

Technical Note on Smart Cities

Abstract

This Technical Note documents the core messages from the Technical Deep Dive on Smart Cities (SC TDD) held on Nov 14 – Nov 18, 2016 by World Bank TDLC. Key takeaways are (1) ICT and open data enables a higher degree of citizen engagement both in developed and developing cities, provided appropriate application; (2) cities must consolidate investments in institutions and infrastructure to pursue innovation and competitiveness, laying the foundations for policies aimed at enterprise support, skills and innovation; (3) creating and building consensus on long-term win-win situations are essential for building a good relationship between the public, private, and academia with equally divided responsibilities.

Learning from TDLC's Technical Deep Dives (TDDs)



Smart Cities and Client Challenge

Rapid urbanization and the ICT revolution are two key trends for cities around the globe. Today, more than half of the world's population reside in urban areas, and this number is expected to increase to two thirds by 2050. Given the significant population influx, it is becoming more and more difficult for cities to meet the rapidly increasing demand for core infrastructure such as clean and adequate water supplies, electricity, sanitation facilities, efficient public transport, and affordable housing. Given their burgeoning needs, cities are looking for ways to become "smarter" in providing infrastructure and urban services, and this is especially true for middle and low-income countries who must tackle competing demands in the face of severe resource constraints.



Smart Cities broadly refers to next-generation urban development, often involving the use of ICT and other high technology for cost reductions and energy efficiency. However, in addition to these aspects, there is a third important dimension: livability and competitiveness. Enhanced ICT connectivity not only improves efficiency and fosters competitiveness but also ensures inclusiveness through citizen engagement and enables the

provision of higher-quality infrastructure and urban services, thus allowing for both further economic growth and improved service delivery. Encompassing these three dimensions, the SC TDD focused on how to successfully plan and implement Smart City initiatives in order to achieve competitiveness, energy efficiency, and enhanced livability and inclusion.



Internal Scope and Capacity

Cities' internal scope for actions is limited by their administrative powers, geographic boundaries, and fiscal resources. Increasing internal scope through enlargement of the three aspects is effective in creating positive outputs for competitiveness, on the condition of commensurate internal capacity for implementation. (World Bank 2015) A similar conclusion can be expected for Smart City initiatives of which competitiveness is a crucial factor, and it is important for cities to possess adequate capacity in order to fully capture the opportunities offered when their internal scope is increased. Clients from Panaji (India) and Quito (Ecuador) have a need for capacity building by exposing policymakers to the value propositions, detailed methodologies, and best practices of Smart City initiatives. Since cities have varying amount of available resources, it is also important to gather support from fellow neighboring cities, different tiers of governments, and private stakeholders in areas where they cannot implement by themselves.

Coordination between the Public, Private, and Academia

Compared to other urban schemes, Smart City initiatives require greater cooperation from private stakeholders since they often involve innovative ICT technologies. In order to gather extensive support from private stakeholders, public entities must set a strategic direction together with private stakeholders to create an enabling business climate within their city that will attract private stakeholders and enable them to remain competitive. Additionally, imprinting the “upfront investment” mindset into private stakeholders through educational campaigns is another important aspect. Formalizing stakeholder engagement processes is mutually beneficial. For example, one of Castries' (St. Lucia) biggest challenge is to build consensus on a shared vision with different tiers of the government, especially the national government. While Panaji and Maputo (Mozambique) lack coordination, particularly between the public, private, and academic sectors, as one of their key challenges. In Quito, partnerships between the public and universities/research centers are also found to be exceedingly important. Building a robust Public-Private-Academic-Partnership is a key to the successful planning and implementation of enduring Smart City initiatives.

Financing for Necessary Infrastructure

Smart City initiatives often require special infrastructure in addition to core infrastructure, requiring large upfront planning efforts and investments. In Johannesburg (South Africa), costs for necessary infrastructure such as network expansion are proving to be a heavy burden for emerging cities. Well-planned upfront investments in Smart City infrastructure can often assist cities overcome financial barriers in the long run. City leaders

often struggle with the allocation of resources to improve sub-national business environments, including the provision of reforms or policies to better mobilize private investments. This is a persistent barrier to the implementation of Smart City solutions.

Gaining Understanding towards Change

Smart Cities require dramatic renewals of social systems and urban service delivery mechanisms for sustainability. This often requires engagement from citizens and private stakeholders crucial for project implementation, such as is the case in Quito. In Dhaka South (Bangladesh), contextualizing current business practices and gathering social acceptance from private stakeholders is a continuous challenge for them in addition to achieving social acceptance from citizens.

EXAMPLE: INTRODUCTION OF UBER

The example of taxi drivers in Argentina radically protesting against the introduction of Uber (photo below) illustrates this point well. After a slow process of dialogue initiated with private and public stakeholders, both of which had varying suspicions of the other, taxi drivers better understood that the conventional taxi industry and Uber could co-exist.

In order to build social acceptance, policymakers must involve citizens and private entities at an early stage to better understand their needs and concerns and to instill into them a sense of ownership. Smart City initiatives such as open data can be utilized to further promote citizen and private sector engagement.

Key Takeaways

“In today’s world, cities need to be “smart” to capture sources of growth, and being a Smart City goes well beyond an ICT strategy.”

Stefano Negri – World SME Forum

Japan is often referred to as one of the most innovative and competitive countries in the world. Its cities have successfully balanced economic growth and urban service delivery despite high population density. What actions did Japanese cities take? What can other cities learn from Japan’s experience? A few key takeaways include:

- ICT and open data can be utilized to promote citizen engagement and improve service delivery.
- Cities must consolidate investments in institutions and infrastructure to pursue innovation and competitiveness, thus laying the foundations for policies aimed at enterprise support, skills and innovation.
- Building a good relationship between the public, private, and academic stakeholders with engaged and continuous dialogue is crucial for Smart City initiatives.

ICT and Open Data

Incorporating ICT into urban infrastructure allows for more efficient operations and management, lower energy consumption and GHG emissions, and better-integrated systems. For example, Nippon Koei asserts that the ideal transportation management system for developing countries is an Intelligent Transportation System (ITS) through which all transportation modes are managed centrally. Policymakers should not forget that utilizing ICT is not only about efficiency. By setting clear objectives and combining with open data initiatives, ICT enables a higher level of interaction between the government and citizens.



CASE STUDY 1: LOCAL GOOD YOKOHAMA

Yokohama City exhibits one of the most advanced utilization of open data in Japan. Although Yokohama is the second most populated city in Japan, the recent national trend of population decline and aging poses new challenges for Yokohama including tax revenue decrease. Collaboration with private entities and citizens is essential for Yokohama since it will become increasingly difficult for the city to solve social challenges by itself. This is why Yokohama, like some other cities in Japan, is working on open data and open innovation as their key priority.

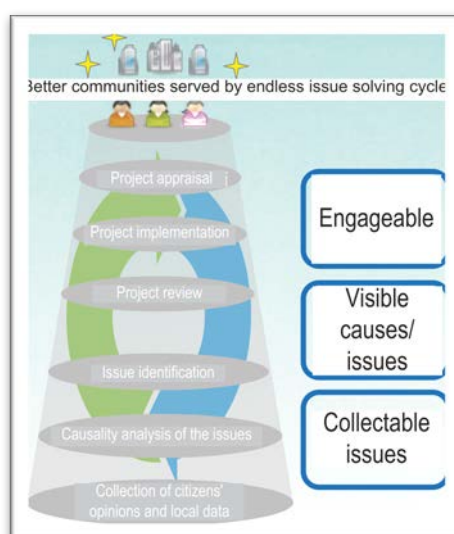
Converting raw data into CSV or Excel format is not sufficient to allow citizens and private entities to make full use of disclosed data. Yokohama City strongly believes that data must be processed and visualized together with potential users prior to disclosure. They started by hosting locally-focused hackathons, held social events to promote the use of the developed applications, and then went a step further to develop an online open data platform called Local Good Yokohama. On the platform, anyone can access local news, post a social concern, visualize disclosed data, start online conversations, and crowdfund a potential idea or startup. By facilitating dialogues among local citizens, Local Good Yokohama aims to foster social innovations driven by citizens themselves. As of November 2016, a number of projects have already been crowdfunded and successfully launched.

Local Good Yokohama was developed by Yokohama Community Design lab (YCD), which is an NPO aiming to connect existing local communities. YCD also operates and manages supplementary activities/facilities including a co-working space which members can use for any purpose such as meetings and startup offices. The Local Good Yokohama initiative is mainly financed by the co-working space rental



charges, advertisement fees collected from their local news media, and participation fees for seminars. Surprisingly, in 2015, only 10 million JPY out of the 60 million JPY budget was provided by the city. The partnership with Accenture is another noteworthy point in the development of the platform. The company has supported the initiative for four years, and this proves that there are private firms willing to provide support social initiatives if they find great social value in the project.

Currently, YCD is working to apply the “Local Good Model” to other cities in Japan and other parts of the world. Several Japanese cities have already adopted the model, and news editing offices have already been set up in eleven foreign locations. The creation of a guide manual on how to utilize ICT to facilitate citizen engagement is also underway. YCD claimed that the introduction costs for the model would be very small, provided the existence of some able engineers, and have high hopes that the model can help some of the participant cities.



CASE STUDY 2: "MOPA" FROM MAPUTO, MOZAMBIQUE

MOPA is a new participatory monitoring program which invites citizens to digitally report problems in the waste management services. The inquiries are plotted onto a map and the information is relayed to the city council who enlist microenterprises to collect the unattended waste. Keys for MOPA's success were to understand the ecosystem, to discuss with the actual users, and to design for scale by using open data and standards. In addition to these aspects, delegates from Maputo emphasized that MOPA did not insist on any top-tier technology that is unnecessary. SMS is used as the media for inquiries since a large proportion of the population owns cellular phones instead of smartphones, and instead of describing the problem in text, users choose from six types of problems in order to prevent typos. MOPA is yet another example showing how ICT enables new ways of urban service delivery, but the key message here is that technology should be used for a purpose, not as a purpose.

"The point is, it is not about latest technology. It is about how we can use technology to solve the problem."

Eva Clemente Miranda, Private Sector Specialist, World Bank Group



Innovation and Competitiveness

For Smart Cities to thrive, their governments must promote open and cohesive collaboration with private stakeholders and citizens. Coordinating diverse activities towards the greatest impact will identify efficiencies that can be gained through data-driven sequencing and prioritization. This process can be sequenced: cities must first consolidate investments in institutions and basic infrastructure to attract people and firms to the city by guaranteeing livability and enabling business environments; then, having the foundations set in place, they can work on policies and interventions to enhance innovation capacity and human capital base and to support firms to grow by providing enterprise support and finance. Furthermore, successful cities often simultaneously implement policies to improve general business climate and proactive interventions to targeted individual industries. (World Bank 2015)

PROACTIVE INTERVENTIONS

Bilbao and Barcelona (Spain) successfully introduced new industries to their cities through their proactive cluster/industrial policies, and Kansas City (USA) attracted a large number of firms by having the Google Fiber implemented. Singapore is a successful example of attracting top-tier students through well-designed education systems, and California (USA) promoted competition for talent among local business by outlawing non-competition agreements between firms. (World Bank 2015)

Public-Private-Academic-Partnership

Strong relationships between the public and private sector provide municipalities options for the provision of infrastructure and urban

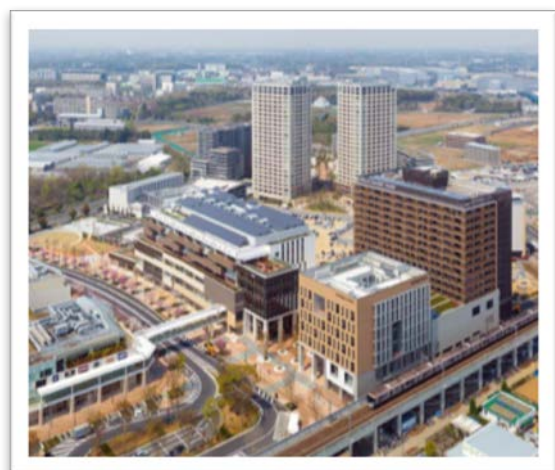
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services by utilizing private resources. For example, Yokohama City required developers to spare space for public facilities and to install basic urban infrastructure such as roads and sewage along with their residential or commercial buildings. Yokohama City explained that, in the end, such schemes benefit private developers through enhance land value, thus leading to a win-win situation between the public and private. Having such an arrangement in place, Yokohama City successfully invited prominent firms to their central business district by providing subsidies proportional to the firm's investment size.

In the SC TDD, participants went a step further and looked at a successful model of Public-Private-Academic-Partnership (PPAP). Being a major dormitory town in the Tokyo Metropolitan Area with two large university campuses, Kashiwa City aspires to become the next-generation academic city. The "Kashiwa-no-ha International Campus Town Initiative" was set as the vision for the city, and the "Urban Design Center Kashiwa-no-ha (UCDK)" was established as an implementation agency for the plans and initiatives. In the implementation of their Smart City initiative, the public, private, and academia equally share duties and responsibilities instead of the public bearing full responsibility. The project is mainly financed by the Smart City fund from the national government, but the development of



the city is mainly driven by Mitsui Real Estate (hereafter referred to as Mitsui), which is one of the largest real estate entities in Japan and the original owner of the land. The company considers addressing social challenges through urban development as their key priority, and the construction of a next-generation Smart City which fosters innovations and new industries is an important next step for them. Businesswise, Mitsui frankly admitted that it would probably take several decades to collect investment from this project alone. However, they see the project as an upfront investment to showcase a role model to other cities in Japan and the world, thus resulting in long-term benefits for the company. The academia also contributes in terms of finance, but their contributions are more centered around educational programs for youths, urban design workshops organized by students, and other such activities necessary to make Kashiwa an academic city. Universities also conduct many social experiments such as one in transport where a new on-demand bus system and a Segway service are operated in collaboration with the University of Tokyo. Lastly, from the public side, the national government provides funding as mentioned above and the municipal government position themselves in between the national government and Mitsui, typically requesting deregulations and subsidies on behalf of Mitsui.



Mitsui was forward-looking towards applying their Smart City model to other cities in Japan and the world. The Q&A session was very lively and participants were able to gain insights



directly relevant to the development of their city. Mitsui explained that some aspects of the Kashiwa-no-ha model can be applied to already existing cities by integrating existing infrastructure with ICT, not necessarily building a brand-new system. They also left participants a strong message that basic urban infrastructure should be planned flexibly in order to leave space for future uncertainties and opportunities.

Column: World Bank Smart Cities Conference

Participants of SC TDD joined the World Bank Smart Cities Conference (WB SCC) held in Yokohama City on November 17, 2016.

- **Session 1: Quality Infrastructure Investment (QII) as a Foundation.** Discussions on the quality infrastructure necessary for building Smart Cities such as connectivity, integration of latest technology and existing infrastructure, and the handling of data.
- **Session 2: Innovative Eco-Systems and Citizen Engagement in Urban Service Delivery.** Focused on how urban challenges can be addressed while ensuring citizen engagement by using ICTs, open data, and other means. Participants learned from ICT initiatives in Kobe City, open data initiatives in Hong Kong, MOPA from Maputo, Mozambique, and the 100 Smart Cities initiative from India.
- **Session 3: Beyond Service Delivery: How Smart Cities Can Trigger Innovation, Competitiveness, and Job Creation.**

Focused on understanding how public and private collaborations are essential for a city not only to deliver urban services but also to foster job creation. Panelists discussed how technology can contribute to cities in attracting new firms, further strengthening existing firms, and foster start-ups and entrepreneurship by providing new values such as enhanced connectivity and higher-value job opportunities.

- **Session 4: How to Generate Economic Benefit.** Topic on how Smart Cities can generate economic benefit. Strong government leadership and commitment, transparency, and continuous monitoring and evaluation of policies were identified as one of the key drivers of a successful Smart City initiative.

After Action Plans

On the last day of the SC TDD, each participant city created a detailed After Action Plan based on the key takeaways from the five-day experience. This section shows two examples from the presented plans to illustrate how the SC TDD helped clients to plan for a better way forward.

Casablanca, Morocco

After learning the case of Local Good Yokohama, Casablanca (Morocco) was very eager to use open data in the context of their 6-year development plan 2015-2020, which addresses mobility, life environment, economic excellence, and attractiveness. They hope that the Local Good Yokohama model will allow for reconciliation between city authorities and the citizens, enhance transparency, facilitate citizen participation, and create new businesses and applications. As their next step, they proposed to (1) conduct a large survey to diagnose existing information channels, garner citizens' needs, and call for citizen-originating solutions; (2) have universities and IT firms to collaborate and provide guidance and frameworks; and (3) launch a Hackathon.

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Quito, Ecuador

The site visit to Kashiwa City showcased a successful PPAP, and Quito was very happy to learn that synergy between the public, private and academia is achievable and actually exists. In order to address their biggest challenge, which is the lack of coordination among government institutions, and also to include academia in the process, Quito will first perform diagnostics of municipal entities to understand the kind of technological platforms they use. Based on the results, they will work out how best government institutions, private firms, and academia can coordinate with each other to construct a Smart City. They will also analyze the respective competencies of municipal entities that manage or interact with the mobility in the city and create an inventory of mobility projects with clear priorities.

Closing Remarks

Now that many cities understand the basic concept of utilizing ICT for Smart Cities, it is important for policymakers to expand their knowledge on how to better prepare for smooth implementation and on additional benefits cities can derive from pursuing Smart City initiatives. This will allow them to create Smart City strategies that are more on-the-ground and more able to capture opportunities. The SC TDD successfully provided pragmatic takeaways based on concrete examples and

site visits, and continuing discussions with a similar approach will enable World Bank clients and staff to better translate concepts into actions.

“I thought I was smart enough to understand Smart Cities, but as the discussion progressed, I became unsure of my own perspective. I learned so much from my peer cities, and now I feel I have a better understanding of Smart Cities.”

Khan Mohammad Rezaul Karim
Dhaka South City Corporation, Bangladesh

TECHNICAL DEEP DIVE ON SMART CITIES

The SC TDD is part of a knowledge exchange series bringing together experts and practitioners to share good practices and experience on specific technical subjects. The program was developed and organized by Tokyo Development Learning Center (TDLC) in collaboration with World Bank Smart Cities Knowledge Silo Breakers (KSB). The one-week program also gathered support from the City of Yokohama, the Japanese Government, and World Bank Competitive Cities KSB. Over 30 participants attended the program, consisting of World Bank's operational clients accompanied by their Task Team Leaders (TTLs).

REFERENCES / ADDITIONAL RESOURCES

- World Bank. 2015. Competitive Cities for Jobs and Growth – What, Who, and How – Washington, DC: World Bank Group.
- New Toolkit to Help Smart Cities be More Accessible: <https://cities-today.com/new-toolkit-to-reduce-smart-city-digital-divide/>

The Tokyo Development Learning Center (TDLC) program is a partnership of Japan and the World Bank. TDLC supports and facilitates strategic WBG and client country collaboration with select Japanese cities, agencies and partners for joint research, knowledge exchange, capacity building and other activities that develop opportunities to link Japanese and global expertise with specific project-level engagements in developing countries to maximize development impact.

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