

URBAN PLATFORMS IN 2040

Thought Brief by Julia Root

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There is great interest and investment in cities today by government, entrepreneurs, academics, philanthropists, and citizen stakeholders. Our nation, like the rest of the world, continues to experience rapid urbanization. According to the 2010 Census, 80 percent of our nation's population now lives in an urban area.¹ More people are moving to and choosing to live in cities in the United States. Cities are seen as places of innovation, creativity, and entrepreneurial activity where density and diversity spawn unlikely encounters, inspiration for art and culture, new products and services, and the growth of business capital. Increasingly, with the partisan gridlock occurring in the federal government and the layered bureaucracy experienced at the state level, citizens offer a comparatively more optimistic opinion of their local government's ability to solve public problems.² Researchers and urban thinkers have suggested that in a dysfunctional political environment, cities may be increasingly better suited to tackling the political and economic challenges of the 21st century.³ Cities are becoming more responsive to the problems that have stagnated in Washington, like climate change or rising inequality. At the city level, government service delivery is more tangible and direct, with greater accountability and fewer layers between those who govern and those who use government services. Further, city residents are a part of the social fabric of their community and can use their knowledge, resources, and social capital to improve the quality of life in their neighborhoods and cities.

Cities must become more efficient and proactive because nearly all municipalities function with

constrained budgets. The federal government is providing fewer discretionary dollars, fewer resources targeted at urban improvements, and a lack of new programs designed for cities.⁴ With little federal or state guidance, the onus has been on cities to be deft and agile, creative and resourceful, and innovative and visionary in order to solve public problems. For some cities, with little innovation capacity and few local assets, the social and business capital that took several generations for cities to build could wither away as talent leaves and as cities' footprints shrink. Some cities struggle to remain relevant. They suffer from weak entrepreneurship, perpetually bankrupt systems, and old industrial models for economic development. When local governing systems fail, it only increases a growing pessimism about the ability of our civic institutions and political leadership to solve the critical issues facing society today.

Emerging trends in city governance, rapidly developing information and communication technologies, and new entrepreneurial models for business platforms could help shape a positive outlook for the economy in the year 2040. The urbanization occurring across the nation and world is unlikely to slow down. The good news is that cities and citizens are becoming more sophisticated at developing and using tools and disseminating new ideas. Urban areas are increasingly efficient at tapping into talent and resources and developing new assets for the 21st century.

This brief starts with a focus on our rapidly changing world in 2015 and then looks forward to 2040. It seeks to evaluate how “the city” is evolving into an “urban platform” and how new tech-enabled governance models and digital infrastructure will play an important role in supporting new economic growth.

In this brief, we explore what the role of cities could and should look like in 2040 and how cities could evolve to address a complex future. We discuss promising current developments and trends. Then we offer two speculations for what the city will look like in 2040 as a dynamic urban platform: a new organizational structure for how

municipal governments solve public problems, and a new regional, mega-city approach for economic development that is ripe for entrepreneurship. We return to the present to examine the infrastructure investments—in data, talent, technology, and broadband Internet—that will be required to advance a progressive agenda, as well as a list of questions to be considered. And lastly, we offer a set of recommendations to a fictional Mayoral Chief of Staff on ideas that could be implemented now.

PROMISING DEVELOPMENTS: THE CITY IN 2015

A digital revolution is fueling creativity, entrepreneurship, and the formation of new business models for sharing assets, processing data, and improving cities. Four emerging trends—the sharing economy, the Internet of Things, civic technology, and the “start-up city”—are dramatically impacting how citizens think about and engage with their urban environments.

MAKING NICE WITH NEW FRIENDS: THE CITY AND THE SHARING ECONOMY

The sharing economy (also referred to as collaborative consumption, the collaborative economy, the trust economy, and the peer-to-peer economy) has seen rapid growth and expansion across U.S. cities in the last year.⁵ Most prominently manifested in sites like Airbnb and Uber, which promote house-sharing and ride-sharing, the sharing economy provides consumers with a platform and network to buy, sell, and share resources and underutilized assets. The city has emerged as a virtual and physical platform that connects people, government, and businesses in new, transformative ways.

The sharing economy has emerged as a new type of market that fundamentally relies on density and ease of interaction within urban settings. It has become

a major disruptor for traditional institutions. These new businesses and digital institutions are bypassing existing organizations and markets to match needs and services in a new, dynamic way, in the process enabling fresh forms of peer-to-peer interaction and civic engagement. We are offered more choices, and new goods and services are available to order, pay, track, and rate through a smart phone. This new paradigm shifts the transactional industrial economic model to a collaborative one that encourages citizens and businesses to become active contributors, financiers, providers, and makers. Typically, as technology has advanced and progressed, the escape into virtual environments has been seen as one of isolation and disconnection from the physical reality. However, the technology that enables the sharing economy provides a virtual platform that connects people, strangers, in new ways that affirm trust and human connection, while at the same time promoting new market efficiencies and reduced transaction costs.

While the sharing economy presents new and exciting opportunities for connecting people with innovative products and services, the uncertain impact on municipal governments is unfolding in real time. A National League of Cities report on the sharing economy (specifically ride-sharing and house-sharing) notes that there is no clear consensus from cities on how to accommodate the new business models of these technology-enabled service providers.⁶ Policymakers are grappling with outdated regulatory frameworks that are not always adaptable for the sharing economy, and stakeholders might not always have the expertise and convening power to create new laws. According to the report, cities across the country have had mixed reactions to the sharing economy. Some have embraced house-sharing but not ride-sharing. In some regions, statewide rulings have welcomed these new business models only to see local institutions implement restraints. Some cities have sued ride-sharing companies for failing to comply with safety regulations or operating illegally, while others are working collaboratively with these firms to find a mutually beneficial solution. Other cities permit new firms to conduct business but are actively

seeking ways to regulate the businesses through taxes and ordinance measures.

It is clear that these companies are no longer upstart experimenters. They have infiltrated urban markets, built a consumer base, and asked permission later. While cities sort out their individual policymaking and regulatory frameworks, the sharing economy is here to stay. It will be cities that must be responsive and proactive in finding solutions to new market conditions.

DATA, SENSORS, AND THE INTERNET OF THINGS

Small data, big data, and open data: we are living in a new era of data collection, analytics, insights, and knowledge transformation. However, generating all of this data is meaningless until it becomes usable information that can shape decision-making. In the process, we are expanding our human capacity to understand what works, generate new cross-disciplinary solutions, and measure success with data-driven methodologies.

In the last five years, data has become a powerful asset and tool for society and cities. Our public institutions have opened up troves of government data for civic and private actors to develop innovative applications that bolster new cross-sector partnerships and engage citizen stakeholders in new ways. In addition, rapidly advancing technology gains, combined with powerful processing capabilities and new methodologies for mapping information, are impacting policy design and government service delivery. These developments have made data-driven governance a real-time game-changer for addressing public problems. Cities, as exemplified by Chicago and its Windy City Grid and Array of Things projects, are building the infrastructure to derive meaning from the vast quantities of data and leverage agency and sensor data for new insights in decision-making and urban planning.⁷

The evolution of Information and Communication Technologies (ICTs) from computing and

communicating devices to sensing tools is changing how we interact with our urban environment. Data is being generated everywhere, and all the time. It is extracted from sensors in buildings and vehicles, it is collected from purchase transactions, it is crowdsourced through innovative apps and social platforms, and it is passively generated by mobile phones and other portable devices. Smart cities use digital ICTs to reduce waste and consumption, generate greater efficiencies, and engage with citizens. The city of Santander in Spain, for example, has been embedded with 12,000 sensors that monitor everything from parking spaces and trash collection to pollution and traffic.⁸ The proliferation of smart phones as sensing platforms indicates how the commonplace sensing technologies like GPS, accelerometer, Wi-Fi, Bluetooth, microphone, and camera that are embedded in our phones enable citizens to monitor and engage in new ways with the city.⁹

The Internet of Things represents this ever-growing universe of devices that are connected to each other and the Internet. Cisco reports that there are more devices connected to the Internet than there are people in the world. Cisco predicts that by 2020 there will be about 50 billion things connected to the Internet.¹⁰ The modern world is deriving meaning, predicting outcomes, and identifying problems and solutions by quantifying behavior through sensors and user-generated social media. A Pew Charitable Trusts survey finds that the Internet of Things and wearable devices will have widespread influence by 2025, generating smarter cities with traffic and infrastructure sensors, improved manufacturing and less waste, and remote-controlled apps to monitor household activities, among many more innovations.¹¹ According to Michael E. Porter and James E. Heppelmann in the *Harvard Business Review*, recent advances could represent the third wave of technological innovation (after the introduction of automation in the 1960s and 1970s and the development of the Internet in the 1980s and 1990s).¹² This could result in a major disruption in how businesses design, invest in resources, and produce and market their products. The authors believe this trend will reshape industries: “The third wave of IT-driven transformation thus has

the potential to be the biggest yet, triggering even more innovation, productivity gains, and economic growth than the previous two.”¹³

CIVIC INNOVATION & CIVIC TECH FOR THE 21ST CENTURY

Civic engagement has long been a point of pride for American democracy since its’ founding as has been noted in Alexis de Tocqueville’s writings about America in the 19th century. Additionally, the US, and most notably Silicon Valley, has been a worldwide leader in developing new disruptive technologies. Now this innovation edge along with greater advancement and more accessible computing power combined with new inspiration for improving our public institutions driven by millennials and other tech minded citizens, has seen an explosion of civic innovation as field of interest. Civic Innovation can broadly be defined as a collective movement to improve cities through the implementation of tools, ideas, and engagement methods that strengthen the inter-relationship between government and citizen stakeholders.¹⁴

The last several years has seen a surge of new organizations, entrepreneurs, and investment in the field of civic technology or “civic tech”, a sub field of civic innovation. A California Civic Innovation Project’s report on the 2050 City views civic technology, technology for the public good, as an enabler (not driver) of this emerging field.¹⁵ This includes new digital crowdsourcing platforms, citizen applications, and new strategies for using current technology, like using smart phones to send and receive text messages between government and citizens. These tools are helping to enable government innovation and citizen engagement. A 2013 Knight Foundation report mapped the growing field of civic tech and identified 11 clusters of civic tech activity that fall into two categories: open government (data access, data utility, public decision-making, resident feedback, mapping and visualization, and voting) and community action (civic crowdfunding, community organizing, information crowdsourcing, neighborhood forums, and peer-to-peer sharing).¹⁶

Citizen stakeholders and civic hackers are using open-government data to produce apps that are transforming how citizens interact and engage with each other and their urban environment. For example, apps use public transit data and GPS information to enable residents to track their transportation options and inform their choices on how to navigate their city or commute to work. Civic crowdfunding sites, like ioby.org and citizinvestor.org are digital platforms that connect neighbors and community members to support local projects or help fund projects with public investment, like city parks. Technology-enabled and open source platforms for collaboration, like loomio.org, allow residents to crowdsource their expertise, helping to map their insights to better inform government policymakers. New civic tech tools are also allowing a greater sense of citizen participation in governance, which has the potential to upend traditional power structures and influence government agenda-setting. A Knight Foundation report documented that approximately \$431 million had been invested in civic tech organizations, many of which did not exist five to seven years ago.¹⁷

Civic tech tools advance people's participation in government. Susan Crawford and Stephen Goldsmith in their book *The Responsive City* describe civic engagement and data analytics in the digital age: a "data smart city" is one that is responsive to citizens, engages them in problem-solving, and finds new, innovative solutions for dismantling entrenched bureaucracy.¹⁸ Their book details case studies in New York City, Boston and Philadelphia that demonstrate how data is transforming the very nature of policy making by making advances in how complicated public policy problems are understood from the beginning.

THE INNOVATIVE CITY

Cities have become entrepreneurial hubs for talent, technology, and innovation. Richard Florida, author of *The Creative Class*, and contributor at *The Atlantic CityLab* calls this trend the "the start up city". He explains how smaller cities, in addition to larger metropolitan areas, are becoming tech hubs.

He points to several megatrends—young people choosing to live in cities, new business platforms for start-ups, and venture capital investment in tech hubs that are sprouting up in cities of all sizes. Local governments have also taken a leadership role in helping tech ecosystems grow in cities through research and development partnerships, academic networks, tax credits, and applied sciences investments.¹⁹

Young people, and many others, are choosing an urban lifestyle that promotes walkable neighborhoods, access to arts and culture, and a diversity of people and opportunities that can generate spontaneous interactions. A recent *New York Times* article, "Where Young People are Choosing to Live," reports on Census data that finds "the number of college-educated people age 25 to 34 living within three miles of city centers has surged, up 37 percent since 2000."²⁰ In addition, Florida notes, with new cloud-based business platforms for managing inventory, operations, and human resources, companies and startups can do a lot more with less, and with a smaller footprint. It's also easier for them to scale and refine products and target their customers living in cities, who are often the early adopters. Furthermore, downtown areas and urban industrial areas offer cheaper rents.²¹

City governments are smartly capitalizing on the resurgence of downtown neighborhoods while at the same time promoting policies that create the conditions for innovation to happen. Bruce Katz and Jennifer Bradley of the Brookings Institute, authors of *The Metropolitan Revolution*, cite the emergence of urban innovation districts as a new tool for "re-conceiving the very link between economy shaping, place making and social networking." According to Katz and Bradley, these regions are comprised of "leading-edge anchors and companies that cluster and connect with start-ups, business incubators, and accelerators." They show how policymakers are recognizing the inherent financial, physical, and network assets of cities and using these assets for local and regional advantage to encourage entrepreneurship and spillover innovation.²²

Government innovation, while not a new field, has seen a proliferation of new structures, roles, and public–private investments in the last five years that together is building a worldwide movement for transforming how governments think about and design services. The Mayor’s Office of New Urban Mechanics in Boston and Philadelphia builds partnerships between internal agencies and outside entrepreneurs that explore how technology and design can better address the needs of residents. Cities across the country like Austin, Chicago, Davis, Kansas City, Los Angeles, Louisville, and San Francisco have chief innovation officers.²³ Organizations like the Rockefeller Foundation, Bloomberg Philanthropies, and Code for America, among others, are funding projects that invest in municipal programs like 100 Resilient Cities, Mayors Challenge Grants, and Code for America Fellows. Further, experimental governing for solving public problems is happening at the intersection of data-driven governance and a set of new interactive interdisciplinary planning approaches like open innovation and human-centered design. New digital platforms and innovations in civic tech are spurring greater collaboration and deeper engagement between government and citizen stakeholders.

THE CITY IN 2040: A DYNAMIC URBAN PLATFORM

The city as a platform connects supply and demand in a more efficient, diverse, targeted, and legitimate manner. An “urban platform” refers to how these transactions take place in the context of the city. In some cases, these interactions only occur because of a shared urban experience. In others, the digital platforms will expand markets and business opportunities from one city to the next.

The 2040 urban platform will have changed the way in which cities can solve problems. It will enable people, businesses, and government to address more diverse problems by removing intermediaries and producing more direct engagement between service provider and end user. The 2040 platform will be characterized by feedback loops that generate greater product and

service customization. Digital platforms along with traditional urban infrastructure will support business and civic entrepreneurs by reducing barriers to entry and enabling the business to scale more easily. All told, the 2040 urban platform will be a networked and entrepreneurial model that spurs new innovations in governance and business, upending years of status quo politics and gridlock.

INNOVATION IN GOVERNANCE

The economy of 2040 will benefit from entrepreneurial government models that seek to establish new collaborative ways of solving public problems that look to the expertise found in and out of government networks. This innovation in governance will be characterized by several key elements. Government functions and responsibilities will be organized in a distributed and decentralized way, data will be open, accessible, and standardized, and technology developments will continue to improve service delivery.

City government in 2040 will be structured in a radically new way. A decentralized model of government will shift the organization from vertical to horizontal, with a focus on small distributive networks of expertise that are mobilized to tackle specific public problems. This network model presents politicians and policymakers with the ability to tackle hundreds of things, not just an incoming mayor’s campaign agenda of four to six key issues. While the mayor still exercises centralized leadership at the helm of City Hall, her deputy mayors and leadership team oversee these distributive networks that are theme- and issue-based. While some traditional agencies like police, health, and transportation will still exist, the majority of policymaking will arise from intra-agency and issue-based teams. These teams will be responsible for testing solutions before advising on policy. They are charged with gathering the right people (with the right expertise) to solve a problem that has been diagnosed through evidence-based methods. As a result, the city is able to tap into the vast network pool and utilize innovative contracting and procurement methods that bring planning, subject matter, process,

and user experts into the public domain to apply their expertise to public problems.

This “Long Tail of Government” is bolstered by the integration of digital platforms for collaborating, funding, and scaling government programs that bring together diverse talent and resources not only from across the city but from across the region. Open data and analytic tools, as well as social platforms that enable people to connect directly with their government, mean that policymakers have many more tools at their disposal for evidence-based decision-making.

It has spurred hundreds of new public–private partnerships that, when subjected to rigorous data-driven oversight, provide the commons with new products and services that demonstrate real, measurable social impact. Local governments will become truly customer- and citizen-centric in designing services that are targeted to the specific needs of resident groups.

At the heart of this networked distributive order will be two key themes: data and technology-enabled service delivery. In 2040, data will be a tremendous asset unique to each city, with wide-ranging applications for public health, safety, and operational functions for the city as well as the national government. The open-data movement that took shape in the U.S. during the second decade of the 21st century will have evolved into a global model for open governance that has standardized how data can be shared across cities and regions. Technology will have enabled new ways for citizens to participate in designing public services and budgeting. Municipal governments, in an effort to deliver more efficient services and adapt to the digital native culture, will have focused internal efforts on the automation of government services. Cities in 2040 will be more in tune with the citizen user experience, and nearly all services will feature online customer ratings and rankings.

In 2040, local governments will continue to face dramatically reduced budgets and even greater service delivery needs. With better-targeted and

customized outreach, more residents will realize they are eligible for benefits, and there will be significantly less stigma associated with public benefits when they can be accessed online. Additionally, with the rise of the gig economy, many more freelancers and contract workers will require safety net services. Lastly, the proliferation of sensor devices and data also means that more information will be attainable for ascertaining the basic health, housing, and food needs of the city’s most vulnerable citizens. City residents will become their own advocates, and leading civic organizations will take to city halls to express outrage at the vast inequities experienced across socio-economic groups and neighborhoods. As a result, city officials will be confronted with myriad pressing funding constraints for serving their constituents. At the same time they will be forced to consider regulations for the impact of this data on health insurance, education, and housing markets, among other domains.

These concepts once seemed revolutionary and at times far-fetched, but it will have become apparent by 2020 that the old top-heavy, industrial model of governance was drowning in its own bureaucracy. Government had become incapable of responding to the limitless number of actions, campaigns, social movements, and interactions spurred on by citizen stakeholders who, once given access to data (and taught in advanced secondary school practicums how to analyze it and design new apps), were relentless in demanding better solutions and more efficient outcomes for their tax dollars.

INNOVATION IN BUSINESS/ EXPERIMENTATION

The economy of 2040 will be characterized by the role of cities and metro areas as centers of experimentation, which will be teeming with interesting experiments and solutions to make the United States a paragon of global innovation and social and economic progress. For many markets, race-to-the-bottom strategies to recruit businesses, chase sales, or raise property tax revenues to generate economic growth will have now been replaced with

a much more sophisticated understanding of what it takes to create value in the economy. By 2040, there will be a noticeable demise of micro-interventions, which will be replaced with more comprehensive, systemic solutions at scale. The desire for greater productivity, greater income and wage growth, and greater output will not be just a macro-economic objective but will also now be a goal for every region of the United States. As a result, the 2040 economy will have a new political force of civic actors who are leading economic and business development efforts. It will no longer be mayors who drive the local and regional agenda, but instead a network of business, civic, political, university, and philanthropic leaders, all working in concert on a whole new set of value-added strategies. These networks will be augmented by smart city sensors and data analytics, resulting in a near perfecting of regions, expertise, and strategies for research and traded sectors.

Cities themselves are networks of government, civil society, and business actors that each rely on the other for the production and consumption of goods and services. With the success of innovation labs and the changing structure of government institutions that allow for more distributed power, the economy of 2040 will be marked by an emergence of a new regional approach to leveraging local assets. Cities will no longer view their economic development pursuits in isolation or in competition with other cities. Instead, cities will actively look for ways to generate mutual gain from collaborating on regional economic goals. This will be enabled partly by the expansion of business, funding, and social platforms that will allow networks of people and business to work together. New funding vehicles will create market-oriented solutions to address market failures in local communities and will connect entrepreneurs with ready capital. Investors will use these platforms to invest in the next big idea for the civic and public marketplace. These funding platforms will also revolutionize venture capital and ownership stake in companies. The relatively new civic crowdfunding platforms that began to spread in 2013 and 2014 will have given way to a version 4.0 which, when taking into account public sector projects, will do more

business than the popular Kickstarter site that started the whole trend. Further, these platforms and cloud-computing capabilities will enable entrepreneurs to capitalize on broad networks to commercialize their products and services.

Once a nebulous concept in the early part of the 21st century, the Internet of Things will have exceeded expectations as a game-changing technological disruption that will produce dramatic effects across all industries. Additionally, these new technological advances that will have occurred at a rapid pace will have spawned many new products and services across sectors and will have broadened the limits of what doctors, scientists, engineers, and researchers only dreamed was possible mere decades ago. Since many high-tech firms will have made the move from suburban office parks to cities like Seattle, Las Vegas, San Francisco, Boston, and New York, cities and regional economies will be uniquely positioned to capture the business rewards of these new technological and biomedical advances.

These new platforms and sensing devices will have created a surge in entrepreneurship, as many try their hand at starting business. But many new businesses will also mean many failed businesses as well. This could create an uneven market development across cities. While these new digital platforms will reduce business transactions between intermediaries, there will be an important role for intermediary agents and organizations that act as connectors and bridges in the networked world. In 2040, there will still be a need for interpersonal connections and relationships, and there will be a greater need for events and convenings that bring stakeholders together to solve the great dilemmas of the time.

OUTCOMES: NEW INFRASTRUCTURE REQUIRED

In order to achieve these objectives, new infrastructure will be required.

DATA

The 2040 economy will be characterized by a wealth of data that defines everyday life. Institutions and people are faced with the managing and sharing a tremendous amount of data. Cities will prioritize secure data infrastructure to warehouse, store, and analyze big data and open data.

MATCHING

The networked and distributed model of governance of the 2040 economy will require a sophisticated identification system for expertise matching. Businesses and governments are both looking to find, vet, and employ individuals who have the niche experience to solve dynamic and pressing social and business problems. A matching system will enable individuals and networks to crowdsource for solutions.

Automation and Technology-Enabled Services

The economy of 2040 will deliver the greater automation of government services, which will require an investment in cloud-based technology and the training of the government workforce to use and monitor these tools.

CITYWIDE BROADBAND ACCESS

In 2040, the rapid pace of technological advancement will mean that smart devices are part of everyday life. They will be given to patients by doctors to monitor health and environmental conditions, and they will be provided to workers to gauge stress levels and used by teachers to boost student learning. Smart phones will become critical lifelines that many individuals use to connect to services and will be ubiquitous across socio-economic classes. Therefore, it will become a necessity that all residents have access to high-speed broadband Internet.

QUESTIONS (BASED ON OUTCOMES)

- What impact will the new economy have on

traditional sharing platforms such as airports, taxis, hotels, schools, libraries, and fire and police services?

- How can cities be active beneficiaries in the new sharing economy?
- How will cities balance entrepreneurship with regulation? With the increasingly fast pace of technological and social advancements, what must this balance look like to encourage innovation but also allow governments to potentially regulate new industries like sharing economies?
- Will government employees be able to keep pace with the rapid development of ICTs? Will they be able to discern between trend and functional use and short-term versus long-term value?
- How are institutions and people preparing for the onslaught of data?
- Who will pay for the new infrastructures? How will government plan for data security and invest in safeguards for public data?
- Can government publicly fail while experimenting/innovating and still maintain public trust?

GAME-CHANGING ADVICE TO THE MAYOR'S CHIEF OF STAFF

These recommendations take into account current trends and speculations for how a dynamic urban platform can build a thriving economy, enable government to deliver high-quality, customized services, and generate an entrepreneurial climate in which businesses and people want to invest and live.

- **Innovation Labs:** The 2015 economy is testing open innovation. There are action learning labs in university settings; new applied sciences schools that use the city as a living laboratory to research, test, and prototype solutions; innovation districts in cities; and new structures, roles, and training for government employees to develop and implement innovative ideas. In 2015, many of the innovators exist on the margins in using networks, trust, new resources and capabilities, data, and feedback loops to

bring about institutional change. There is an opportunity to formalize innovation labs as part of city governance and specifically address the talent gap facing municipal government. New practices can help civic and business leaders work together in government or work with government officials with greater ease, resulting in more knowledge and skill transfer between sectors. The government could make it easier to procure services or contract employees for short-term engagements from six months to two years. Additionally, a funded mandate with directed resources beyond a chief innovation officer can bring about greater impact and longer-term institutional change.

- **Publicizing Failure as a Necessary Part of Innovation: “We Learn When We Fail” Website for Cities:** The city must find ways to celebrate and publicize innovation and experimentation in service delivery. By promoting key learning in an online and public setting, the hope is that public agencies will not be subjected to “gotcha” hype. Further, they can be proactive in sharing information with mixed results or highlight iterations that are changing the course of decision-making.
- **New Credentials for Public and Business Management:** With the onslaught of data on cities that will be entering the public domain, organizational leadership will be looking for a new skillset from business and public management and public policy programs. Graduates will need to enter the workforce as strong critical thinkers. The 20th-century management skill set focused on how to solve problems. With so much data accessible, the 21st-century management skill set will instead be focused on defining and diagnosing problems. Leaders will also need to be versed in tech project management, design thinking, agile development, quantitative analysis, and urban science.
- **Reengineer Government:** In order to tap into expertise in more efficient ways, the government organizational structure needs to be redesigned to be better networked and distributed. The current organizational structure of our institutions

is an archaic, industrial economic model that is not conducive to solving the cross-disciplinary nature of complex urban problems. Government must become an adaptive system. People, expertise, ideas, and data need to be mobilized in quicker, more agile ways.

- **Citizen Sensor Technology Infrastructure:** There is enormous business potential for the development and use of sensor technologies to improve products and services. However, how can municipal governments support an open data collection and sharing system that citizens can interact with and use to improve their quality of life?
- **Regulate Broadband:** By 2040, access to the Internet will become a right. It will become the role of cities to ensure that all citizens have equal access.

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