CDO Summary: Smart Cities Component[1]
Nicole Goodman and Zachary Spicer

Introduction

The broad adoption of the ICTs, coupled with innovative methods of community engagement and government transformation, have altered the way in which we interact, communicate and receive services from our local governments. This component of the CDO project aimed to assess smart city development in Canadian communities. To date, the project has understood "smart cities" to be municipalities that harness technology to improve service production or delivery, enhance local economies and enhance participatory governance.[2] Specifically, three research questions guided this project:

1. To what extent are Canadian communities using digital infrastructure to become intelligent communities/smart cities, employing e-health, e-work, e- commerce, e-education and e-government to create digital opportunities for all citizens?
2. How do key stakeholders define and envision an intelligent community/smart city? Do ideals about these concepts differ based on the stakeholder group (i.e. residents, administrators, elected representatives)?
3. How can we define a smart city? What measures best assess community intelligence?

A series of papers and reports have been prepared to answer these questions. As the CDO project approaches its conclusion, this document presents key findings from the research and provides suggested implications for understanding opportunities in Canada's digital future.

Output concepts and major findings:

We conducted an original survey in conjunction with CDO partner Delvina with residents, local administrators and elected officials in Canada's 33 CMAs to better understand the ways in which communities across Canada are leveraging a range of digital technology, including concepts related to smart city development. For the benefit of respondents, we defined a "smart city" in the survey as: "*communities that invest in information and communication technologies and include residents in decision-making to contribute to sustainable economic development, a high quality of life, and wise management of natural resources.*"

Survey results were used in two ways. First, survey data allowed us to better understand how municipalities are using smart city technology and how impressions of technology adoption differ between residents, administrators and politicians. Drawing on a survey sub-sample of residents in Toronto, Montreal and Vancouver we adopted a variation of the Hutchison-Cohn approach, a smart city consultation strategy that carries out focus groups with key members of the community and outside experts to evaluate community intelligence and assess local smart city policy.[3] We find a divergence between the types of smart city services being put in place and the importance the public places on such services as well as the priorities of residents and administrators. We argue that this disjunction illustrates that city officials should consider public need to a greater extent in their planning and consideration of smart city implementation.

[1] Please note that some content and wording is taken directly from project outputs.
[2] Some additional terms are "intelligent community", "knowledge city", "sustainable city", "world (or global) city" and "future city". See Batagan 2011; Albino et al. 2015; Cretu 2012; Kourtit and Nijkamp 2012; Bakici et al. 2012;
[3] This paper is currently being revised for publication after being presented at the American and Canadian Political Science Association conferences.

We have also used survey data to produce a plain-language report on smart city adoption, which was developed in conjunction with Evergreen and the Association of Municipal Managers, Clerks and Treasurers of Ontario. The report finds that while attitudes among residents and municipal officials towards smart community building are generally positive, these groups have different perspectives regarding the trajectory and beneficiaries of these developments, which may have much to do with the consultation method employed – some local governments have admitted that smart city development plans are being drawn up and led by a small group within the city. Moreover, there is often a low understanding among residents concerning smart city project implementation.

In addition to our survey, we conducted semi-structured interviews in Nova Scotia's Annapolis Valley and Iqaluit, Nunavut to examine how rural communities were adopting technology in smart city programs. Analyses from these interviews detail the unique challenges small and rural communities face in adopting digital infrastructure, given they often suffer from capacity challenges that large urban centres do not. We find that collaboration is an essential component for the pursuit of smart city development in rural and remote communities.[4] We are currently developing an additional paper examining how Indigenous ways of knowing have influenced the process of community decision-making in the adoption of smart city technology in First Nation communities.

Finally, a portion of our work focuses on conceptual clarity. Existing smart city research uses a variety of terms to define smart cities and intelligent communities that have created a fragmented research terrain, which has been consumed with corporate driven sloganeering. We have written a paper to better understand what a smart city is, which ultimately provides a guide for future researchers concerned with evaluating and measuring implementation. The paper carries out an evolutionary concept analysis (an approach commonly used in the medical sciences) of current literature to achieve conceptual clarity about the term. The research identifies six core dimensions of a smart city: governance and management, ICTs, environment, engagement, economic development, infrastructure, planning and development. We suggest future studies should consider re-operationalizing the concept to avoid conceptual stretching and aid in the policy evaluation necessary in smart city implementation.

Key Implications for Digital Opportunity and Policy:

The smart city space in Canada is expanding rapidly, marked by two large developments that have occurred since the inception of the CDO project. The first is the Smart City Challenge that was introduced by Infrastructure Canada in January 2018. The Challenge, modeled on the US program of the same name, captured the interested of hundreds of municipalities across the country and focused attention on the acquisition of new smart city technology and programs. The second development is the Quayside project by Google affiliate Sidewalk Labs, which aims to build Canada's first "smart community" on Toronto's eastern waterfront. The project, thus far, has received mixed reviews, with many applauding the opportunity a firm like Sidewalk Labs can bring to what is arguably underutilized space along the City's waterfront, while others have raised serious concerns about equity, inclusion, data governance and privacy. These developments, coupled with the results from our research have promoted conversation about policy solutions. We offer our initial thoughts:

- Bring the public to the forefront: Our research demonstrates there is a disconnect between public attitudes towards the adoption of new technology and responses from decision-

[4] These findings are found in an article currently under review as part of a special issue of *Urban Studies*.

makers. Although technology is often adopted to improve the quality of the community, residents are not always as robustly consulted with, or listened to, about these policy and service changes. The process of adopting smart technology should include a component of resident consultation and outreach. Transparency of smart city developments (especially those on a scale like Quayside) needs to be dramatically increased.

- Focus on access: Policy should focus on expanding digital access This will ensure a level playing field for the community to meet digital opportunity when it is available. An interesting example along this front is "Digital C", a community based collective in Cleveland, Ohio that has the goal of connecting underserviced areas within the city to broadband and providing skill-building training programs within lower-income neighbourhoods.[5] While this is a charitable initiative, government should be focused on laying the groundwork for inclusive technology adoption within our cities.
- Strengthen national standards governing privacy, data use and IP: Most local governments do not have the capacity to address the privacy, data governance and intellectual property challenges that accompany smart city developments. Federal and provincial governments should create a national data governance framework or good practice guidelines for procurement and operations to aid municipalities with diminished capacity to act in this policy space.
- Make decisions through an "inclusivity lens": It is imperative policy makers at all levels consider the consequences of decisions made in the digital economy. This is especially pronounced in the smart city space given that local government delivers the majority of services Canadians receive. The further digitization of local services may have dire consequences for those without the necessary digital literacy or who lack the means to access digital services. The benefits of smart cities may very well accrue unevenly if we policy makers do not take proactive and dedicated actions to ensure opportunity in the smart city space is equally available.
- Improve procurement policies: Municipalities need to recognize that virtually every infrastructure project has a data component. As a result, procurement policies need to be designed with privacy protections in place and strong consideration given to the collection, use and storage of data.

All of this brings us to the question of who is driving this process. Our research suggests that historically the main driver appears to be the private sector. The largest development in this space is Quayside in Toronto. This development is driven by Waterfront Toronto but has raised questions about the involvement and ownership of private company, Sidewalk Labs, who have a mandate from their parent company (Alphabet Inc) to seek out tech-driven urban development. Likewise, the federal Smart City Challenge has attracted a great deal of interest from the private sector, which has moved into provide support to scale up winning projects.[6] At this point, the smart city space is marked by a near absence of government intervention and interaction with local networks to design and implement policies and programs for "inclusive innovation". This does not mean that government cannot be active in this area, but it has lacked either the interest or capacity to be adequately responsive to concerns about inclusivity in the smart city space to date. Though there has been progress in this area since the research, especially in larger cities like Mississauga and Toronto, there remains work to be done.

[5] For more information on Digital C, please see https://www.digitalc.org/

[6] See, for instance, Nokia's entrance into this space https://www.smartcitiesdive.com/news/nokia-launch-joint-program-canada-smart-city-projects/521627/