chicago Mayor Richard M. Daley, Philadelphia Mayor Michael Nutter, Columbus Mayor Michael Coleman, and others to approve a resolution to "seek redress against the gun industry through the courts of the world — including local, state, and federal courts, and international courts — for damages caused to our countries, cities and communities by global trafficking of illegal guns" (The resolution's mere mention of possible multinational legal action seemed to reflect the mayors' expansive view of how to push their views and protect their citizens on an international scale).

At the same Chicago conference, Mayor Bertrand Delanoe of Paris said, "Both national governments and journalists should get used to mayors having strong positions and expressing them." Delanoe, at the time president of the UCLG global cities organization, pointed again to stalled climate negotiations and failure of the 2009

---

15   Tim Campbell, *Beyond Smart Cities: How Cities Network, Learn and Innovate,* Earthscan Publishing, 2012.

Copenhagen climate summit. "National governments did not listen to what we said," he said. "Copenhagen was a failure whereas it is in the cities where this fight can be won."[16]

Within individual nation states, the powers that mayors wield differ dramatically. They range, for example, from direct popular election and significant authority to an opposite pole in which some cities are obliged, under nation-state law, to operate under appointees of central or provincial governments. Mayors in the latter category are less likely to seek significant influence on national or international issues.

The nation state-city balance is, however, shifting perceptibly worldwide toward decentralization of central government powers. Junaid Jamal Ahmad of the World Bank notes that nations' capital city bureaucracies, which long monopolized power — often as a legacy of the era of Western colonial control — have increasingly found they cannot provide the services demanded in diverse local communities. Very powerful non-governmental agency and community-led systems of service delivery are emerging. All this, Ahmad notes, is accelerated as the decentralization phase, which began in Latin America 30-some years ago, now impacts more than 100 nations across the globe.[17]

If power is decentralized, to what level of sub-national government will it gravitate? In India, for example, provincial governments continue to hold most legal power, making it difficult for cities to even elect mayors. By contrast, Lagos State, created by Nigerian government decree in 1967, runs one of the world's megacities with a substantial decree of local autonomy.

Latin America offers clear examples of major cities that wield significant autonomy to carve out their own policies. Rio de Janeiro, Curitiba, Bogota, Medillen, and Mexico City are able, by varying legal mechanisms, to initiate programs and interventions in which they are the clear driver. And in many of those cases, national policy has helped cities become more prosperous, and in the process more self-reliant. The socially progressive policies of Brazilian President Luis Silva da Silva (2003-2010) were successful,

16   "Could Mayors' Fervor for Gun Curbs Trigger Global Legal Action?," column by author, Washington Post Writers Group, May 12, 2010.

17   Author Interview with Junaid Jamal Ahmad, Dec. 4, 2009.

for example, in virtually ending hunger, providing basic financial assistance, and raising the literacy of millions of city dwellers — policies that contributed significantly to improved living conditions and economic advancement in Brazil's cities.[18]

Another possibility is for nation-state governments to collaborate with NGOs and other international organizations as they reach out to cities. In the words of Billy Cobbett, Manager of the Cities Alliance (which uses multination financing in programs to combat urban poverty):

You can't do effective international work by ignoring national governments. Our successful programs tend to be collaborations that include more than one tier of government, but always the national government. It would be counterproductive to try to bypass national governments to engage with cities. We'd then be interfering with internal arrangements of the country.[19]

The institution of the nation state will not fade away in this century. It is ensconced and embedded deeply in constitutions and statutes (or enforced by undemocratic central governments). It controls so many policies — ranging from national military force and diplomatic relations to banking and currency — that in most places, it would have to be invented if it did not already exist. Further, even as cities gain more independence and weight, urban-rural connections remain vital.

Nevertheless, the global economic shifts and urban population explosions of recent decades have propelled billions of people into cities, and these changes do raise questions about future balances of power. Cities, with the dominant population totals of their nations, with communications allowing them to be in contact with municipal entities across the globe, will inevitably demand a greater share of power.

In addition, it is worth noting that the issue is not just the role of cities but of the entire metropolitan areas in which they are the (sometimes disputed) leaders. As Blair Ruble of the Woodrow Wilson Center for Scholars notes, "What constitutes a city needs to be redefined — that is, carpets of urban development that obliterate

---

18   Author Interview with Thomas Shannon, U.S. Ambassador to Brazil, Sep. 29, 2012.

19   Author Interview with Billy Cobbett, Sep. 6, 2012.

the landscape as they extend literally hundreds of square miles in every direction."[20] Not surprisingly, this rapid physical expansion makes it exceedingly difficult for the central city to command full political power and investment potential over its region. Some nations' laws do make it easier. China permits, for example, significant autonomy to its regions. By contrast, laws in such countries as the United States and Mexico make it quite difficult. Frequently, world cities face stiff political battles as they seek to extend the central city's authority and taxing authority, and this is a problem that is likely to persist for decades to come.

David Miller, former Toronto mayor and leader of the C40 group, suggests that cities are "not waiting for national governments to act any more. They're addressing their challenges, shaping their actions in a way to influence international policy." And while bothersome, he suggests that the issues of split jurisdictions in a metropolitan region are not a reason for inaction or defeat. "It's the core city that has to lead," he says, adding that the surrounding metropolitan communities "only exist because of the core city, and thus have a major stake — admitted or not — in its welfare."[21]

The Global City Club

Organizations of cities are scarcely new — an International Union of Local Authorities was formed a century ago, in 1913. But from occasional contacts in past years, the world's cities, through their elected leaders, observers, analysts, funders, supplicants, and others, have now formed a rich tapestry of organizations.

Among them are United Cities and Local Governments, which was formed in 2004 to bring together the original International Union of Local Authorities with Metropolis (the World Organization of Major Metropolises), the World Federation of United Cities, and others.

Nicholas You, leader of the World Urban Campaign, offers a quick explanation: "Mayors are very competitive. But unlike corporations, they are glad to share their secrets. A mayor will share everything

---

20 Ruble, Ibid.

21 Author interview with David Miller, Aug. 27, 2012.

he knows with other mayors. The networking among mayors focuses on very practical knowledge."[22]

But today's conversations extend far beyond mayors. Many top global academic institutions, in addition to independent analysts and a handful of renowned authors and foundations have begun to take direct interest in the fortunes of cities. The World Bank and its affiliated World Bank Institute are turning increasingly to urban challenges. Non-profit organizations are studying, reporting, and holding conferences on multiple aspects of global urban development. And most recently, a profusion of Internet sites have sprung up in order to watch developments and experiments in cities worldwide. Belatedly, traditional world media are starting, but still in spotty fashion, to cover new ideas and development in cities beyond their own.

Why is this significant? The web of research, and knowledge, and personal city-to-city contacts is getting deeper, thus permitting smart city leaders to learn of and consider many of the latest approaches and trends they could emulate in their own city. And in some cases, they are pursuing this policy imitation with interesting depth and sophistication.

Former World Bank official Tim Campbell reports on research showing that the 500 largest cities on the planet are constantly "on the prowl," sending delegations to visit each other, repeatedly and consistently every year, on the order of thousands of study trips annually. Campbell's 2012 book, *Beyond Smart Cities,* explains his case that in a globalized economy, cities no longer have the protections of trade regimes and comforts of regional isolation, and they "need to work harder to make a living." This means that to capture incoming investments, they have to strive to be at the top of their game and make themselves an attractive place for global talent.

Campbell believes that "an entirely new approach to solve urban problems" is now being invented, as expertise no longer flows top-down but "localities are the source of solutions." That means, he suggests, a new paradigm in which "the transition to an urbanized planet comes with a large surge of creative solutions by cities

---

22 Author interview with Nicholas You, Aug. 1, 2012.

themselves." He asserts that this opens the way to "a larger prize — the embedding of knowledge in the city culture as part of an innovative milieu that allows urban communities to make coherent decisions."

Trying to make that approach actually work may be difficult. But an initial try at defining how to do so was made by a so-called "World Smart Capital Initiative" that held its first meeting in Amsterdam in 2012. The goal of the conference was to broadly promote solutions and services for cities in the developed and developing world. However, the method the conferees developed was more fine-grained — a collective discovery, city-by-city, of innovative ways to tackle such issues as conservation of energy, water, waste, and emissions. Solutions were not pulled randomly out of a hat, but rather from the experience of engaged urban partners working simultaneously in solution invention as agents of culture, creativity, and economic activity. Put in other terms: knowledge can go all over the world, but value is created locally.

Dissenting individuals or groups can thwart even the finest and most sensitive plans. Cities, however, are more pragmatic and comparatively free of the party and ideological differences that are typical in nation state politics. Cities' 21st century opportunity may be to maximize that difference and learn from each other across all boundaries and oceans.

The Wealth Factor

Another massive asset of cities and metro regions is that they are the chief generators of national and *global* wealth. They are the world's leading generators of nations' GDP, taxes, personal income, and technologies and products for the global marketplace. As Marc Weiss, CEO of Global Urban Development notes, cities generate nations' prosperity in seven distinct ways:

1. as centers of innovation and services;

2. as centers of culture, sports, entertainment, conventions, and tourism;

3. as centers of education, research, and health care;

4. as centers of transportation and trade;

5. as centers of manufacturing and technological development;

6. as market centers; and

7. as workforce centers.

Given all that, he concludes there is no way that rural areas can even start to compete with cities.[23]

In the meantime, recognition of cities' individual fiscal needs is widening on the global stage. At a major C40 conference in Sao Paulo, Brazil, in May 2011, then-World Bank President Robert Zoellick announced his institution was opening expedited "one-window access" for C40 cities to tap the bank's climate-related expertise. Zoellick said the bank's climate investment funds — totaling over $6 billion a year — might now enable cities to attract as much as $50 billion in private capital for climate projects.[24]

A high number of requests through the new one-window approach have come from Latin America. The first proposal was from Curitiba, seeking assistance to conduct a full and ongoing greenhouse gas inventory covering all sources of emissions, establishing a baseline scenario, and then tracking progress through time.[25] Mayor Bloomberg, at the same Sao Paulo event, signed a C40 agreement with ICLEI to define a single standard for measuring emissions across all localities, large and small. The major objective of this agreement was to provide a base measurement for cities to use in their climate protection fund applications to the World Bank.

Yet for world cities, and especially those of the developing world, there's a serious companion challenge. With their extraordinarily rapid population growth, cities will need to obtain the massive amounts of funds needed to finance infrastructure expansion and improvement, ranging from roads and transit systems to housing, schools, water, sewage, waste disposal issues, and more.

---

23   Marc A. Weiss, "Metropolitan Economic Strategy: The Key to Prosperity," *Harvard College Economics Review,* Fall 2006.

24   "Climate and the World's Cities: A Week to Remember," Washington Post Writers Group column by author, Jun. 8, 2011.

25   Email from Marcus Lee, Cities and Climate Change Specialist, Urbanization and Resilience Management Unit, the World Bank, Dec. 7, 2012.

The U.S. government, at the World Urban Forum in Naples in September 2012, indicated understanding of this issue. Heidi Crebo-Rediker, chief economist at the U.S. Department of State and chair of the U.S. delegation, emphasized the need for global financial support. She also found optimism in the use of public-private partnerships and infrastructure banks (government participation helping to promote private investment in sustainable urban infrastructure), in which the United States had prime world experience. The capital needs of the 21st century, Crebo-Rediker indicated, are overwhelmingly urban, so it is imperative to join public and private wealth with inventive partnerships that link governments to private sector funding and strategic skills.

Concurrently, world cities are also linking to another source of global power through partnerships with the multinational corporations that operate directly in their cities. The roster is long and growing, and includes such companies as IBM, Cisco, AECOM, Veolia, Phillips, Siemens, and major international banking organizations. In many cases, cities are simply customers for standardized goods or services that the international firms offer. In other instances, however, they become strong partners in developing and applying new technologies and approaches in areas ranging from sophisticated building techniques to a myriad of new information technologies. CISCO, for example, has worked closely with the city of San Francisco to develop its pioneering system of e-government services — information, access to programs, and services via "the cloud" rather than the old bureaucratic model of "come to our office, stand in line for the clerk, and maybe we can help you."[26] CISCO's payoff is the increased demand for its electronic communications technology.

Yet cities, CISCO official Gordon Feller notes, do need to approach the "new tech" negotiations with corporations with caution. New technologies may sound alluring — a "bright shiny object syndrome" — but hurdles have to be dealt with in changing cultures within government organizations and in determining how any new technology fits with existing city operations.[27]

---

26   A High-Tech Revolution Opens for World Cities," column by author, Washington Post Writers Group, Jan. 7, 2012.

27   Interview with author, Dec. 11, 2012.

There are also cases in which global firms may be seen as unwelcome competitors to local businesses. Those pushing controversial projects (elevated roadways, for example) may encounter strong opposition from groups within the cities. But the skillful outside companies that are interested in broad and ongoing business in a particular city will think before they try to sell, study actual city conditions, and form strategic local alliances, not only with mayors' offices but business and civic forces within the cities.

A striking example of corporate-city collaboration comes from Rio de Janeiro, a city long and notoriously afflicted with storms so severe they destroy the foundations of the settlements that dot the steep, high hills surrounding the city, and cause frequent landslides, injuries, and deaths. Conferring with city officials, IBM developed the idea of a high-resolution weather system, called "Deep Thunder," to combine standard tracking of incoming storms with a path-breaking process described as advanced analytics or "deep computing." The intended result was to predict an oncoming storm's likely intensity, and then to correlate that intelligence with sensor systems on hillsides that can gauge soil stability and the danger of landslides. This enables the city to alert residents in advance of storm danger, and make early decisions on street closures, ambulance mobilization, and other public safety measures.[28]

To operationalize the system, IBM worked with local government officials to create a city operations center able to help meteorologists, police, and over 30 other city departments both predict the danger of, and then respond rapidly to, emergencies such as storms, utility breakdowns, crowd-intensive events, and other hard-to-manage events. The workers in the operations center, recruited from many departments of the city government — transit, law enforcement, utilities, and others — wear NASA-style uniforms to underscore their collegiality. The system provides a model, with clear worldwide emulation possibilities, of how cities can increase their efficiency by breaking down some of the "silo" walls that separate municipal departments and make collaboration difficult.[29]

---

28 "A High Tech Revolution Opens for World Cities," column by author, Washington Post Writers Group, Jan. 8, 2012.

29 Ibid, including interview with Gerard Mooney, IBM general manager for Global Smarter Cities.

Building a Global Brand

Increasingly, cities are going on the global stage to create a special brand identity for themselves. The motives are clear: to increase local pride, spark added economic vibrancy, and make themselves more attractive targets for international tourism and investment.

Much has been written about global "command and control" cities, with some lead cities clearly more successful than others in attracting major corporations, communications media, sports and arts facilities, and more. But while much discussed, intercity rivalry may not be as critical as is each city's ability to mobilize its own resources — physical, financial, corporate, intellectual, and other.

Many efforts are slogan-based, following the example of "I Love New York" — both a logo and a song promoting tourism in the city since the mid-1970s. Hong Kong was early in the game with a "Brand Hong Kong" effort that begun in 2001 to cement the city's position as "Asia's World City."

But events are also valuable. Once again, a top current contender is Rio de Janeiro, which is advertising the combination of its successful bid for the Summer Olympics of 2016 (the first Olympics in South America), the FIFA World Cup in 2014, and numerous other international conferences (among them the Rio+20 meeting in 2012). Beijing used the 2008 Summer Olympics as a ticket to added international attention. Yet another model is San Francisco, which is leaping forward (along with allies in New York, Boston, Philadelphia, Chicago, and other cities) to apply cutting-edge technology such as "apps" on citizens' computers and mobile phones, fiber optic connections, ubiquitous sensors spread around town, and ever-speedier computing. If a prime competition of the times is for talented young professionals, these strategies can be a powerful attractor.

The most sweeping rebranding to date has been that of Bilbao, Spain, which consciously determined in the 1990s to remake its struggling, industrial-based economy through its new landmark cultural institution, the Guggenheim Museum. Bilbao has subsequently become a globally recognized arts center; the Guggenheim Museum's own estimate is that it has contributed close to €200 million in local economic activity, as well as almost

4,000 jobs. Abu Dhabi, capital of the United Arab Emirates, is now aiming to draw global attention by its commissioning of another Frank Gerry-designed Guggenheim museum that will open in 2014.

Could Cities Become World Leaders?

Might there be a future in which cities — rising to huge shares of both global and nation state populations, applying their economic and intellectual assets — actually become world leaders?

Given the immense legal powers of nation states, it is a future hard to imagine. Yet, this is precisely the thesis to be offered by Benjamin Barber, distinguished U.S. intellectual and author of *If Mayors Ruled the World*, to be published by the Yale University Press in 2013.

Barber, in a recent interview with author Richard Florida,[30] explained the core of this thesis. It begins with his assertion that "traditional state-based organizations such as the UN and the Bretton Woods institutions are paralyzed by sovereignty and distorted by private market relations." Looking for "alternative building blocks for global governance," some way to offset what Barber sees as "the undue influence of financial capital and multinational corporations," he selected the city as a natural candidate — one "already deeply engaged in networking and transnational cooperation."[31]

Barber develops the idea that a global "parliament of mayors" could "achieve a good deal of concord voluntarily on both common policies and common actions." But the approach would not be a "legal mandate" but rather "a 'soft' bottom-up approach" based in what he terms "glocality." He suggests three "parliaments" of mayors a year — perhaps better called "audiments" because the goal is "common action that is voluntary."

Could such a mechanism address the key global issues Barber himself identifies — "pandemics, climate change, global financial markets, immigration and terrorism"? He acknowledges that "these are not typical urban issues, and do indeed require a certain vision

---

30 "If Mayors Ruled the World," Atlantic Cities, Jun. 12, 2012.

31 Barber lecture at Cowell Theatre in Fort Mason Center in San Francisco, Calif., Jun. 5, 02012

The Rising Urban Reality

World leaders are increasingly aware of the growing importance of cities on the global stage. United Nations Secretary-General Ban Ki-moon made the point well in an address to a U.S. Conference of Mayors, in Baltimore, Maryland, June 19, 2011.

When I became Secretary-General, I did not expect to work so closely with mayors. Heads of State, foreign ministers, ambassadors, activists, United Nations staff, these, I thought, were the people who would fill my days.

But everywhere I turn, it seems, a mayor is there, front and center.

When we increased the deployment of police personnel in order to strengthen peacekeeping, to whom did we turn? Your cities' finest. Seventy-six United States policemen and policewomen are part of our operations, from Haiti to Liberia to Sudan.

When we tried to break the global deadlock in negotiations on nuclear non-proliferation and disarmament, who was by our side? The United States Conference of Mayors and Mayors for Peace. The Cities Are Not Targets petition campaign has more than 1 million signatures and is now proudly on display at United Nations Headquarters....

And as we continue to implement our recently adopted first-ever Global Counter-Terrorism Strategy, whose expertise have we drawn on? Your police, your officials at your seaports and airports, as well as others on the frontlines of keeping people safe.

I could go on. Mayors and local governments are central to the United Nations work on development, human rights, as well as rule of law and peace and security. My senior representatives work with you and your counterparts worldwide in all of these areas. Every day....

In fact, I have been so impressed with the mayors taking part in our work that I hired a mayor to be part of my team. Juan Clos, who did such wonderful things in his decade as mayor of Barcelona, is now bringing that dynamism to UN-Habitat...

For me, the message is clear the road to future peace and progress runs through the world's cities and towns....

The world's cities are laboratories, crossroads, and magnets, places where innovation is born, economic dynamos that produce 75 percent of world economic output. The United Nations wants to work with you even more closely than we do already.

and statesmanship from mayors to be properly addressed." Yet, Barber adds that a major factor is the potential ability of mayors to collaborate, which stems from "the common problems they face."

The question is whether the "practical knowledge" exchange among mayors and other urban leaders can be amplified to a global debate and then real action on the mega-issues, many of which are a direct result of the activity generated in the dynamically growing cities of the world themselves. One possibility is that the C40 model — major cities unifying to compare notes and influence international policy — could be emulated in global city alliances focused on such issues as rapid urbanization, water, health, or other compelling shared issues.

What is safe to predict is that world cities, in many forms and covering many issues, will be comparing notes, unifying, and positioning themselves for enlarged roles on the world stage through the next decades of the 21st century. The era of unchallenged nation states will be giving way to a distinctly more urban-oriented order.

Acting Locally, Sharing Globally: The Positive Ripple Effect of Cities

Adam Freed

Introduction

As the world globalizes and becomes more urban, cities are organizing into global networks that break beyond traditional regional foci to work together to address the challenges they face. In many instances, the economic and technological revolutions that have occurred over the past few decades mean that New York City has as much in common with London, Dubai, and Hong Kong as it does with Philadelphia, Boston, and Chicago. This has caused a shift from a geographically based dynamic — either regional or bilateral — to a more fluid and global dynamic, where cities are working together across geographies to address local issues. With regards to the traditional alignment of cities, the Atlantic Basin is getting much smaller — and in some cases, cities are leaping over it to the Far East to find innovative ideas, adopt successful urban models, and form new partnerships.

One of the most active areas of global urban collaboration has been around climate change, as cities across the globe are working to reduce their greenhouse gas (GHG) emissions and increase their climate resilience. In the past 20 years, several urban networks have been formed to help cities learn from each other and take collective actions to address climate change. These organizations offer important lessons on how to create and operate successful networks despite the inherent challenges of developing global networks. They also highlight the power and impact that cities can have when they act together.

The Growth of Cities

The role of cities as political, environmental, and economic engines has grown over the past 50 years, and will continue to grow through the mid-century. In 2008, for the first time in human

history, over half of the world's population was in urban areas. By 2050, this is projected to grow to over 70 percent as 2 billion more people are added to urban areas. As a result, many cities today are actually larger in terms of population and economic activity than several countries. For example, Mumbai, Tokyo, or Sao Paulo each have a population larger than 150 of the smaller United Nations member states.[32]

Just looking at megacities, which have grown in number and size since 1950, the world's 50 largest cities generate 2.6 billion tons of CO_2 annually[33] — approximately 10 percent of global GHG emissions and over two-thirds of the amount of carbon reported by 500 global companies through the Carbon Disclosure Project (CDP) in 2012.[34] In addition, they are home to 500 million people and have a total gross domestic product (GDP) of $US 9.6 billion.[35] The largest 25 cities, for example, accounted for 15 percent of global GDP in 2005.[36] In discussing the power and importance of cities, Daniel Hoornweg, the former Urban Lead for the World Bank, referred to megacities as "country-lites" given their economic output and ability to influence global trends.[37]

While the growth of cities is shifting populations around the world, it is having the most dramatic effect within developing countries. While "the Earth's urban landscape appears to be stable, its center of gravity is shifting decisively and at speed."[38] By 2025, 136 new cities will enter the ranks of the world's top 600 urban centers, all

32   Otto-Zimmerman, Konrad, "Embarking on global environmental governance," ICLEI-Local Governments for Sustainability, Bonn, Germany, 2011.

33   The World Bank, "Cities and Climate Change: An Urgent Agenda," The World Bank, December 2010, Vol. 10. pg. 16. (Hereafter referred to as "Cities and Climate Change")

34   Riffle, Conor and Kyra Appleby, "Measurement for Management: CDP Cities 2012 Global Report," Carbon Disclosure Project, London, U.K., 2012, pg. 14. (Hereafter referred to as CDP 2012)

35   The World Bank, "Cities and Climate Change: An Urgent Agenda," Washington, DC, December 2010.

36   United Nations Human Settlements Programme, "State of the World Cities 2010/2011: Bridging the Urban Divide," UN-HABITAT, Nairobi, Kenya, 2011, pg. 20. (Hereafter referred to as "State of the World Cities")

37   Hoornweg, Daniel, Lorraine Sugar, and Claudia Lorena Trejos Gomez, "Cities and greenhouse gas emissions: moving forward," Environment & Urbanization. Jan. 2010, pg. 11. (Hereafter referred to as Hoornweg , et al)

38   Dobbs, Richard, Sven Smit, Jaana Remes, James Manyika, Charles Roxburgh, and Alejandra Restrepo, "Urban World: Mapping the Economic Power of Cities," McKinsey Global Institute, New York, NY, Mar. 2011, pg. 1. (Hereafter referred to as "Dobbs, et al")

of them from developing countries and 100 from China alone.[39] By 2050, South America will be the most urban region in the world, with 91 percent of its population living in cities, and Northern and Southern Africa and Eastern and Western Asia will have a greater percentage of their populations in cities than present day Europe.[40] This is leading to a shift in economic power as well, not only around the globe but within countries and regions. The McKinsey Global Institute noted that "the prominence of (particularly large) cities in Latin America's economy makes fulfilling their economic potential a key to sustaining growth in the region as a whole."[41]

As this growth is occurring and many of these cities are entering global networks, a shift in membership (and thus knowledge sharing) is occurring from a more traditional North America/European dynamic to one that includes collaborations between "Western cities" as well as cities in South America, Africa, and Asia. This has the dual impact of making the sphere of influence of Atlantic Basin cities bigger, while at the same time diluting their importance as more global cities enter the international stage and shift the center of gravity of urban partnerships to the east.

Sustainable Cities

Urbanization has led municipal and national governments to realize that urban problems like traffic congestion, poor air quality, high crime rates, and aging infrastructure are not just quality of life issues, but economic development issues that could inhibit growth. McKinsey found that for Latin America to sustain its growth, the region's largest cities "need to be able to address challenges not only to their economic performance but

Top cities in 2025, ranked by GDP growth from 2007 to 2025. Cities in developing regions are in bold

1	**Shanghai**
2	**Beijing**
3	New York
4	**Tianjin**
5	**Chongqing**
6	**Shenzhen**
7	**Guangzhou**
8	**Nanjing**
9	**Hangzhou**
10	**Chengdu**
11	**Wuhan**
12	London
13	Los Angeles
14	**Foshan**
15	**Taipei**
16	**Delhi**
17	**Moscow**
18	**Singapore**
19	**Sao Paulo**
20	Tokyo
21	**Shenyang**
22	**Xi'an**
23	**Dongguan**
24	**Mumbai**
25	**Hong Kong**

Source: McKinsey Global Institute

---

39 Ibid, pg. 1

40 State of the World Cities, pg. 13

41 Cadena, Andres, Jaana Remes, James Manyika, Richard Dobbs, Charles Roxburgh, Heinz-Peter Elstrodt, Alberto Chaia, and Alejandra Restrepo, "Building Globally Competitive Cities: The Key to Latin American Growth," McKinsey Global Institute, Aug. 2011, pg. 1.

also to the quality of life experienced by their citizens, sustainable resource use, and the strength of their finances and governance."[42]

As greater attention has been focused on climate change and on finding the most efficient and effective means of achieving significant GHG emission reductions, cities have begun to be recognized for their tremendous environmental benefits and as one of our greatest hopes and assets in combatting and preparing for the inevitable impacts of climate change. They have also recognized the need to look beyond their boundaries and regions for innovative ideas to address local issues. Working together, cities have the opportunity to share best practices, advocate for resources, and engage with national and international bodies to promote investments in dense, urban development, and the infrastructure and policies that support low-carbon lifestyles and resource conservation. These investments enable "sustainable densification,"[43] which can lower carbon emissions and improve the quality of life for billions of urban residents.

By their very nature and design, well-planned cities enable residents to live low-carbon lifestyles. Cities occupy only 2 percent of the globe's land mass but contain over 50 percent of the world's population. While cities generate an estimated 70 percent of global GHG emissions,[44] in most cases, per capita emissions from cities are lower than the average for the countries in which they are located.[45] New York City's per capital GHG emissions, for example, are one-third the U.S. average.[46]

Several characteristics contribute to cities' relative low per capita carbon footprints. Population density and dense building stocks reduce energy use and encourage walking. Mass transit reduces dependency on personal vehicle ownership and use. Mixed-

---

42 Ibid., pg. 2.

43 The term "sustainable densification" is adapted from The Nature Conservancy's concept of sustainable intensification for agriculture as a means to reduce the land, water, and GHG footprint of agriculture while meeting the growing need for food.

44 C40 Cities Climate Leadership Group press release "President Clinton and Mayor Bloomberg Join Forces to Combat Climate Change" issued Apr. 2011.

45 Dodman, D., "Blaming cities for climate change? An analysis of urban greenhouse gas emissions inventories," Environment & Urbanization, Apr. 2009 vol. 21 no. 1. (Hereafter referred to as "Dodman")

46 Dickinson, Jonathan and Doug O. Price, "Inventory of New York City Greenhouse Gas Emissions," Mayor's Office of Long-Term Planning and Sustainability, City of New York, NY, 2012.

use zoning, which allows for the colocation of residential and commercial uses, encourages pedestrian activities and reduces travel for non-work purposes. Apartment buildings and row houses save energy and reduce heating needs through shared walls, and dwellings in cities are also typically smaller, and thus use less energy than homes outside of urban areas.

Why Cities Matter

As political bodies, cities control many of the levers needed to reduce GHG emissions and climate risks. Zoning and building codes, which shape the urban form and energy use in cities, are often controlled at the mayoral or local level. In most cities, local zoning determines what kinds of buildings can be built and what types of economic activities can occur where; local building codes determine how buildings are designed; local governments have primary responsibility for providing emergency services in response to potential climate change-exacerbated situations such as flooding and heat waves; and local governments or authorities generally own and operate the water systems that are among the most important systems to be considered in climate change adaptation planning.

Based on an analysis of the 73 cities that reported emissions to the Carbon Disclosure Project in 2011, the CDP estimates that mayors have control over approximately 70 percent of urban GHG emissions.[47] Assuming this figure is relatively true for other cities, this would mean that cities influence almost 50 percent of global carbon emissions (or control over 70 percent of the 70 percent of global GHG emissions that are generated by urban areas). As David Dodman notes, while debates and negotiations over GHG mitigation generally occur within global and national arenas, "action to reduce emissions usually requires actions by local institutions and communities."[48]

Cities are already taking significant steps to reduce GHG emissions. It is estimated that cities are responsible for 77 percent of all actions

---

47   Berg, Nate, "When It Comes to Cutting Carbon, Cities May Be More Powerful Than National Governments," The Atlantic Cities, Jun. 19, 2012. (Hereafter referred to as "Berg")

48   Dodman, pg. 196

being taken to reduce GHG emissions.[49] This leadership — often ahead of national governments that have not developed formal climate change goals or programs — has provided cities with the technical knowledge and experience of what works and what does not work, and has given them an understanding and appreciation of the potential co-benefits of carbon reduction efforts.

One of the reasons for such early and aggressive climate action in urban areas is because cities and local governments feel the impacts of climate change — and the benefits of mitigation and adaptation efforts — sooner than national governments. New York City Mayor Michael R. Bloomberg noted that "when it comes to confronting a challenge of this magnitude [climate change], nations have long talked about comprehensive approaches, but it has been up to cities to act. After all, cities are most directly responsible for our residents' health and well-being."[50] Former Toronto Mayor David Miller observed that one of the reasons that cities have been willing and able to address climate change is because "Mayors are very practical. Mayor LaGuardia [of New York] quite famously said there is no Republican or Democratic way to pick up the garbage."[51]

Cities can also see direct budgetary savings from energy efficiency efforts, improved air quality from emission reduction actions and tree plantings, and improved park access through other "greening" projects. In addition, cities are on the front lines of climate change. Over 90 percent of urban areas are coastal, thus cities are at risk from sea level rise and coastal storms.[52] As a result, many cities do not have the luxury of waiting for international negotiations to be completed to take action to protect their residents.

While mayors see the economic risk of climate change, 82 percent of cities participating in the 2011 CDP questionnaire stated that climate change presents economic opportunities — a higher percentage than citing economic risks.[53] Mayor Bloomberg

49   Berg

50   CDP 2012, pg. 2

51   PricewaterhouseCoopers and the Partnership for New York City, "Cities of Opportunity," PricewaterhouseCoopers International Limited, New York, NY, 2012, pg. 65.

52   Aggarwala, Rohit, Rishi Desai, Benson Choy, Andrea Fernandez, Paula Kirk, Alina Lazar, Tania Smith, Mark Watts, and Anson Yan, "Climate Action in Megacities: C40 Cities Baseline and Opportunities," Arup, 2011, pg. 95. (Hereafter referred to as Aggarwala, et al.)

53   CDP 2012, pg. 10

recognized the unique role of cities in combatting climate change, and the failures of national governments to take aggressive action or to engage cities. In accepting the nomination as C40 Chair at a C40 workshop in Hong Kong, Mayor Bloomberg told assembled mayors and city officials, "We've seen again and again how national governments have struggled, both at home and on the international stage, to take climate actions. Cities must learn from that experience. We must be bolder. We must be more collaborative. And we must be more determined. Together we have to fill the vacuum of leadership ourselves."[54]

Cities are also engaging in global climate networks independently from their national governments, enabling a degree of collaboration and cooperation on the sub-national level that has eluded international climate efforts. An analysis of the composition of global climate change networks found that "attributes of cities — rather than country attributes such as democracy, income level and being an Annex 1 country under the Kyoto Protocol — account for cities' participation in international environmental networks."[55]

The "Positive Ripple Effect"

One of the fundamental assumptions and hopes of urban networks is that by sharing information and working together, successful sustainability programs and policies can be transferred between cities. Mayor Bloomberg refers to this as the "positive ripple effect" that city actions can have around the globe.[56] Reflecting the global dynamic of cities and shift from regional to global collaborations, this ripple effect can connect cities across a variety of geographies.

Cities' efforts to reduce GHG emissions and increase their climate resilience offer a prime example of the increasingly global perspective of cities and value of networks. While some of the networks focus on regional or national connections, a majority reflect the increasingly global view and connectivity of cities and draw on an international membership. Several examples of this replication can be seen among cities within the C40, a network of

---

54   Michael R. Bloomberg speech, delivered Nov. 5, 2010.

55   Lee, Taedong, "Global Cities and Transnational Climate Change Networks" Global Environmental Politics, Massachusetts Institute of Technology, Volume 12, Issue 1, Feb. 2013, pg. 125.

56   Michael R. Bloomberg speech, delivered Nov. 5, 2010.

over 60 global megacities committed to taking aggressive actions to combat climate change.

Many of these replications have occurred in the transportation sector. Since London's successful implementation of congestion pricing, nine other cities have adopted or are trying to implement similar programs (not including New York City, which unsuccessfully tried to adopt a congestion pricing program to reduce traffic and finance transportation infrastructure in 2007).

Bus rapid transit (BRT) systems, which were pioneered in Bogota, Columbia, and Curitiba, Brazil, (which created the first BRT line), are now part of the mass transit networks in Cape Town, Hong Kong, Johannesburg, New York City, Sao Paulo, and several other cities. BRT systems such as Bogota's *TransMilenio* provide light rail-like service utilizing dedicated bus lanes, pre-boarding ticketing, elevated bus stations, limited stops, high capacity vehicles, and Traffic Signal Priority (TSP) for buses for a fraction of the price of rail systems. In total, 13 C40 cities have created BRT systems and 8 additional cities are planning their introduction. All of these systems, except Los Angeles', were created after Bogota's system and the establishment of C40.[57]

Several cities have also replicated Bogota's *ciclovía* program, which closed major portions of the city's roadways every Sunday from 8 am until 2 pm for pedestrian and bicycle use. New York closed almost seven miles of streets from the Brooklyn Bridge to Central Park on three successive Sundays in 2008 in a pilot of what has become its annual Summer Streets program. In 2012, more than 250,000 people participated in the Summer Streets program.[58] Similar events have spread to Chicago, Los Angeles, Melbourne, San Francisco, and Vancouver.

A Network of Networks

This paper provides a broad overview of some of the largest and most important networks, as well as networks that have taken innovative approaches to addressing global issues. This includes the World Association of Major Metropolises (Metropolis),

---

57   Aggarwala, et al, pg. 16

58   New York City Department of Transportation website, http://www.nyc.gov/html/dot/summerstreets/html/about/about.shtml.

ICLEI-Local Governments for Sustainability (ICLEI), the Urban Sustainability Directors' Network (USDN), Asian Cities Climate Change Resilience Network (ACCCRN), and the C40 Cities Climate Leadership Group (C40). These organizations offer important lessons on how to create and operate successful networks, the challenges that can be faced in developing global networks, and the more fluid dynamic and connectivity of global cities. They also highlight the power and impact that cities can have when they act together.

Several factors and design elements contribute to the success of global networks and their ability to enable cities to accelerate the spread and adoption of innovative ideas and gain traction in national and international dialogues. These include:

- Structural design: being selective in membership, which is becoming less geographically focused as cities become more global in their perspectives; focusing on the staff that works in cities as well as the cities themselves to foster deeper and more technical interactions between cities and to develop the field of urban sustainability; and selecting a defined set of issues on which to focus;

- Clear governance: establishing membership standards to enhance credibility and ensure meaningful interactions among members and empowering members to set network agendas;

- Technical and financial assistance: providing tools to cities and developing partnerships with third parties to accelerate the implementation of new programs and policies and encouraging action and collaboration through funding; and

- Performance standards: measuring and reporting on members' progress.

While it may be too soon to see (or understand) the full impact of global urban networks, municipal governments' willingness to try and scale up innovative ideas led the World Bank to highlight cities as "credible laboratories of social change, with sufficient scale to

bring about meaningful changes."[59] Rio de Janerio Mayor Eduardo Paes observed that "when mobilized as one, cities wield sufficient collective power to influence opinion and nudge policy further up the legislative agenda."[60]

World Association of the Major Metropolises (Metropolis)

Launched in 1985, the World Association of the Major Metropolises (Metropolis) was one of the first global networks of local governments. While not focused on climate change, Metropolis tested the theory that through collaborative action, cities and metropolitan regions with more than 1 million residents could increase their individual and collective capacity to improve their economic, physical, and environmental well-being.

Metropolis represents more than 120 metropolitan areas around the world and manages the Metropolitan Section of United Cities and Local Governments (UCLG). The organization encourages cooperation between cities; represents the needs of cities to international organizations, including the United Nations, World Health Organization, and World Bank; and facilitates knowledge and best practices exchanges between network members.

International Council for Local Environmental Initiatives (ICLEI)

One of the first, and largest, networks of local governments focused on climate change was established in 1990 when more than 200 local governments from 43 countries met at the World Congress of Local Governments for a Sustainable Future at the United Nations in New York. The International Council for Local Environmental Initiatives (ICLEI) was created to support local-level sustainability and advocate for local governments on international issues.

ICLEI is unique in that it consists of large and small local governments — including cities, towns, villages, and counties — that pay membership fees for technical assistance and tools, including carbon accounting calculators and guidelines. ICLEI's members include 12 mega-cities, 100 super-cities and urban

59 Hoornweg, pg. 2

60 C40 Cities Climate Leadership Group press release "Mayors of the World's Largest Cities Demonstrate Progress in Greenhouse Gas Reductions and Launch Two New Initiatives," Jun. 19, 2012.

regions, 450 large cities, and 450 small and medium-sized cities and towns in 84 countries.[61] ICLEI provides invaluable tools to local governments, particularly small- and medium-sized governments that are at the initial stages of sustainability planning, and has conducted GHG inventories for numerous local governments.

ICLEI enables members to publicly track and disclose their emissions through an international carbon registry and is the officially recognized representative of local governments by the United Nations Framework Convention on Climate Change (UNFCCC). This affords ICLEI with a guaranteed speaking slot at the UNFCCC Conference of the Parties (COP) climate negotiations — a highly coveted and visible opportunity to advocate for the needs of local governments on the international stage.

Asian Cities Climate Change Resilience Network (ACCCRN)

Launched in 2008 and funded by the Rockefeller Foundation through 2014, the Asian Cities Climate Change Resilience Network (ACCCRN) is a network of ten cities in India, Indonesia, Thailand, and Vietnam working collectively to develop and implement city-specific resilience plans. Utilizing facilitated interactions and sharing platforms and direct financial, policy, and technical assistance to cities, ACCCRN aims to increase the capacity of its cities for resilience planning and implementation, raise awareness and engagement in resilience planning, and scale-up urban resilience efforts in cities within and outside of the network.

European Covenant of Mayors

The European Commission launched the Covenant of Mayors in 2008 after the adoption of the European Union Climate and Energy Package. The Covenant, which consists of European local and regional authorities that have voluntarily committed to increasing energy efficiency and the use of renewable energy, endorses and supports local governments' efforts to meet continental targets. By joining the Covenant, signatories pledge to meet and exceed the European Union 20 percent CO_2 reduction objective by 2020. To date, 4,228 local governments have signed the Covenant, representing 166 million people.

---

61   ICLEI website, http://www.iclei.org/

As part of the initiative, local authorities agree to compile a baseline emissions inventory and to formulate a Sustainable Energy Action Plan (SEAP), a comprehensive overview of key sustainable energy actions. As of July 2011, more than 1,700 SEAPs have been formally submitted and are all publically available.

Urban Sustainability Directors Network (USDN)

Launched in 2009, the Urban Sustainability Directors' Network is a peer-to-peer network focused on sustainability directors rather than mayors or city governments writ large. The network currently is made up of 120 urban sustainability directors from the United States and Canada and was created to address the fact that "local governments were solving similar cross-cutting sustainability issues in geographic silos, without a forum to collaborate, to share best practices or to partner."[62] USDN membership is balanced to include a mix of large and small cities from regions throughout North America.

USDN has several elements that contribute to its success and high member satisfaction and that set it apart from other networks. In addition to its focus on sustainability professionals rather than cities and sophisticated tracking system to monitor members' participation, it has a well-defined innovation system that encourages collaboration between cities, identifies network-wide priorities, and has a formal process to scan best practices and produce case studies and other tools to support the scale-up of successful policies and programs.

USDN also offers frequent opportunities for interactions between members, including monthly webinars and conference calls open to all members, monthly working and user group meetings, small group discussions, and an annual meeting. It also frequently polls its members to understand their needs and to gauge membership activities and satisfaction.

---

62 Yee, Jennifer L., "Exploring the Urban Sustainability Director's Network," Kellogg Innovation Network, Kellogg School of Management, 2012. (Hereafter referred to as Yee).

C40 Cities Climate Leadership Group

Mayor Ken Livingston of London created the C40 Cities Climate Leadership Group in 2005 to link mayors working on climate change issues to each other. Upon its launch, the organization (then called the C20) consisted of 18 cities and limited its membership to megacities aggressively addressing climate change. Mayor Livingston recognized that cities were "increasingly interconnected — no city can wall itself off from the consequences of climate change, and no city can prevent catastrophic climate change on its own."[63]

The C40 network helps cities identify, develop, and implement local policies to reduce GHG emissions and climate risks by convening sub-networks of cities to share best practices and take collective actions. At the same time, C40 advocates for the needs of cities on the international stage. Today, the C40 network includes 40 core members and 22 "innovator" cities.

C40 has significant strengths that should enable it to meet the needs of its members; advocate for additional recognition, engagement, and resources for cities; and help reduce global GHG emissions and exposure to climate risks. C40's sub-network structure enables it to identify challenges faced by multiple cities and highlight and accelerate the scaling up of successful programs.

The organization's data-driven approach and membership standards give it significant credibility and will help measure C40 and member cities' progress (which will in turn enable C40 to promote successes and identify challenges that need to be addressed). By conducting an analysis of the powers held in each city, C40 can also play a sophisticated matchmaking role between cities with similar challenges and potential to adopt similar solutions. The selection of Mayor Bloomberg as the Chair of the C40 Steering Committee and the partnership with the Clinton Climate Initiative are also tremendous assets, which bring high visibility and energy to the organization and have helped the development of external partnerships and fundraising efforts.

---

63 Aggarwala, et al.

Best Practices of "Best Practices" Accelerators

As the number of urban networks has increased in recent years, several different models have emerged for membership criteria, focus, funding structures, and governance. While each network is unique in its mission, activities, and goals, several common factors have proven successful in fostering connections between cities, accelerating the adoption of best practices, and gaining recognition and resources for cities.

Be Selective

Despite the globalization of cities, all urban areas are not the same. Networks that target specific types of cities and understand and value the similarities and differences between cities are well-positioned to meet their member's needs. C40 was the first network of its kind to limit itself to large cities (as opposed to all local governments) taking on climate change (as opposed to broader sustainability issues). Core membership is limited to large cities actively working to address climate change "by developing and implementing policies and programs that generate measurable reductions in both greenhouse gas emissions and climate risks."[64] "Innovator" members are accepted based on their "clear leadership in environmental and climate change work" and must be "internationally recognized for barrier-breaking climate work, a leader in the field of environmental sustainability, and a regionally recognized 'anchor city' for the relevant metropolitan area."[65]

The mix of megacities working on climate change (at varying stages of commitment and sophistication) and smaller cities of economic or political significance or with innovative policies, allows C40 to focus on the unique needs of mega and leading edge cities. In contrast, ICLEI may not be able to meet the needs of all of its members given the broad scope of its membership. This is particularly relevant for large cities and cities that are well-advanced in climate planning and action, as the needs and capabilities of small cities differs greatly from large and megacities.

---

64   C40 website, http://www.c40cities.org/history

65   C40 Cities Climate Leadership Group press release, "C40 Announces New Guidelines for Membership Categories," issued Oct. 2012.

Establish and Enforce Membership Standards

As the number of networks and their opportunities to engage in national and international policy debates has increased, many networks have established membership standards to demonstrate their commitment to concrete action and to enhance their credibility (and by extension, that of their members).

The European Covenant of Mayors was the first climate network to apply membership standards. Local authorities who fail to deliver on their commitment to meet and exceed the European Union's 20 percent GHG reduction goal by 2020 are suspended from the initiative. To date, 72 signatories have been suspended from the Covenant.

Membership in USDN is limited to city staff who are responsible for cross-departmental and citywide sustainability issues (usually in the executive or environmental departments), have a demonstrated track record on sustainability, and agree to meet minimum participation standards (including opening a majority of USDN's weekly newsletters, responding to two of three annual surveys, and participating in at least one USDN user group).[66] Members' participation is tracked by the Network Coordinator and Steering Committee.

The C40 adopted new membership standards in 2011, making participation in the Carbon Disclosure Project's GHG reporting mandatory for C40 cities and requiring a minimum level of participation in C40 summits and workshops. While no city has had their membership in C40 revoked to date, the new membership standards provide the C40 Steering Committee with a means of increasing cooperation and transparency among its members.

Focus on People as Well as Places

Unlike other networks, USDN's membership is centered on professionals within municipal governments, not the government or organization as a whole or an elected official. USDN offers frequent opportunities for interactions between members, which fosters deeper connections and knowledge exchanges than other

---

66 Given these membership requirements, USDN generally includes cities that are somewhat advanced in their sustainability planning and implementation, although some exceptions exist.

networks. The emphasis on peer-to-peer connectivity is carried through to the USDN website, which is designed "not to create a best practice library, but to connect people in real time who can help each other solve problems. It is focused on reaching the right person, not the right document."[67]

In its first two years, USDN focused on building relationships and trust between members, identifying and sharing best practices, and developing tools to support the field of urban sustainability.[68] This differs greatly from other networks, which have not focused on supporting the emerging profession of urban sustainability. Notably, USDN's Professional Development Working Group also developed a training program to provide newer sustainability directors with the skills and tools they need to succeed and a toolkit that allows members to perform a self-assessment of their skills.

While the network has grown since its inception, it remains an application-based organization where membership is given to individual sustainability directors (or comparable positions), not to cities. The network has elected to slowly increase the number of members moving forward to five to ten a year at most to maintain the current size, which members feel allows them to build strong relationships with other members, fosters mutual trust, and allows for deeper partnerships.

Provide Tools to Meet Critical Needs

One of the critical services provided by networks is the development and provision of tools to advance monitoring, reporting, and action. For example, ICLEI developed a five-step climate planning and implementation process to guide climate actions. The process outlines best practices to develop a GHG inventory, establish reduction targets, develop local climate action plan, implement measures, and track progress. Over 1,000 local governments have formally followed this process to develop and implement climate action plans.

ICLEI also developed the first official protocol for greenhouse gas measurement and reporting for U.S. local governments. This

---

67 Yee

68 Yee

protocol, which was released in 2008, provided much-needed guidance for local governments on how to compile a municipal-level greenhouse gas inventory for both community-wide and municipal government emissions.

These tools are especially valuable for small- and medium-sized governments that are at the initial stages of sustainability planning. For example, ICLEI has developed several versions of emissions analysis software and decision support tools for GHG accounting and the development and monitoring of emission mitigation efforts. ICLEI has also conducted GHG inventories for numerous local governments and provided carbon accounting tools, protocols, and technical assistance to countless others. Many of these items are provided through fee-for-service consulting or as part of annual membership fees.

Focus on a Defined Set of Issues

Given the broad set of issues that are involved in sustainability and climate change efforts, successful networks have selected a sub-set of issues on which to focus. This allows cities to self-select which areas to participate in and maximizes deep engagement around issues that are important to them — a critical factor given the limited time participants often have to work on network-related issues and activities.

USDN has a sophisticated, user-driven process to encourage collaboration between cities, identify network-wide priorities, and scan best practices. The network currently has 13 peer-to-peer user groups, which hold monthly conference calls to share information and innovative programs or address cross-city policy needs and challenges. These groups include fostering sustainable behavior, community based social marketing, bike share, sustainable economic development, climate change adaptation, rental housing energy efficiency, sustainability indicators, sustainable economic

development, ecodistricts, sustainable jails, regional networks, public policy, and food systems.[69]

In addition to the user groups, USDN enables members to organize "Small Group Discussion Marketplaces," which are informal conference calls between seven to ten cities based on member interests and needs. These marketplaces often evolve into user groups.[70]

C40 has also organized its efforts around several priority areas that were identified through interviews with member cities to determine their needs and interests. Each of C40's seven networks is further divided into a series of sub-networks and foci to enable deeper discussions and collaborations. C40's networks includes areas such as transportation, energy, measurement and planning, and green infrastructure (the existing Connecting Delta Cities network[71]). These sub-networks bring members together through workshops that often result in cross-city collaborations.

Empower Members to Set the Agenda

Maintaining active participation of the municipal staff (and elected officials) who are the primary contacts for cities within networks is always a challenge given competing priorities and time constraints. One way to encourage commitment is to empower members to play a leadership and agenda-setting role in the organization. This also ensures that a network is focusing on the needs and issues relevant to its members.

---

69   Unlike other organizations, USDN does not put out formal statements or advocate as a network for public policy issues. Reflecting the fact that USDN was created to provide a forum for sustainability directors to share information, the public policy working group is a means for members to raise and identify issues that are important to cities and/or individual members and gather support for members to act together as a collection of individual cities, not representatives of the network. For example, when New York City was petitioning the U.S. Supreme Court to review a lower court decision banning the city from incentivizing the use of fuel efficient taxis, the city worked with the public policy working group to ask USDN members to petition the Supreme Court to hear the case. The Public Policy Working Group and USDN as an organization did not issue any briefs or public statements on this issue.

70   Interview with Julia Parzen conducted Oct. 17, 2012.

71   The Connecting Delta Cities networks emerged out of a 2008 C40 workshop on climate adaptation and includes eight cities working to reduce coastal threats from sea level rise. Additional information on the Connecting Delta Cities network can be found at http://www.deltacities.com/.

The best example of this is USDN, which is a member-led organization with a limited professional staff. The network is overseen by a ten-member Planning Committee, which rotates at least two seats each year and works with a part-time network coordinator to implement the vision and agenda agreed upon by the full membership at their annual meeting. Members lead committees and user groups on a variety of topics, with support from the network coordinator. C40 also empowers its members through its ten-member Steering Committee, which consists of mayors from ten member cities. The Steering Committee, through the mayors or staff representing their respective mayors, sets the strategic direction and governance for the organization.

Encourage Action and Collaboration through Funding

One of the greatest motivating factors for cities (or any network member) is the possibility of securing funding for their efforts. The ACCCRN, which is unique in that it is a foundation-sponsored entity, not only builds the capacity of its members for climate adaptation, but includes significant resources to directly fund projects in member cities. This is an element that no other city network includes at this scale.

As of August 2012, ACCCRN had invested $9.4 million in 22 city projects across all 10 cities with a number of others under consideration.[72] This funding leveraged additional funding from local governments and other local partners. Funded projects address a variety of challenges, including flood reduction and drainage, natural disaster risk reduction, freshwater protection, housing, and public health.

While USDN was not created to directly fund projects, it has become an ongoing component of its work. USDN members have elected to fundraise for and provide direct funding to cities to encourage collaboration among cities on critical issues and solutions. USDN's Innovation Committee manages a small grant program that awards funding (up to $50,000) through a competitive Request for Proposal process to cutting-edge multicity sustainability initiatives with the potential to be scaled up to other cities. USDN has awarded over $400,000 in grants to 12

---

72 Asian Cities Climate Change Resilience Network, "ACCCRN City Projects,"Aug. 2012.

partnerships of cities for collaborative projects. These partnerships have included more than 49 cities. At the completion of the project, members develop a case study and presentation to be shared with other USDN members. According to Network Coordinator Julia Parzen, "the Innovation Fund is beginning to aggregate member knowledge into a picture of the field, helping members to identify priority innovation niches, and spurring collaboration to advance practice in these areas."

In 2011, USDN also entered into a partnership with the Funders' Network for Smart Growth and Livable Communities to initiate the Local Matching Sustainability Fund (LMSF). The purpose of this fund is to encourage new and deeper partnerships with city sustainability efforts and place-based foundations by providing matching grants from national foundations for local projects. The executive director of the New York Community Trust, the largest community trust in the United States and an initial funder of the LMSF, noted the importance of funding local initiatives. "Sustainability initiatives have the most traction at the local level — it's where things are getting done. Providing matching funds will help accelerate sustainability projects and create new partnerships between community foundations and city governments."[73]

Develop Partnerships to Deliver Technical Assistance

On their own, networks cannot meet the diverse and specific needs of cities. Several networks have developed partnerships with external organizations to meet the informational, technical, and financing needs of their members.

C40 has been a leader in developing partnerships to provide cities with additional resources, increase accountability and data collection, and foster greater collaboration. Through a partnership with the World Bank, C40 cities will be provided with more direct access to World Bank financing, technical assistance and resources through a "single, dedicated entry point" for C40 cities.[74] In addition, the Word Bank and C40 will work to develop a

---

73 Funders' Network for Smart Growth and Livable Communities press release, "Local Sustainability Matching Fund May 2012 Awards," May 2012, http://www.fundersnetwork.org/participate/green-building/local-sustainability-matching-fund/lsmf-may-2012-awards

74 C40 Cities Climate Leadership Group press release "C40 and World Bank Form Groundbreaking Climate Change Action Partnership," Jun. 1, 2011.

consistent approach to climate action planning and implementation to increase investors' and lenders' ability to finance local climate actions. This partnership, which was hailed as "a landmark recognition of the leadership the world's great cities are taking to meet the challenges of climate change" by then World Bank President Robert Zoellick,[75] enables cities to expand their climate mitigation and adaptation activities while working to achieve the World Bank's goals of the poverty reduction and protecting vulnerable populations (goals which are often in line and supported by climate actions).

C40 also launched a partnership with the World Bank and the U.S. Department of State's Climate and Clean Air Initiative to provide technical assistance to cities working to reduce methane emissions from solid waste management. In addition, the World Resources Institute and the C40 established a partnership in early 2013 to reduce GHG emissions from urban transportation. Mayor Bloomberg hailed this partnership, which "will accelerate the work cities are doing to implement more efficient and effective transit systems. By combining the forces of two organizations that know how to get things done, we will help provide greater transit options that will help us build a more sustainable planet."[76]

USDN created a partnership with the Institute for Sustainable Communities (ISC), a U.S.-based non-profit that helps communities around the world address environmental, economic, and social challenges, to provide training to new sustainability directors. Together, USDN and ISC created the Urban Sustainability Leadership Academy, which has so far been attended by more than 100 urban sustainability professionals.

Measure Progress

Being able to quantify the scope of the challenge facing networks and measure their individual and collective progress is critical in demonstrating success and ensuring that programs and resources are effectively focused and implemented.

---

75   Robert Zoellick speech, Jun. 1, 2011.

76   C40 Cities Climate Leadership Group press release "C40 Cities Climate Leadership Group & World Resources Institute Partner to Promote City Transit Solutions," Jan. 17, 2013.

In 2011, C40, ICLEI, the World Resources Institute, and the Joint Work Programme of the Cities Alliance announced an agreement on a common approach to GHG accounting and reporting — the Global Protocol for Community-Scale GHG Emissions (GPC). This was a critical hurdle, as the lack of a standardized method of carbon measurement prevents cross-city comparisons or analysis.[77] The GPC was developed to support consistent and transparent public GHG reporting by cities, harmonize existing protocols and standards for city level GHG inventories, facilitate access of local governments to climate finance, and support cities' "ability to demonstrate the global impact of collective local actions."[78] The World Bank's involvement in the development of the GPC and commitment to require applicants for funding to use the GPC should help increase the flow of funding to cities.

The ability to document city actions and GHG emissions has contributed to a shift in attention toward cities and their relation to climate change. One national publication noted after the Rio+20 announcements, "when it comes to leadership on climate change issues, don't bother looking to the top. National governments have made little headway in developing plans and policies that reduce greenhouse gas emissions… At the local level, though, progress has been made… [as] cities across the planet are crafting and implementing plans to adapt to and even to reduce the impacts of global climate change."[79]

C40 also requires its members to report their GHG emissions on an annual basis to the Carbon Disclosure Project, which produces an annual report on GHG emissions and climate actions in cities. Mayor Bloomberg observed that "by joining C40, each of our cities has made a commitment to action — a commitment that must be matched by an equal willingness to be judged by our progress, and

---

77   For example, of the 73 cities that reported emissions to the Climate Disclosure Project (CDP) in 2011, 28 percent used the 2006 IPCC Guidelines for National Greenhouse Gas Inventories; 17 percent used the International Emissions Analysis Protocol developed by ICLEI; 15 percent used the new International Basic Standard for Community-Scale GHG Emission Inventories developed by the World Resources Institute, ICLEI, and C40 Cities; 2 percent used the International Standard for Determining Greenhouse Gas Emissions for Cities developed by the World Bank; and 37 percent used other methodologies. CDP 2012, pg. 15

78   "Global Protocol for Community-Scale Greenhouse Gas Emissions, Pilot Version 1.0," http://tinyurl.com/d25yjkb.

79   Berg

be 100 percent accountable."[80] This was similar to the approach Mayor Bloomberg took in New York City, in which progress on the city's comprehensive sustainability plan, PlaNYC, is tracked annually through sustainability indicators, a progress report, and a GHG inventory.[81]

ICLEI spearheaded another effort to capture and report data for cities. In 2010, ICLEI launched the Carbon*n* Climate Registry to publically track and report on GHG emission reduction efforts of participating cities. Carbon*n* is a joint effort of ICLEI and United Nations Environment Program (UNEP) and currently tracks the progress of the 146 cities that signed an agreement at the 2010 Worlds Mayors Summit on Climate to reduce emissions.[82] These cities dramatically vary in terms of size, economic output, and GHG emissions, and while Buenos Aires, Johannesburg, Los Angeles, Paris, Vancouver, and Jakarta signed the pact, most of the other signatories are small- to medium-sized cities.

While USDN does not track members' climate progress, it does collect information on their goals and planning processes. As of 2012, more than 77 percent of USDN members have set specific goals for GHG reduction in the next 10-20 years, and at least 35 percent have set or are considering setting goals for long term, transformative GHG reduction. In addition, 75 percent have adaptation and resiliency plans or are starting to incorporate adaptation and resiliency into existing plans.[83]

The Impact, Value, and Potential of Collective Actions

Climate actions in cities offer a detailed example of how cities are networking on a global basis and the value this can create. In 2011, C40 and Arup released the *Climate Action in Megacities* report, which documented the efforts being taken by cities to address climate change and assessed the powers that cities have related to climate change. As of 2011, the 36 cities that participated in the *Climate Action in Megacities* report had implemented 4,734 policies and programs and were considering 1,465 additional actions to

---

80   Ibid.

81   These reports can be accessed at http://www.nyc.gov/html/planyc2030/html/publications/publications.shtml.

82   Otto-Zimmerman

83   Interview with Julia Parzen conducted Oct. 17, 2012.

reduce GHG emissions and climate risks. This included 355 unique actions undertaken by at least one city.[84]

Seventy-four percent of these actions have been implemented since 2005 (when C40 was launched), a figure C40 cites as an indication that membership in C40 has accelerated climate actions in member cities. As similar studies of non-C40 cities do not exist, overall local action on climate change has increased, and C40 cities by definition are generally more aggressive in taking climate actions, it is difficult to substantiate any relationship between C40 membership and the increasing number of climate actions in recent years. However, it is clear that local actions have been increasing.

As would be expected, the types of actions taken by cities are reflective of the powers held by mayors. While this varies from city to city, several clear trends emerged from the *Climate Action in Megacities* report. In general, mayors have strong powers in transportation, building codes, public space (including parks), and land use, while municipal control over energy (particularly energy distribution and supply), water, solid waste, and food is weaker and more fractured .

The main source of GHG emissions in most cities (energy used in buildings) is unfortunately one of the weakest areas of municipal control.[85] Mayors can help set the vision for bulk energy supplies, "which can be used to unofficially influence higher levels of government who hold most of the these powers," but in most cases, state, regional, and national government entities exercise greater control of energy supplies.[86] This reflects the constraints that cities face if they do not involve and work together with higher levels of government.

C40 Cities in Action

The *Climate Actions in Megacities* report opens with the observation that "while many national governments have

---

84 Aggarwala, et al., pg. 8

85   This statement assumes that GHG emissions from energy used in buildings, which constitute 45 percent of GHG emissions in C40 cities, are influenced more by the carbon intensity of energy sources rather than the amount of energy consumed in buildings, which would be addressed through energy efficiency. (Aggarwala, et al, pg. 3)

86 Aggarwala, et al, pg. 4

consistently struggled both at home and on the international stage to take the actions necessary to prevent catastrophic climate change, C40 cities have forged ahead as innovators and leaders in this arena."[87] As would be expected, actions in areas where cities have strong, direct control have been more numerous and impactful.

For example, more actions have been taken by C40 cities to address energy used in existing buildings than any other single area. As of 2011, over 1,343 actions had been taken, a majority of which focused on municipal and residential buildings, with limited action on private and commercial buildings. The second most popular area of action for C40 cities has been transportation, with over 900 actions undertaken related to transportation. Other important areas include action in solid water, water conservation and sourcing, and climate resilience.

Local Action with Global Impact

Actions taken in C40 cities have improved the quality of life for city residents, increased the efficiency of urban systems, produced significant cost savings, and reduced citywide GHG emissions. Taken together, they also have the potential to significantly reduce global GHG emissions. C40 estimates that its members are on track to reduce GHG emissions by 248 million tons by 2020 — about 0.8 percent of global emissions.[88] This figure is based on current actions underway or planned for implementation. It is estimated that C40 cities have the potential to reduce GHG emissions by over 1 billion tons by 2030 from business as usual — an amount equivalent to the emissions produced by Canada and Mexico combined — based on current emission portfolios and municipal powers.[89]

Challenges Ahead

Despite the significant advantages that networks have provided cities to accelerate their actions to reduce carbon emissions and

---

87 Aggarwala, et al, pg. 1

88   C40 Cities Climate Leadership Group press release, "Mayors of the World's Largest Cities Demonstrate Progress in Greenhouse Gas Reductions and Launch Two New Initiatives." Jun. 19, 2012.

89   Ibid.

prepare for the impacts of climate change, several challenges need to be overcome to enable cities to meet their full low-carbon potential, protect their residents and economies from climate risks, and help the world achieve sufficient GHG reductions to avoid catastrophic changes. A number of these challenges are not unique to urban networks focused on climate change, but will need to be addressed as cities continue to work together across regions on common issues. Failure to overcome these challenges could delay or prevent large-scale change.

With regard to climate change, assuming that cities are responsible for 70 percent of global GHG emissions and have control over 70 percent of the emissions generated within their boundaries, city governments have influence over almost half of global GHG emissions. Their ability to significantly reduce these emissions depends on whether they are able to address six significant challenges: the lack of engagement by national and international entities; a lack of funding from these bodies; the turnover in elected municipal leadership, which can delay or end climate actions; the rapid growth of urban populations (and cities) in developing countries, many of which are not engaged in urban networks on climate change; the current trend of urban sprawl in many new and emerging megacities; and the need to adequately account for and take actions to reduce GHG emissions caused by urban consumption.

First, cities need to be engaged, recognized, and empowered by national and international governments. Despite increased recognition for the actions underway in cities, national and international entities have not fully embraced cities as partners in addressing climate change. Nor have these entities matched the level or activity of commitment to climate action found in cities. This is problematic, as Mayor Bloomberg notes that "not all problems of global warming can be tackled at a city level. In particular, national governments have to take responsibility for large-scale renewable energy generation."[90] National governments should adopt pro-city policies to encourage and support sustainable densification, which will help them meet international targets for GHG reductions. In evaluating the state of cities, the United

---

90 Aggarwala, et al, pg. 1

Nations found that many national governments have adopted an "ambivalent or hostile attitude" to urbanization.[91]

Second, significant investments need to be made by national and multi-national entities in urban infrastructure to maintain, improve, and expand critical systems that enable cities to survive and support sustainable densification. These costs would be significant even without the added pressures of climate change. The World Bank estimates that current financing for adaptation and mitigation is less than 5 percent of what will is estimated to be needed annually by 2030 to reduce GHG emissions and projected climate risks.[92] To date, cities have paid for a majority of the costs associated with their climate actions. According to the CDP, approximately 64 percent of the climate actions occurring in cities are funded by general municipal funds. Only 14 percent are financed by the private sector and less than 1 percent has been financed by development banks.[93]

This trend is not as pronounced, but still significant, in non-climate change related infrastructure investments. The United Nations estimates that 25 percent of water and sanitation investments in developing countries are funded by local and regional governments.[94] While cities are testing innovative programs to raise funding for GHG mitigation projects, including Tokyo's Emissions Trading System, large-scale reductions will ultimately not be achieved without financial support from national and international actors. The need to invest in infrastructure in advance of (and in response to) climate change is most acute in developing countries. The World Bank estimates that developing countries are likely to bear approximately 75 percent of the costs of climate change, including infrastructure needs and climate impacts.[95]

Third, the processes that enable the visionary, long-term planning and action needed to reduce GHG emissions need to be institutionalized to ensure that actions are not delayed or dismantled by turnovers in city leadership. These political changes

---

91 State of the World Cities, pg. 4

92 Cities and Climate Change, pg. 5

93 CDP 2012, pg. 10

94 World Health Organization, "UN-Water Global Analysis and Assessment of Sanitation and Drinking-Water (GLAAS) 2012," World Health Organization, Geneva, Switzerland, 2012, pg. 26.

95 Cities and Climate Change, pg. 4

make consistent funding and support for long-term transformative change difficult to maintain.

By the end of 2015, 22 of 27 C40 cities for which election schedules are available will hold a mayoral election. This represents over half of C40's core membership. While it is highly unlikely that a majority of the mayors facing re-election will lose, a number will be term-limited out of office (including the current C40 Chair) and some degree of turnover is inevitable.

Few cities have adopted requirements ensuring the continuity of climate planning efforts. An example where this has occurred is New York City. New York City local laws 17 and 22 of 2008 require future mayors to update the city's long-term sustainability plan at least once every four years, issue an annual progress report tracking progress for each of the initiatives in the city's plan, release an annual ghg inventory, and report on a set of sustainability indicators to measure progress toward the city's long-term goals.[96]

Fourth, new and emerging megacities in regions not yet particularly active in climate change efforts or urban networks, such as China and India, need to be engaged to provide them with the resources and technical expertise. The organization of networks by cities rather than regions should enable this to occur, but the inclusion of new and emerging global cities, which often do not have the global connectivity or perspective of more established megacities, in urban networks has not always kept pace with urbanization in the developing world. Of the 40 most populace cities in 2010, 15 were not members of C40. Ten of these "un-networked" cities are in China and India.

As the world continues to urbanize, mechanisms need to be created to provide new and emerging megacities with resources and technical expertise to invest in infrastructure, utilize sound planning principles, and reduce GHG emissions. As urban per capita GHG emissions are typically lower than national averages, urbanization can help reduce per capita GHG emissions and the transition to a low-carbon future if cities follow a pathway toward sustainable densification. Engaging new and emerging megacities

---

96   The full text of these laws can be found at http://legistar.council.nyc.gov/
LegislationDetail.aspx?ID=446181&GUID=D94C5227-81E3-44C5-8386-DBE4B23A6E79&O
ptions=ID%7cText%7c&Search=sustainability

(especially those in Asia and Africa) in networks such as C40 could accelerate their sustainable development and the adoption of successful climate policies.

Fifth, as urban population grows, particularly in developing countries, cities need to avoid poor planning and infrastructure investments that will lock-in higher carbon lifestyles for generations to come. One of the primary examples of this is suburban sprawl. Between 1970 and 2000, the surface areas of many cities grew 1.5 percent faster than its population.[97]

The need for continued focus on sustainable densification in cities is critical as several megacities are increasing in physical size at a faster rate than their population growth. This can contribute to a form of sprawl and increase GHG emissions. For example, the surface area of Guadalajara, Mexico, grew 1.5 percent faster than its population between 1970 and 2000. Similar patterns are emerging in Beijing, Johannesburg, Cairo, and Mexico City.[98] Left unabated, global population is projected to double by 2030, while urban areas will triple in geographic size.[99]

Addressing this challenge is critical to achieving a low-carbon future. The World Bank found that "urban form can be the single largest determinant of a city's GHG emissions," as transit patterns, energy needs, walkability, economic activities and concentrations, and building types are shaped by the form and design of cities — as is a city's climate resilience.[100]

Developing and emerging cities should look to successful policies enacted in more mature cities, such as New York and Hong Kong, which have intensified density around mass transit and given municipal officials greater flexibility to shape development. These

---

97   State of the World Cities, pg. 10

98   Several factors are driving unsustainable development patterns in cities. In some cases, informal settlements have organically grown on the outskirts of urban areas. These settlements, which can house millions of people, are less dense than more established urban areas and have poor or even no public services and infrastructure. At the same time, new residential zones in are being created in other (and sometimes the same) cities outside of existing urban boundaries to house the swelling number of middle- to upper-class residents. As these new neighborhoods are developed, investments in mass transit are not being made to connect residents to the economic centers of cities, encouraging (and forcing) people to drive personal automobiles. (State of the World Cities, pg. 10)

99   Cities and Climate Change, pg. 15

100   Ibid., pg. 31

tools, which require some form of city-controlled zoning, include Floor Area Ratio bonuses, transferable development rights, transit-oriented development, and tax incentives and public infrastructure investments to spur development in targeted areas.

Conclusion

Despite some significant challenges that remain to be overcome, cities have demonstrated the value and power of working together to disseminate best practices and advocate for more direct engagement and recognition from national and international organizations. As the economic and political importance of cities continues to increase, their ability and willingness to work together in global networks will accelerate the pace of change occurring throughout the world. This is particularly true in relation to climate change, where cities have demonstrated a willingness and ability to take aggressive and innovative actions to reduce GHG emissions and protect their residents from the impacts of climate change.

The advent and growing sophistication of urban networks that link cities together will accelerate the dissemination and implementation of successful climate polices. This should not allow national and international bodies to abdicate their responsibility to adopt policies to reduce GHG emissions or to provide the critical resources needed to allow cities to achieve their full potential in carbon reductions (and economic growth). It does mean, however, that progress will continue to occur on the local level in the near-term as international climate negotiations end without a binding treaty and many national governments fail to acknowledge or act on the realities of climate change.

In speaking to assembled mayors at the 2010 C40 summit, Mayor Bloomberg observed that "the call to action sounded in Rio [in 1992] still rings loudly in the streets of our home cities, and in cities across the globe. Even as action at the national and international levels has faltered, the world's cities have forged ahead."[101] Their actions show a pathway toward a low-carbon future that should be recognized, resourced, and replicated, and demonstrate value of working together at a global level to address local issues.

---

101   Michael Bloomberg speech, Jun. 1, 2011.

Smart Cities: Promise and Peril for Urban Policy and Planning in the Atlantic Basin

By Dr. Anthony Townsend

Introduction

Cities and information and communications technologies (ICTs) have co-evolved for thousands of years. In the ancient world, writing supported cities' role as specialized hubs for government, commerce, and religion. In the industrial cities of the 19th, century the telegraph, telephone, and mechanical tabulators powered a "control revolution" to coordinate human activity on a previously unimaginable scale.[102] More recently, the Internet and cellular networks have facilitated both urban sprawl and the rise of global cities.

Today, ICTs are spreading into the streets — as mobile devices carried by inhabitants, into vehicles, into buildings, and infrastructure networks. This is creating new opportunities for greater efficiency and precise control in urban management. To date, much of the discussion of "smart cities" has focused on this shift. But smart cities are not just the top-down creations of industrial engineers, or even the designs of technocratic public officials — citizens and entrepreneurs are playing a major role in their evolution.

These trends are evident throughout the diverse geography of the Atlantic Basin. While there are significant regional and localized differences in the kinds of technologies, the speed of diffusion and the impacts of their interaction with local social, economic, and institutional capacities, all areas of the Atlantic Basin are grappling with rapid and simultaneous urban and technological change. Yet the promise and peril of these technologies for developing so-called "smart cities" — places where information technology is deliberately used to improve city operations and management, enable innovation in public services and governance, and

---

102   Beniger, J. R, *The Control Revolution: Technological and Economic Origins of the Information Society,* 1986, Harvard University Press.

increasingly to improve long-range planning — are often deeply misunderstood by urban planners and policymakers.

To address this global knowledge gap, and highlight the key challenges and opportunities smart cities present within the diverse geographies of the Atlantic Basin, this chapter provides a broad overview of the ICTs of smart cities. But more importantly, it identifies the actors behind these massive investments in public and private systems and explains their motivations. My focus is not on the specific merits of any particular approach, nor to provide a comprehensive inventory of interventions. Rather, my aim is to illustrate how rapid technological change in cities is shaping new political, economic and social synergies and conflicts, and identify some strategies for anticipating and exploiting or mitigating these as they emerge.

Three key areas of concern for the Atlantic Basin are discussed.

- First, how can the maturing economies of the northern Atlantic Basin use smart city technology affordably and sustainably to extend the life and expand the capacity of their aging infrastructure in an age of extended fiscal austerity?

- Second, what are the opportunities for accelerating more equitable, sustainable development in the southern Atlantic Basin, and addressing the wide range of existing urban problems — keeping in mind that the challenges of already largely urbanized region of South America and rapidly urbanizing Africa differ dramatically?

- Finally, how will currents of innovation between these poles grow, be cultivated, and even reverse themselves (e.g. innovations flowing from South to North) over the coming decade and beyond?

The Origins of Smart Cities

"No invention has been more timely than the telephone. It arrived at the exact period when it was needed for the organization of great cities and the unification of nations."

—Herbet Casson, The History of the Telephone, 1910

This historic migration of information and communications technologies out of homes, offices, and factories into the streets will play out against the backdrop of the greatest period of city building humanity may ever know. But we are now predominantly urban and in the next century will become almost exclusively so. "[T]he world population will reach a landmark in 2008," United Nations demographers declared in 2007, "For the first time in history the urban population will equal the rural population of the world."[103] By 2050, nearly 70 percent of humanity will live in cities.[104] More speculative projections suggest as many as 90 percent could by 2100. [105] Within the Atlantic Basin, this wave of urbanization will have vastly different faces. Dispersal of existing metropolitan populations continues in the United States and Europe, despite counter-currents of urban revitalization (which is occurring at densities far below historic averages). Already largely urbanized, Brazil will spend the 21st century rebuilding its vast squatter cities, the *favelas*. In sub-Saharan Africa, where 62 percent of city dwellers live in slums, the urban population is projected to double in population in the next decade alone (though this rate is increasingly the subject of debate).[106]

As much as these trends compel us to look to the future, when forecasting, it is critical to look back before looking ahead. As we consider urbanization paradigms for the next 100 years, then, it is useful to look back as far. It is difficult to understate the importance of ICTs in enabling the first great wave of urbanization in the late 1800s. Steam power may have started the industrial revolution, but information technology saved it from collapsing under its own weight. In the United States, just keeping track of the population and the economy overwhelmed the federal government by the 1880s. The decennial Census, mandated by the U.S. Constitution, was proving too vast and complex to tabulate by hand. In 1887, as the even larger 1890 count loomed, clerks in Washington finally

---

103   "World Urbanization Prospects: The 2007 Revision," United Nations, Feb. 26, 2008, 1.

104   "World Urbanization Prospects: The 2011 Revision," United Nations, Mar. 2012, 1.

105   Author's calculation based on global population forecast in *The 2010 Revision of World Population Prospects* and urbanization forecast of 70-80 percent in Shlomo Angel, *Planet of Cities*, Lincoln Institute of Land Policy, Sep. 2012).

106   Slum population: *State of the World's Cities 2012/2013: Prosperity of Cities*, World Urban Forum Edition, UN-HABITAT, 100. Population projection: remarks by Joan Clos, Director UN-HABITAT, "Smart Cities: An Opportunity for Liveable Cities," Smart Cities Expo 2011, speech, Barcelona, Spain, Nov. 29, 2011.

completed the analysis of the previous one. This crisis of counting was a governance problem that strongly parallels the contemporary problems of cities in the global south. And ironically, it is a story about the role of private industry in inventing and marketing technologies to address urban problems, and the risks of that approach. This is the creation story of IBM, the most aggressive proponent of smart cities today.

The first Census began on Monday, August 2, 1790.[107] By 1793, the hand-tabulated results were in. In 56 pages, Return of the Whole Number of Persons Within The Several Districts of the United States described a nation of villagers and farmers — barely 1 in 20 Americans lived in cities and towns in 1790. In New York City, already the nation's largest settlement, a mere 32,328 persons resided. This pattern would hold for decades. As late as 1840, the share of the nation's population that was urban was still just 10.8 percent. The Industrial Revolution would change all that. From just 2 million townsfolk in 1840, the United States' urban population grew to over 50 million in 1920, when they outnumbered farmers for the first time.[108]

As the country grew, the Census grew in scale. In 1790, fewer than 4 million persons were found. By the tenth count in 1880, the population has swelled to 50 million. The scope of data gathered on each person expanded dramatically as well. A major expansion in the 1880 Census designed to improve understanding of immigration also included a massive commercial survey of the new industrial economy. While the 1870 Census reported back in just three volumes, the 1880 report contained 22 and took seven years to compile, even with a three-fold increase in the workforce to over 1,500 clerks.[109] The 1890 Census was shaping up to be a catastrophe, despite plans for even more staff in Washington. There were fears that the "1890 figures would be obsolete before they could be completely analyzed."[110]

107   "1790 Census: Census of Population and Housing," U.S Bureau of the Census, http://www.census.gov/prod/www/abs/decennial/1790.html.

108   "Population: 1790 to 1990," U.S Bureau of the Census, http://www.census.gov/population/censusdata/table-4.pdf.

109   http://www.census.gov/prod/www/abs/decennial/1880.html#

110   Beniger, p. 411

The crisis at the Census was a manifestation of what sociologist James Beniger has called "the control revolution" of the late 19th century, a time when "innovations in information-processing and communications technologies lagged behind those of energy and its application to manufacturing and transportation."[111] Essentially, cities were growing faster than government could measure them. Similar logistical problems plagued railroads, shipping lines, and manufacturers.

For the Census, the solution was a primitive breed of mechanical computers. After seeing the looming crisis, in the 1880s a former Census clerk named Herman Hollerith developed a mechanical tabulating machine to speed the count up. Able to rapidly read and record survey responses encoded on paper punch cards, the machines revolutionized the Census. Using the machines, the raw 1890 population count of over 60 million people was completed in just six weeks. Hollerith boasted that the Census could now process a stack of forms the height of the Washington Monument in a single day.[112] The full tabulation was completed in 1892, five years faster than the previous one.

Hollerith's mechanical tabulator, born of the need to measure cities of unprecedented scale, set the stage for a far greater transformation. The company he formed, which after a number of mergers emerged as the prosaically named Computing-Tabulating-Recording Company, would pursue an ever-expanding market for information processing throughout the next century and beyond. Governments, railroads, and shipping companies — collapsing under the weight of their own massiveness and speed — were eager customers. And in 1924, the company took a new name: International Business Machines.

The parallels between then and now are striking — booming cities spinning out of control, and the application of new technology to measure and control them. Consider Rio de Janeiro, for instance, a city described as recently as 2004 by one U.S. defense intellectual as "feral."[113] Today, Rio is embracing a diverse array of information

---

111   Beniger, p. vii

112   Beniger, p. 414

113   Norton R J. "Feral cities," http://www.usnwc.edu/getattachment/9a5bddeb-e16e-48fc-b21a-22515e79aaa9/Feral-Cities.

and communication technologies for law enforcement and urban management to re-assert government authority in preparation for the 2014 World Cup and 2016 Olympic Games. But this latter-day control revolution is not limited to the Global South. It is proving a powerful band-aid for the fiscally-challenged cities of the Global North. As Mayor Michael Bloomberg of New York is known to say "if you can't measure it, you can't manage it." A new generation of technocrats throughout the Atlantic Basin are seizing upon smart cities as a framework for problem-solving.

Most striking about this trend is that the business model for urban informatics has not changed in more than a century. Rather than sell, Hollerith leased his machines and charged per card counted. Today, the company he created has centered its strategy on selling cities metered services delivered over a global cloud computing infrastructure.

Urbanization and Ubiquity

> *"In the lifetimes of our children, the urbanization project will be competed. We will have built the system of cities that their descendants will live with forever."*

> —Paul Romer, economist

Over 120 years after Hollerith's tabulator rendered the United States' (and soon thereafter Europe's) unprecedented urban masses governable, information technology is again being harnessed to power another "control revolution" that rivals the one in the late 19th century described by Beniger.

Urbanization and the spread of digital sensing, computing, and communications into every corner of the built and human environment — "ubiquitous computing" as computer scientists call it — are perhaps the two most important forces shaping the 21st century. Both will play out over the next century, by the end of which the network of cities globally will be largely in place, and the ubiquity of information technology will be complete. During that process, these two trends will deeply influence each other's course.

Just as we crossed the symbolic halfway point in global urbanization around 2008-09, the spread of ICTs reached milestones of its own. In 2008, the number of mobile broadband

subscribers surpassed the number of fixed lines for the first time. By freeing us to gather where we want, mobile networks are a catalyst for density — the most robust cellular networks are those that blanket stadiums in bandwidth. But they are also the substrate of sprawl, connecting cars to the cloud. They are our metropolitan nervous system, our most critical infrastructure. Even as our roads and bridges crumble, the wireless industry pumps $20 billion a year into the towers that blanket U.S. cities with bandwidth.[114] Mobile phones are the most successful consumer electronic device of all time. Some 6 billion are in service around the globe, three-quarters in the Global South.[115] In just a few years, it will be rare for a human being to live without one.

Meanwhile, just as we verged on linking all of humanity to the global mobile web, we became a minority online. Today, 5 billion connected things (i.e. devices) cohabitate the network with 5 billion people, projected to rise to some 25 billion devices over the next decade.[116] The torrent of readings generated by this Internet of Things will drown out the entire human web. Businesses, governments, and even citizens will tap this pool of observations to understand the world, predict, and react. This "big data," as it is known, will be an imminent force that pervades and sustains our urban world.

It is no coincidence that these trends are playing out in parallel. As we have seen from history, they are deeply intertwined. Urbanization and ubiquity reinforce each other. Each time cities expand, advances in information technology have kept pace to manage their ever-expanding complexity.

A century ago, some of the first urban telegraph networks were put in place by police departments. They allowed city governments to scale services to match the unprecedented size and complexity of industrial cities.[117] Today, technology also makes it possible

---

114   "U.S. Wireless Quick Facts," Cellular Telecommunications Industry Association, http://www.ctia.org/consumer_info/index.cfm/AID/10323.

115   "Key Global Telecom Indicators for the World Telecommunication Service Sector," International Telecommunications Union, http://www.itu.int/ITU-D/ict/statistics/at_glance/KeyTelecom.html.

116   "The Internet of Things [INFOGRAPHIC]," 2011, Cisco Systems, http://blogs.cisco.com/news/the-internet-of-things-infographic/.

117   Tarr, J., "The City and the Telegraph: Urban Telecommunications in the Pre-Telephone Era," *Journal of Urban History* 14 (Nov. 1987), 38-80, with T. S. Finholt and D. Goodman.

to actually govern cities of previously unthinkable size — 5, 10, or even 20 million people. Cities employ a broad array of digital systems to expand control over transportation, energy, and water networks and track social and economic shifts in real-time.

This symbiosis is visible at the individual level as well, as consumer technologies like smart phones increase people's ability to make a livelihood and manage business, family, and community affairs in rapid, highly-coordinated ways. Largely without commentary by urban scholars, our entire civilization is switching from a rigid choreography of scheduled events to a tele-swarm of constantly re-calibrated rendezvous. With their days and nights increasingly stretched across the megalopolis, urbanites have turned to these gadgets to keep it all synchronized.

Smart Cities as Solutions

The use of digital computers to analyze, simulate, and control cities dates to the late 1950s when researchers in the nascent field of cybernetics began applying the tools and methods of defense planning to the problems of cities.[118] By the 1990s, many scholars and policy analysts anticipated a growing role for digital technology in restructuring cities and their metropolitan areas.[119] In the last decade, as urbanization and ubiquity have converged, this process has accelerated. Today, leaders everywhere are talking about "smart cities."

But what is a "smart city"?

In a sense, the term "smart city" is merely the latest in a long lineage of terms coined to describe the convergence of cities and ICTs. Dating back as far as the 1970s, terms such as "wired city," "intelligent city," and "information city" have all been used. William Mitchell, the author of several books on design principles for digital cities, chose the name "Smart Cities" for the research group he set up at the MIT Media Lab in 2003. Adapted by IBM for its multi-million dollar "Smarter Cities" marketing initiative in 2008, the term has stuck.

---

118   Light, J., 2003, *From Warfare to Welfare: Defense Intellectuals and Urban Problems in Cold War America*, The Johns Hopkins University Press.

119   *The Technological Reshaping of Metropolitan America*, 1995, Office of Technology Assessment, GPO stock #052-003-01448-3

Despite this serendipitous convergence on a catchy moniker, a broader shift in the nature of urbanization is emerging. Scholars have proposed several definitions. The EU's FIREBALL project offers the following definition, which weaves technological transformation together with broader goals of citizen empowerment:

A useful definition to start with is to call a city "smart" when "investments in human and social capital and traditional (transportation) and modern (ICT-based) infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory government" [Caragliu et al 2009]. To this, the notion of empowerment of citizens and "democratizing innovation" should be added [Von Hippel 2005].[120]

The authors add to this definition a placemaking element, arguing:

The smart city provides the conditions and resources for change. In this sense, the smart city is an urban laboratory, an urban innovation ecosystem, a living lab, an agent of change.[121]

In this view, a smart city is defined by the convergence of these four elements — human capital development, digital enhancement of infrastructure, citizen engagement through open innovation processes, and a distinct and critical place-based program.

This approach is a crucial first step to mapping the political economy of smart cities. To date, most of the public discussion about smart cities has focused on the "what" — the technologies and their applications — and to a large extent without reference to specific problems in specific communities. Broad technological prognostications have dominated the discussion, and this had led to the promulgation of visions largely initiated by technologists themselves. But of more importance is the "why" and "how" of creating smart cities, because a vast array of actors and interests are now in play. They are as diverse as the forces that shape the city itself.

---

120   Hans Schaffers, Nicos Komninos, Marc Pallot, 2012, "Smart Cities as Innovation Systems Sustained by the Future Internet," URENIO Research Unit, p6.

121   Schaffers et al., p63.

A useful starting point for decoding the process of producing smart cities is to look at their problem-solving potential. Urbanization and ubiquity provide the broad historic context for the emergence of smart cities as a distinct typology. But the short-term context of a global economic recession and the ascendance of cities as leading advocates for and practitioners of voluntary systems of global governance is a better explanation for their role as a strategy. These shifts have focused local leaders on a search for pragmatic frameworks for action. Technology-enabled solutions, partly because of their effectiveness but also partly because of their novelty, have become particularly appealing. What distinguishes "smart cities" from all those earlier technology-derived labels is their emphasis on problem-solving. As the FIREBALL authors put it, "the smart city is the engine of transformation, a generator of solutions for wicked problems."[122]

Smart Cities in the Atlantic Basin

The deductive approaches to defining and analyzing smart cities are a useful exercise. But they are somewhat misguided, as they assume technology as the starting point, and challenge us to imagine what a city organized around those technologies might look like. And in recent years, the most highly-publicized models of future urban development have been a succession of very large "smart" and "sustainable" real estate developments along the Indian Ocean and western Pacific Rim — Masdar in Abu Dhabi, New Songdo City in South Korea, Lavasa in India, and One-North in Singapore.[123] These projects combine greenfield construction, a heavy emphasis on building and infrastructure automation, and ambitious carbon footprint/energy intensity targets. They are all master-planned with varying degrees of government involvement, designed to be scalable and replicable models for these rapidly urbanizing regions.

But even if these new communities do inspire a wave of copycats, their scale suggests a minimal short-term impact on any of the issues they aim to address: sustainability, safety, or economic competitiveness. They take a decade or more to develop and are designed for tens of thousands of inhabitants — yet by one

---

122   Schaffers et al., p63

123   Hollands, R.G., 2008, "Will the real smart city please stand up?" *City*, Vol. 12, No. 3., pp. 303-320

estimate, some 1 million people in the Global South move to cities each week.[124]

But we can also try to understand smart cities inductively by looking at examples from a broad cross-section of places, markets, and socio-technical movements. Given that in practice their form — physical and technological as well as organizational — is evolving so rapidly, this approach is likely to be more responsive to changing reality. Furthermore, the nature of smart cities in the Atlantic Basin has been markedly different than the regions from which model smart cities hail. The lone greenfield smart city in the Atlantic Basin is Portugal's PlanIT Valley — a new town designed for some 150,000 residents and 100 million sensors in the hinterlands of Oporto — which has thus far failed to materialize in any tangible form.[125]

In contrast, the existing and growing cities of the Atlantic Basin appear to be taking a more organic approach to implementing smart city solutions and adopting the technologies that enable them. In a sense, the cities of the western Pacific Rim and Indian Ocean Basin are master-planning smart cities like mainframe computers, while those of the Atlantic Basin are growing them in a more distributed fashion, more like the Web. Some might see this process as haphazard. It is more accurately seen as adaptive and organic.

Consider two Atlantic Basin cities that are widely recognized as global leaders in the application of smart solutions and technologies to city management and planning, London and New York. While each city has adopted long-term sustainability plans and have articulated pieces of a digital or smart city strategy, one can hardly argue that there is an articulated "smart city" agenda at all. But unlike the smart cities of Asia, which all presume a strong, if not exclusive, leadership role for government and/or industry, the goals, means and outcomes of smart city investments in the Atlantic Basin are all hotly contested. In these cities, one is forced to consider a smart city not as a simple set of technologies and services but as a much broader set of innovations spanning

---

124   TK source

125   Doig, Will, "Science fiction no more: the perfect city is under construction," *Salon*, Apr. 28, 2012, http://www.salon.com/2012/04/28/science_fiction_no_more_the_perfect_city_is_under_construction/.

infrastructure management, governance, everyday social life, and community development. Rather than a single design, a broad array of projects, businesses, and bottom-up initiatives are all inter-mingling in what I see as a struggle for the "soul" of the smart city.

Consider four examples from the four continents of the Atlantic Basin, which highlight the main stakeholders in this emerging power struggle over the future of the city.

- In South America: In preparation for the 2014 World Cup and 2016 Olympics, the municipal government of Rio de Janeiro hired IBM to build the Intelligent Operations Center, an urban command center. Anne Altman, general manager for IBM's Global Public Sector, described this center as an all-seeing eye that can "accurately gather, analyze, and act on information about city systems and services" and "recognizes the behavior of the city as a whole." At its heart was a prediction engine offering "deep insights into how each city system will react to a given situation."[126] It is housed, along with 70 operators from 30 different city departments, in a new bunker in the neighborhood of Cidade Nova, just a few miles north of Copacabana Beach. A network of 400 cameras placed throughout the city relays live video to a bank of screens covering an entire wall, which a government promotional film brags is "the largest screen in Latin America." Originally intended as an emergency management tool, the building was quickly re-purposed as a day-to-day management hub. It is the epitome of IBM's Smarter Cities philosophy, the direct application of enterprise information technology developed for the global operations of multinational corporations to the problems of urban management.

- In North America: Foursquare, the leading mobile social network, is based on an app that lets friends share their current location by "checking in" to businesses, public places, and other venues. In contrast to IBM's platform for top-down sensing and control, Foursquare is designed to allow a collective awareness of the city to bubble up from its inhabitants in a rich ecosystem of content and interactions. Foursquare and the owners of

126 "Intelligent Cities Forum: Anne Altman," National Building Museum, Last modified June 6, 2011, http://www.nbm.org/media/video/intelligent-cities/forum/intelligent-cities-forum-altman.html.

businesses and public attractions provide information about location, hours, and amenities as well as special coupons and discounts. End users can share their current location and tips and suggestions on interesting activities. Third-party content channels like the *Wall Street Journal* or a city's economic development agency (Chicago was the first in 2010)[127] can create curated collections (Foursquare calls them "lists") that users can follow to help script their urban experience through alerts that guide them as they move through the city. Unlike industrial smart cities, which seek to maximize efficiency, security and state control, Foursquare accentuates the city's organic, bottom-up propensities for sociability, serendipity, and fun.

- In Europe: More than any layer of governments, cities are using technology to innovate in governance, economic development, and citizen engagement. Zaragoza, Spain, has built a massive new center for art and technology and transformed the city into a living laboratory for the technologies that will be created there. A new urban space called the "Digital Mile" is the focal point of an open source city where designers and citizens will co-create everything from interactive sculptures to new public services — all unlocked by a new, universal citizen smart card.

- In Africa: Map Kibera, an open source community mapping effort in Kenya, has created a digital base map of a slum of some 250,000 people. Using community volunteers, consumer GPS devices, and the Open Street Maps cartographic toolkit and data repository, the developers have documented the physical structure of the community and local assets for the first time. The resulting base map is both a platform for innovative community media and information services as well as a springboard for integrating the community into the city's formal urban planning processes.

These examples represent the diversity of ways in which new information technologies are being applied to create "smart" services, interventions, and experiences in the cities of the Atlantic Basin and adjacent territories. But they are not only regionally

---

127   "How 5 Brands Are Mastering the Game of Foursquare," http://mashable.com/2010/04/02/foursquare-brands/

representative. They each represent one of four critical sets of actors shaping the smart city: the technology industry, startups and citizen hackers, city governments, and the urban poor. The richness of innovation — organic and highly networked — occurring within and at the intersection of these competing interests distinguishes the Atlantic Basin from other regions of the world. This is an asset, but in order to fully exploit its potential, will require more attention to harvesting and cross-fertilizing the most promising ideas through collaborative and coordinating mechanisms. The following four sections explore the technologies, activities and motivations of each of these stakeholders, and I conclude with a discussion of how policy and planning can accelerate the flow of best practices and technologies throughout the region.

The New City-Builders

"This is the final phase of industrialization. Everything in your society has to be modernized. Everything has to be smart."

—Fareed Zakaria, Newsweek[128]

"Smart city" pilot projects are proliferating around the world, bringing together technology companies and cities and towns in public-private partnerships to promote sustainability, conserve energy, reduce costs, and meet the needs of citizens who are demanding a reasonable price.

—World Economic Forum, 2012[129]

The growing hype of smart cities has largely been driven by industry marketing, with hundreds of millions of dollars spent by IBM alone since the launch of its Smarter Planet and Smarter Cities initiatives in 2008-09. But behind this effort is an historic expansion opportunity for the IT industry that has real benefits and potential risks for cities.

In 2007, the gold rush into smart cities began with a forecast published by Booz Allen Hamilton, a management consultancy with a long history of pioneering work in automation. The study

---

128   "Live Blogging from Smarter Cities Rio: Day 1," http://asmarterplanet.com/blog/2011/11/live-blogging-from-smarter-cities-rio-day-1.html

129   World Economic Forum Annual Meeting 2012, "The Great Transformation: Shaping New Models," 2012, World Economic Forum.

predicted that by 2030, some $41 trillion would need to be spent globally to modernize aging infrastructure and accommodate new urban growth. The authors lamented the "technologically outdated, woefully inadequate, and increasingly fragile" state of "the critical infrastructure that is taken for granted by both their citizens and their government leaders."[130] While much of this need is concentrated in the massive economies of China and India, a considerable portion will need to be invested in retrofitting and replacing networks in the northern Atlantic Basin as well as new construction in the Atlantic South.

Soon after the release of this study, the investment bank Lehman Brothers collapsed, and a severe global recession followed. Corporations quickly tightened technology spending, negatively affecting the earnings of technology vendors like Cisco and service providers like IBM. Meanwhile, governments everywhere launched massive stimulus spending programs, much of it allocated to the badly needed infrastructure areas identified by Booz Allen. Technology firms, seeking a piece of these investments, repurposed existing technologies — sensor networks, communications networks, automation systems, and business data analytics — and launched pilot projects to demonstrate how they could be used to retrofit existing infrastructure and be integrated into future designs. The addition of IT into traditional water, energy, transportation, and building systems would bring many benefits: greater resource efficiency, increased security, improved diagnostics and reliability, remote and centralized control, and predictive modeling. The cost of these improvements was marginal. According to the chief planner of South Korea's New Songdo City, making a greenfield city "smart" cost less than three percent of the construction budget. While retrofitting existing cities in the North Atlantic Basin with smart technology is inevitably more costly (laying fiber optic lines during new construction versus tearing up existing streets, for instance), there are still considerable efficiency, reliability, and security benefits that can easily make the business case for doing so.

Though a small share of the infrastructure market, smart cities promise to be a cash cow for the technology industry. If even a fraction of that $41 trillion in infrastructure spending would be

---

130 Doshi, Viren, Gary Schulman, and Daniel Gabaldon, "Lights! Water! Motion!," 2007, strategy + business, Booz & Co.

spent on chips and fibers, as opposed to asphalt and steel, it could power decades of growth. Andrew Comer, a partner at construction engineering firm Buro Happold, explains the cocktail math:

> If you project that figure into the future, multiply it by a fairly conservative estimate of the construction costs involved, and take a relatively small percentage of that for high-technology infrastructure, it's trillions of dollars. If these hi-tech companies can capture parts of this market, they have a 20 to 30 year period of insatiable growth.[131]

The potential growth of smart cities is also initiating new alliances between real estate developers (private and state-backed), industrial giants, and technology firms. For instance, New Songdo's joint venture partners now include Posco (the world's largest steel manufacturer), Gale International (a U.S.-based developer), and Cisco. MIT's Michael Joroff describes this trend as "the birth of a new city-building industry." This is an area where the Indian Ocean Basin and the western Pacific Rim have been leaders, but since most of those early model smart cities have been scaled back, dumbed-down, or cancelled, governments and developers in the Atlantic Basin have the advantage of learning from their mistakes. Projects like the massive Eko Atlantic landfill in Lagos, Nigeria, are beginning to import successful elements of this partnership model to sub-Saharan Africa.[132] More controversially, Honduras' Regiones Especiales de Desarrollos, modeled after NYU Professor Paul Romer's neocolonial "charter cities" concept, while not explicitly targeting a "smart city" model, holds the promise of less top-down planning, and more effective market-driven investments in smart infrastructure in greenfield cities (Although great care will be needed to assure they are socially equitable and ecologically sustainable investments).[133]

These greenfield smart cities are less about answering the needs of development as they are about creating platforms for commerce. Just as General Motors aggressively shaped Americans' aspirations

---

131 Andrew Comer and Kerwin Datu, "Can you have a private city? The political implications of 'smart city' technology," *Global Urbanist*, last modified February 11, 2011, http://globalurbanist.com/2011/02/17/can-you-have-a-private-city-the-political-implications-of-smart-city-technology.

132   http://globalurbanist.com/2012/06/19/pros-cons-eko-atlantic.

133   Greg Lindsay, "Chartered Territory: Can A New Model for Cities Thrive in Honduras?," *Next American City*, http://nextcity.org/forefront/view/chartered-territory.

in the 20ᵗʰ century around auto-powered mobility and freedom, these firms are attempting (with considerable success) to plant the seed of a utopian vision of cities powered by their products. As Brent Toderian, the former planning director of Vancouver, Canada, has said, "the technology companies are talking about things they are selling… not the things that cities need."[134]

DIY Smart Cities: Where Sociability Trumps Efficiency

> *"Computers are mostly used against people instead of for people; used to control people instead of to free them; Time to change all that — we need a... People's Computer Company."*

—People's Computer Company Newsletter #1 1972

While global technology companies have led the way in stimulating discussions about smart cities and the role of information technology in managing urban systems, over the last decade a parallel grassroots movement has developed an alternative framework. If the industry vision is a top-down one of the smart city as a mainframe or a cloud with a highly centralized infrastructure and system of governance, this bottom-up alternative is more like the personal computer: cheap, democratized, and decentralized. Instead of proprietary technology, it builds on open source software and hardware and on consumer devices like smart phones and social networks. The low cost and widespread availability of these tools have empowered almost anyone with an idea for how to rewire the city to rapidly build and deploy an app or a device. Rather than wait for industry or government to solve the challenges faced in their communities, a variety of self-organizing efforts are taking a do it yourself (DIY) approach to creating smart cities.

Three big shifts in technology have opened the door for these entrepreneurs. First, computing has moved off the desktop. By 2011, sales of personal computers were flat, while smart phones and tablets sold in record numbers. These devices not only decentralize computing power from large organizations into the hands of everyday people, they also embed it in everyday urban spaces, spurring new ideas about potential uses. Second, wireless broadband subscriptions now outnumber wired lines worldwide.

---

134 "Technology Alone Won't Save Our Cities," http://www.planetizen.com/node/57356.

This shift from fixed to untethered communications is pushing information technology into every crevice of the city. Third, cloud computing has decoupled information processing from place, enabling supercomputing power to be accessed from any device, anytime, anywhere — including our pockets. By riffing on the infinite permutations of how these pieces can be assembled, a process Google chief economist Hal Varian has dubbed "combinatorial innovation," this grassroots confederacy is rapidly evolving a set of new tools that rival top-down designs in technical sophistication and blow them off the map in terms of novelty.

Where the corporate smart city seeks to control, optimize, and make efficient, the bottom-up version seeks to enhance sociability, transparency, and entertainment. For instance, SeeClickFix is an app that makes reporting complaints to local government a social process. Citizens can submit reports on potholes, broken parking meters, and other everyday complaints using smart phones, and others can vote on the issue to bring issues of broad concern to the attention of local leaders.

DIY smart city hackers are also building hardware — infrastructure improvements that may one day provide an alternative infrastructure for sensing and controlling the physical realm, versus the top-down systems being deployed by industrial giants like Siemens and GE.

Environmental sensing is a particularly intense area of experimentation. In Paris, the Internet think tank FING developed a wristwatch that could sense and relay ozone levels on city streets. In a demonstration involving 100 bicyclists riding in a single neighborhood, volunteers were able to create a finely detailed air pollution map that dramatically surpassed the government's sparse network of just ten stations across the entire city. At MIT's SENSEable City Laboratory, researchers developed a rudimentary mobile phone with onboard GPS that could be attached to trash and thrown away, generating a map of the "removal chain" and illuminating the secret journeys of our waste. In New York, a group calling itself Public Laboratory has developed inexpensive sensors that alert citizens to situations during thunderstorms when the city's stormwater drains overflow into its sewage system and cause coastal discharge of sewage. The intent is that ambient displays in

homes would spur people to refrain from flushing toilets during these events, thus reducing the flow of raw sewage into waterways.

In coming years, this space will explode as open source platforms for building smart devices, such as the Arduino micro-controller, dramatically reduce the time and expertise needed to create networked things that can sense the city, inform us as we make choices, and even act on the world.

Beyond ICT4D

"For indeed any city, however small, is in fact divided into two, one the city of the poor, the other of the rich; these are at war with one another."

—Plato, *The Republic*

The term ICT4D is used to describe a loosely knit community of development scholars, policymakers, and practitioners who seek to apply new information technologies to address the social and economic problems of developing countries. This movement began in the 1980s with numerous efforts to deploy rural telecenters. The first wave of ICT4D projects, which had mostly failed or been discontinued by the end of the 1990s, has been widely viewed as a failure. These efforts — which Heeks characterizes as "ICT4D 1.0" missed the mark for a variety of reasons ranging from lack of end-user fit, poor support and training plans, and lack of unsubsidized business models. MIT's once-vaunted One Laptop Per Child (OLPC) initiative was the last and most colossal disappointment of this period. While at the outset the project in 2006, MEdia Lab co-founder and OLPC leader Nicholas Negroponte predicted shipping 100 million units a year by 2008, only 2.5 million had been built in total by 2011.[135]

Yet in same four years it took the OLPC project to deploy those 2.5 million laptops, Nokia and its competitors sold over 2.5 billion mobile phones, nearly doubling the number of mobile subscribers to 5.3 billion. In developing countries, where periodic spikes in copper prices have led to scavenging of telephone lines, wireless networks offer cheap, fast, and relatively secure deployment. While

---

135   Talbot, David, "$100 Laptop Program's New President," *Technology Review,* Last modified May 2, 2008, http://www.technologyreview.com/news/410072/100-laptop-programs-new-president/.

the cost of building fiber optic networks is thousands of dollars per home, delivering broadband wirelessly can cost one-fiftieth that much.[136] The impact is enormous. A World Bank study of 120 countries in 2009 found that for every 10 percentage point increase in the penetration of mobile phones, GDP increased by 0.8 percent. "Mobile phones have made a bigger difference to the lives of more people, more quickly, than any previous technology. They have spread the fastest and have become the single most transformative tool for development," wrote the bank's chief economist.[137]

The emergence of the mobile phone, spread largely through markets, caught the ICT4D community by surprise. But as Heeks argues, the arrival of the mobile phone is driving a huge strategic shift in the way aid organizations think about intervention. "We can keep pushing down the PC-based route when less than 0.5 percent of African villages so far have a link this way. Or we can jump ship to a technology that has already reached many poor communities."[138] ICT4D 2.0 — as he dubbed the next wave of efforts to leverage mobiles for development — would recognize the ubiquity of these technologies, and the ability of the poor to innovate around them. Heeks argues that the pro-poor models of ICT4D 1.0 (outsiders delivering solutions to the poor with little design interaction) would give way first to para-poor models (outsiders co-creating with the poor) and eventually per-poor (the poor developing new technology and applications independently).

Yet, even as the ICT4D community shifts to more mature models for intervention, the digitalization of government services and public records in many countries is creating unintended consequences with sometimes severe negative impacts on the poor. In Karnakata state in India, for instance, the Bhoomi land registry program used findings from the World Bank and the Asian Development Bank to digitize the land records of millions of farmers, replacing centuries-old village-level frameworks for managing property rights. With intense development pressures

136   Chowdhury, Pulak, Suman Sarkar, and Abu Ahmed (Sayeem) Reaz, Date unknown, "Comparative Cost Study of Broadband Access Technologies," http://networks.cs.ucdavis.edu/~pulak/papers /broadband_cost_study_ANTS.pdf.

137   Zhen-Wei Qiang, Christine, 2009, "Mobile Telephony: A Transformational Tool for Growth and Development," *Private Sector & Development*, Proparco.

138   Fox, Killian, "Africa's mobile economic revolution," Jul. 23, 2011, *The Observer*, http://www.guardian.co.uk/technology/2011/jul/24/mobile-phones-africa-microfinance-farming.

in the fast-urbanizing region, the outcome was large-scale disenfranchisement. Speculators (many of whom operated from the United States) who had the tools and skills to access and analyze the data could quickly assemble larger parcels for development. In many cases, this was done by using the new system to challenge existing claims. It was a computational arms race farmers could not resist. Mark Slee calls this phenomenon the "open data doppleganger." Increased access to public records in the name of transparency amplifies the analytical capability of those who have it more than those who do not.[139]

Civic Leadership: Re-Inventing Urban Governance

"There is no Democratic or Republican way of cleaning the streets."

—Fiorello La Guardia, Mayor of New York City

The fourth set of actors framing the evolution of smart cities are city governments themselves. There are estimated to be more than 500,000 municipalities worldwide that face both shared and unique challenges, and have a growing array of technologies and financing models at their disposal.[140] Leaders in these communities are performing a critical integration function of these countervailing technology trends, seeking to leverage both top-down and bottom-up models for building smart cities. While many problems are the same, each community faces a unique set of circumstances, and citizen demands are growing. Just as people increasingly expect computers, software, and web services to be highly personalized, we are expecting the same of smart cities. I use the phrase "a planet of civic laboratories" to describe this intersection between the wave of technology innovation and the broader reforms in city management and urban governance that are developing alongside it. Some elements will be shared, but each city will create its own designs. As a result, the next decade will be a period of intense experimentation.

---

139 Slee, M., "Seeing like a geek," http://crookedtimber.org/2012/06/25/seeing-like-a-geek/, posted Jun. 25, 2012.

140 Esteban, Aida, Sascha Haselmayer, and Jakob H. Rasmussen, 2010, *Connected Cities: Your 256 Billion Euro Dividend: How Innovation in Services and Mobility Contributes to the Sustainability of Our Cities*, Royal College of Art.

In the Atlantic Basin, U.S. cities are at the forefront of this international movement, and form a representative spectrum of approaches to exploiting the opportunity of smart solutions. Unlike the tech industry's showcase smart cities, the fiscal pressure of the recession, coupled with the Internet-savvy public's increasing thirst for service innovation, has driven mayors into the arms of local tech communities looking for answers. Three approaches have borne fruit.

The first approach focuses on innovation. Portland, Oregon, is the leader in the most radical approach, and has opened up public databases to anyone willing to create new services with them. The results have been spectacular. By opening up real-time transit data, this modestly sized city has produced many new variants of tools for planning local rail and bus trips. Fifteen of the 100 largest U.S. cities have created open data portals (excluding transit agencies, which have been more progressive in opening data). Many follow the model of Washington, DC, which developed a contest to spur innovative uses of the data. Over time, these contests and data sharing efforts have become less ad hoc and more focused on guiding developers to work on problems related to long-term planning goals such as expanding use of transit.

The second approach is more politically motivated, and focuses on creating tools for large-scale citizen engagement in city planning and community affairs. New York City's Change By Us, launched in 2011, provides a soapbox for anyone — resident, visitor, or remote observer — to post a virtual sticky note with their insight on what city government ought to be focusing on. Change By Us seems to mobilize citizens to start community-level projects that align with and advance with the city's much-lauded sustainability plan, PlaNYC.

The third approach extends traditional local governing styles, and can best be viewed as problem-solving. Boston, where mayor Tom Menino has built up a robust network of political listening posts during nearly two decades years in office, most embodies this approach of focused, cautious problem-solving with new technologies. Problems are defined and priorities are set the old-fashioned way with good political instincts that respond to voices from the community. Menino created an Office of Urban

Mechanics to mainly coordinate resources from government and the private sector with community priorities.

In practice, many cities are employing all of these approaches in parallel. And aside from these public efforts, many are also procuring substantial amounts of technology from large corporate vendors. However, the diversity in which city governments are approaching smart technologies suggests a more evolutionary than revolutionary process.

Risks and Unintended Consequences

"For every complex problem there is an answer that is clear, simple, and wrong."

—H. L. Mencken

The desired impacts of new technologies often end up dwarfed by their unintended consequences. Electricity, invented as a substitute for gas lighting, has found an immense and unpredictable array of applications. Motorization first improved living conditions in cities by eliminating the need for draft horses, but its long-term effects were devastating on urban centers — unleashing conflicts over congestion, sprawl, segregation, public health, and climate change. Smart technologies present many new solutions to urban problems, but they are likely to create just as many new risks and unintended consequences.

Some of the greatest risks of smart technologies come from errors in design and operation — what are colloquially known as "bugs." This use of the term to describe technical failings dates from the early telegraph era.[141] The term was carried over into computer science in the 1940s with the rise of digital computers after World War II. Bugs are triggers for the kinds of cascading and often unpredictable failures in extremely complex systems that sociologist Charles Perrow calls "normal accidents." Perrow argued that the likelihood of an unforeseeable chain of events that pushes a complex system out of balance is essentially inevitable. The Chernobyl nuclear disaster, for instance, was caused by an irreversible chain of events triggered during tests of a new reactor

---

141   Casale, J., "The Origin of the Word 'Bug'," The OTB (Antique Wireless Association), Feb. 2004, reprinted at http://www.telegraph-history.org/bug/index.html.

safety device. Perrow's conclusion was that "some technologies, such as nuclear power, should simply be abandoned because they are not worth the risk."[142]

We have already seen bugs wreak havoc in smart cities. In 2007, a Washington Metro rail car caught fire after a power surge went unnoticed by buggy software that had been designed to detect it.[143] Some bugs in city-scale systems will ripple across networks, with potentially catastrophic consequences. In 2006, a bug in the control software of San Francisco's Bay Area Rapid Transit system a forced a shutdown three times over a 72-hour period. The economic toll of these shutdowns can be huge — by comparison, the cost of a two-and-a-half day shutdown of New York's subways during a 2005 strike was estimated at $1 billion.[144]

Other parts of smart cities are surprisingly brittle. The creation myth of the Internet as a network designed to withstand a nuclear strike (only true in a general sense) has led to troublesome complacency about the resilience of digital network infrastructure. Most worrying is our growing dependence on untethered networks, which puts us at the mercy of a fragile last wireless hop between our devices and the tower. Cellular networks are especially fragile. During crises, they fail in multiple ways — damage to towers (15 around the World Trade Center on 9/11 alone), loss of the landside "backhaul" (many more), and power loss (most cell towers have just four hours of battery backup). Hurricane Katrina downed over 1,000 cell towers in Louisiana and Mississippi, severely hindering relief because the public phone network was the only common radio system among many responding government agencies. In the areas of Japan north of Tokyo annihilated by the 2011 tsunami, the widespread destruction of mobile phone towers forced people to resort to radios, newspapers, and even human messengers to

142   Perrow, Charles, 1984, *Normal Accidents: Living With High Risk Technologies*, Princeton University Press.

143   "Surge caused fire in rail car," Apr. 12, 2007, *The Washington Times*, http://www.washingtontimes.com/news/2007/apr/12/20070412-104206-9871r/.

144   "The Economic Impact of Interrupted Service," American Road and Transportation Builders Association, http://www.artba.org/Economics/Econ-Breakouts/04_EconomicImpactInterruptedService.pdf

communicate. "When cellphones went down, there was paralysis and panic," the New York Times reported.[145]

Public cloud computing infrastructure has already proved less reliable than hoped, and highlights the vulnerabilities of dependence on web-based smart city technologies. Amazon Web Services, the 800-pound gorilla of public clouds that powers thousands of popular websites, experienced a four-day disruption in April 2011 due to a "normal accident." When a technician at its data center in northern Virginia unintentionally stressed a key system beyond normal operating limits, it exposed a catastrophic software bug.[146] Public clouds underperform in comparison to other critical infrastructure, including the much-maligned electric power grid. Amazon promises its cloud customers 99.5 annual uptime, far short of the 99.97 percent average uptime achieved by the much-maligned U.S. electric power industry in 2006.[147] According to the U.S. Department of Energy, just those two hours of downtime costs the economy some $150 billion annually.[148] The costs of cloud outages will be multiplied as they disrupt other vital economic systems.

The threat of deliberate sabotage on civil infrastructure is only just beginning to capture policymakers' attention. StuxNet, a virus that attacked Iran's nuclear weapons plant at Natanz, was a wake-up call to this threat. StuxNet attacks computers that control industrial machinery and infrastructure, known as SCADA (supervisory control and data acquisition) systems. At Natanz, StuxNet attacked the SCADA controlling thousands of centrifuges used to enrich uranium. But the wide spread of StuxNet was shocking. It has infected 90,000 similar machines as far away as Pakistan, India,

---

145 Fackler, Martin, "Quake Area Residents Turn to Old Means of Communication to Keep Informed," Mar. 27, 2011, *New York Times*, http://www.nytimes.com/2011/03/28/world/asia/28phones.html

146 Raphael, J.R., Jun. 27, 2011, "The 10 worst cloud outages and what we can learn from them," Infoworld, http://www.infoworld.com/d/cloud-computing/the-10-worst-cloud-outages-and-what-we-can-learn-them-902?page=0,1

147 Eto, Joseph H. and Kristina Hamachi LaCommare, 2008, *Tracking the Reliability of the U.S. Electric Power System: An Assessment of Publicly Available Information Reported to State Public Utility Commissions*, Lawrence Berkeley National Laboratory.

148 *The Smart Grid: An Introduction*, Date unknown, U.S. Dept. of Energy, http://energy.gov/sites/prod/files/oeprod/DocumentsandMedia/DOE_SG_Book_Single_Pages.pdf

Indonesia, and even the United States.[149] Even more worrisome are "forever day" bugs — known vulnerabilities in legacy systems for which manufacturers no longer support or develop patches. Retired by vendors, but still in use throughout the built environment, these vulnerable systems control building systems, industrial plants, and infrastructure.

Computational Leadership Networks for the Atlantic Basin

The challenge ahead for building efficient, productive, equitable and sustainable cities throughout the Atlantic Basin is navigating the competing interests of diverse stakeholders who have so much to gain and lose from the applications of smart technologies to urban problems. In that sense, there is a shared set of challenges throughout the region. Industry is providing a valuable toolkit, but has restrained research and development spending, which has produced limited innovation. These companies often over-hype the benefits of smart solutions while failing to address even their most obvious risks and downsides. A diverse array of startups and citizen hackers in the North Atlantic Basin are building cheap, fast, open source alternatives, but their fragmented efforts have not yet congealed into a social movement that can mobilize resources at the scale of the challenges cities face. City governments are beginning to coordinate efforts and pool resources but face significant operational challenges in scaling these collaborations. The poor are rapidly adopting and adapting mobile phones as a tool for enabling livelihoods. But they face enormous risks of exclusion as powerful interests use smart technologies to constrain their choices and regulate their actions.

Urban governments and the policymakers who lead them will have to address these tensions to exploit the best of smart technologies and mitigate the worst of them. There are five high-reward challenges that stand out.

First, these systems will be powerful tools for innovating across bureaucratic barriers, but they will destabilize power in government

---

149   Yeo, Vivian, "Stuxnet infections spread to 115 countries," ZDNet, Aug. 9, 2010, http://www.zdnet.co.uk/news/security-threats/2010/08/09/stuxnet-infections-spread-to-115-countries-40089766/.

organizations. Information sharing between government agencies, and between government and citizens, will be much easier and this can make operations more efficient, effective, and transparent. Yet it can also be a powerful tool for centralizing power. For instance, in Rio de Janeiro, Mayor Eduardo Paes' new Intelligent Operations Center designed by IBM is rapidly consolidating information, communications, and authority.[150] While many laud the entrepreneurial leadership of mayors on issues like climate change and security — even as nations fail to — in light of the global trend to devolve power from national to local governments, this represents a potentially non-democratic countercurrent.

Second, the instrumentation of urban infrastructure and government operations will produce large streams of data that will be used to guide policy and management decisions — but these decisions must be carefully evaluated. Data-driven decision-making presents great opportunities for cities to carefully and effectively allocate scarce resources, but it often creates perverse incentives. For instance, in New York City, the COMPSTAT system used to micro-manage police patrols based on crime reports has been plagued by falsification of crimes to less serious offenses and intimidation of citizens to not report crimes.[151] Similarly, overly enthusiastic use of computer models for planning can lead to misguided choices — a model used in New York in the 1960s to reallocate fire companies based on faulty assumptions about traffic and response time led to a rash of fires that displaced hundreds of thousands of people.[152]

Third, city leaders will need to manage a portfolio of projects — there will be no single technology or "urban operating system" that will address every need. To date, there has been a divide between the kinds of smart solutions being imposed from the top-down (largely in the booming cities of the global south where mayors struggle to maintain control) and those percolating from the bottom-up (largely in the global north where citizens are demanding more services and more responsive governance).

---

150   Lindsay, G., "Building a smarter favela: IBM Signs Up Rio," Dec. 27, 2010, http://www.fastcompany.com/1712443/building-a-smarter-favela-ibm-signs-up-rio

151   Eterno, John A. and Eli B. Silverman, *The Crime Numbers Game: Management by Manipulation*, 2012, CRC Press.

152   Flood, J., 2010, *The Fires: How a Computer Formula, Big Ideas, and the Best of Intentions Burned Down New York City-and Determined the Future of Cities*, Riverhead.

Going forward, cities everywhere will need to engage in a variety of projects that pursue efficiency, as well as ones that enhance transparency. Most critically, they will need to support smart systems that leverage sociability to accomplish sustainability goals — peer-to-peer sharing of capital assets like cars is a leading example of how emissions can be reduced through social means, rather than efficiency engineering in infrastructure and control systems.

Fourth, cities will need to learn to be good civic laboratories — places where innovators can rapidly prototype smart technological solutions to unique local problems. There is a tremendous variety in the pre-conditions for smart cities to develop in the Atlantic Basin. Differences between north and south include retrofitting versus new development, different computing paradigms (PC versus phone), differing capacity of governments, and different norms for citizen engagement. But just as IBM's marketing pitch that "a smart solution in one city can benefit any city" glosses over the painstaking work of defining and solving local problems, every city can't reinvent the wheel every time.[153] We are already seeing the emergence of what can best be described as "computational leadership networks" for smart city technology that function like the C40 does for climate policy. Code for America is cross-fertilizing open source software amongst a network of U.S. cities. Living Labs Global, based in Barcelona, works with cities and SMEs to globalize smart city technologies much like multinationals do. They are becoming mechanisms of technology exchange between cities within regions and between North and South, cross-fertilizing software, algorithms, and data. In the future, a whole new set of platforms for global dialogue in this area will be needed.

Last and most important, smart cities need to focus on sustainable growth from the very beginning. If smart solutions to problems that constrain urban growth — crime, traffic, etc — are deployed before smart technologies that can reduce emissions and environmental impacts, it might only speed up the growth of megacities that are powered by today's dirty energy technologies. That would be an economic success story of epic proportions, but a global ecological disaster.

---

153 Back cover advertisement, Sep. 2011, *Scientific American*.

Conclusion

As the authors Townsend, Pierce, and Freed suggest, cities must grasp the opportunity for global collaboration and communication to meaningfully influence the form of current and future urbanization. For these partnerships to be innovative, relevant, and democratic, all three authors suggest that they must:

- Use geographic frameworks that are relevant to and/or potentially beneficial for a certain issue area or to explore shared values, opportunities, and connections. Development of an Atlantic Basic consciousness, for example, would better promote the flow of information between the cities of the North and South;

- Rely on constructive and inclusive dialogue that works with, and not against, existing global institutions and frameworks;

- Take advantage of existing institutions that support cities in their goal to collaborate and adopt lessons learned from ongoing cooperation on issues such as climate change; and

- Consider the opportunities and challenges presented by advances in information and communication technologies.

Urban scholars have commonly referred to cities as civic laboratories that tactically adopt proven innovations. Ultimately, however, any global goals must be translated to reflect local political, social/cultural, and economic contexts. The impact of any global conversation among cities will therefore be highly varied.

To balance creativity with risk, cities should take stock of their long-term goals, and the potential added value of the employment of new information technology, partnerships, and emerging trends. City leaders should ask what the ultimate effect on their citizens might be. Additionally, as these authors have shown, it is not only

the city that can drive innovations in this area but empowered citizens, NGOs, and international corporations, thus illustrating that the orbit of potential stakeholders is larger, more fluid, and more collaborative than once anticipated.

About the Authors

Neal Peirce

Neal Peirce is a pulse-taker of change in how cities govern themselves and prepare to face new challenges. Peirce was a founder of the *National Journal*, and before that for several years politics editor of *Congressional Quarterly*. He is the author of 13 books including *The Book of America: Inside Fifty States Today* (W.W. Norton & Co., 1983). He led the field in recognizing the vital role of metro regions with his book, *Citistates: How Urban America Can Prosper in a Competitive World* (Seven Locks Press, 1993). He is chairman and founder of the Citistates Group (www.citistates.com), a network of journalists, government analysts and civic leaders focused on the issues of building competitive, equitable and sustainable 21st century cities and urban regions.

Recently focusing on the challenges facing cities worldwide, Peirce was the lead author of *The Century of the City: No Time to Lose* (Rockefeller Foundation, 2009). He has also covered major U.N. and World Bank conferences on city issues. Peirce was awarded the UN-HABITAT Scroll of Honor Award "For a lifetime of journalism dedicated to reporting cities for a better urban future."

Adam Freed

Adam Freed is the director of The Nature Conservancy's Global Securing Water Program and a lecturer at Columbia University's Earth Institute. He previously served as the deputy director of New York City Mayor Michael Bloomberg's Office of Long-Term Planning & Sustainability. He represented Mayor Bloomberg on the Steering Committee of the C40 Cities Climate Leadership Group for three years and held several leadership positions in the Urban Sustainability Director's Network. Freed is a member of the American Institute of Certified Planners and a Mel King Community Fellow at the Massachusetts Institute of Technology.

A life-long urbanist, he currently resides on the Lower East Side of New York City with his wife and two sons.

Dr. Anthony Townsend

Dr. Anthony Townsend is an urban planner and forecaster whose writing, public speaking, activism, and consulting focuses on urbanization, ubiquitous computing, and technology-led innovation and economic development. He holds posts as research director at the Institute for the Future, an independent research organization based in California's Silicon Valley, and research scientist at New York University's Rudin Center for Transportation. Townsend was co-founder of NYCwireless, a pioneer in the community broadband movement, and was named one of Planetizen's "Leading Thinkers in Urban Planning & Technology" and "Top 100 Thinkers" tracking the Internet of things by Postscapes.

G | F OFFICES

Washington • Berlin • Paris • Brussels
Belgrade • Ankara • Bucharest • Warsaw • Tunis

www.gmfus.org