Open City Network

Briefing: Digital Public Infrastructure

December 2019

We don't know if the operating system for Canadian cities will be open source, or a closed system. Will it be under strong public governance, or run by private interests? Will it be a public park, or a walled garden?

Technology has collided with democracy in Canada

Digital and cultural transformation has always been difficult in the public sector. But today, technology is presenting new risks to the institutional health and democratic wellness of our cities.

The scope, scale and pace of change has accelerated across a range of technological fronts that impact almost all city departments. City bureaucracies are under big pressure to modernize, but are chronically underfunded in doing so, meaning it's harder to make adequate investments or respond to private sector disruptors. This, as cities continue to be weighed down by legacy systems and the complexity of transformational change while maintaining service levels and fulfilling statutory obligations.

IT departments used to be responsible for internal transformations within city hall. Now, with connected public infrastructure, they're also sharing responsibility for the external transformation of the city. This intersects with the full complexity of cities as public institutions and the challenges they face, in areas like:

- data ownership and commercialization;
- infrastructure planning and policy;
- cybersecurity;
- economic development and innovation;

- justice and civil rights;
- democratic engagement and oversight;
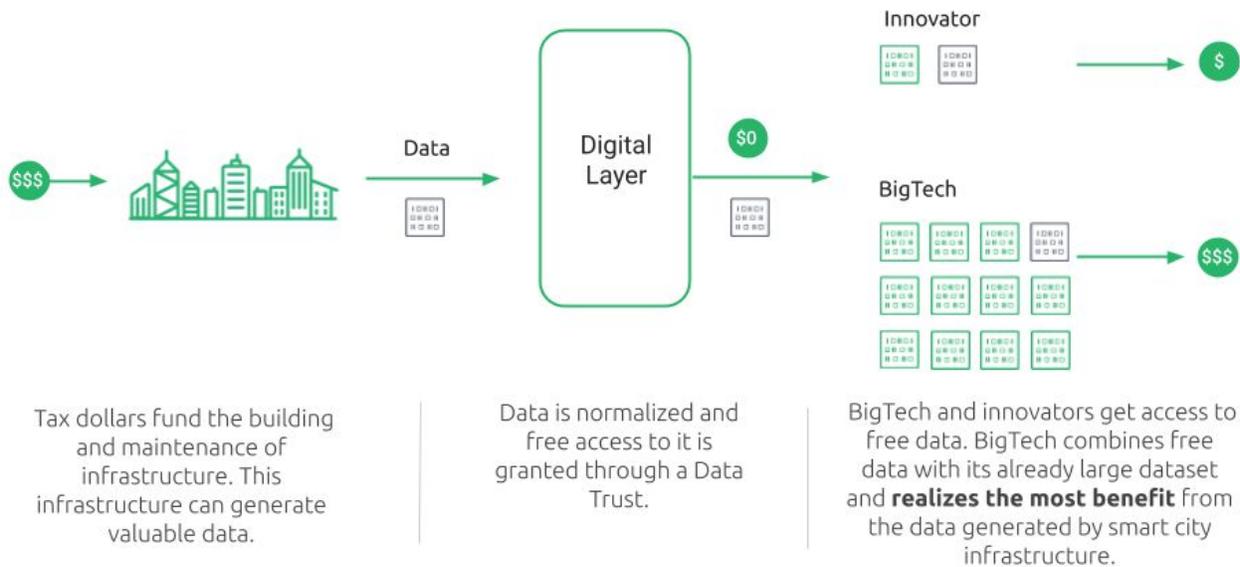- intellectual property;
- privacy.

Structurally, cities also remain the poorest order of Canadian government, with the least taxation powers, and fewest internal resources for public policy or innovation work. The net result is that, through no real fault of their own, local public institutions are far from harnessing the full transformative potential of the Internet, digital platforms, open source software, embedded computing, and the ever-growing array of emergent technologies and applications.

On the tech side of things, the prices for sensors and network access are steadily falling, leading to steep growth in the number of connected sensors deployed on public infrastructure. This creates similar growth in structured, machine readable data - the data upon which lofty smart city visions depend.

Information Created Worldwide =
Expected to Continue Accelerating
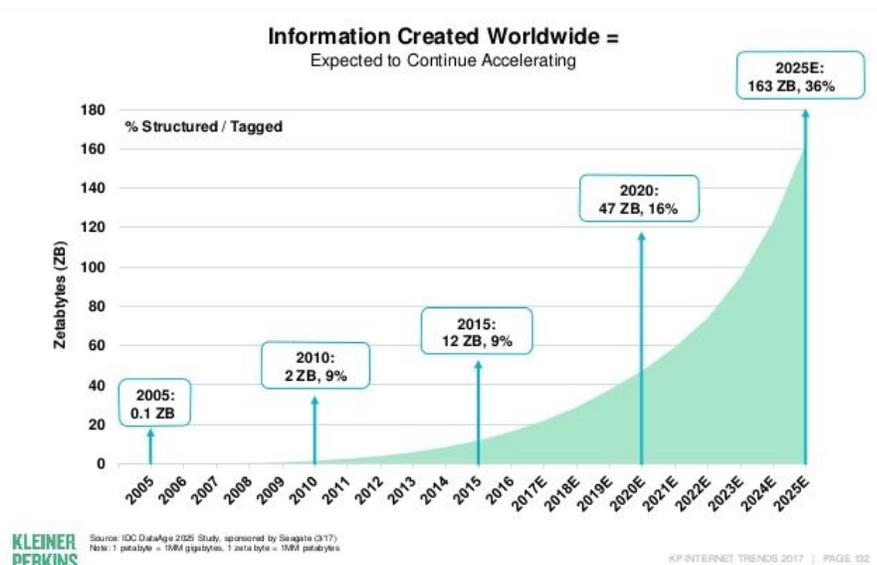
Translating traditional models of open data into this new landscape can have an unforeseen potential consequence: a massive transfer of wealth from the public to the private sector. The value of a piece of data is relative to what other data the actor has, and can correlate it with. This situation (an information asymmetry) means that if the growing amounts of clean, structured data generated by public infrastructure are made freely available, large private actors may reap the most financial benefits, while the public sector and smaller Canadian innovators get the smallest share.

What will happen to the value of public data?

Tax dollars fund the building and maintenance of infrastructure. This infrastructure can generate valuable data.

Data is normalized and free access to it is granted through a Data Trust.

BigTech and innovators get access to free data. BigTech combines free data with its already large dataset and **realizes the most benefit** from the data generated by smart city infrastructure.

While we are not yet in a widespread position for cities to safely unlock the value of its data, we must protect it while our public institutions explore if it is possible to do so in the public interest. This is a potential source of capital to fund the modernization required of our cities.

All of the above are the reasons for the challenging journey of the Toronto Quayside project to date. While the land on the waterfront was a blank slate, in terms of public policy and governance, the project burst into a complicated space at the intersection of technology, cities and democracy.

Two main lessons from Quayside to date

Quayside revealed that our collective understanding of doing smart city work at scale is not where it needs to be. At least, not if we want to do this work and protect vital aspects of the public domain. Normal city business now intersects with a long list of unsolved societal challenges which no city is set up or resourced to solve alone. The decisions we make today will have generational ramifications for these vital democratic institutions.
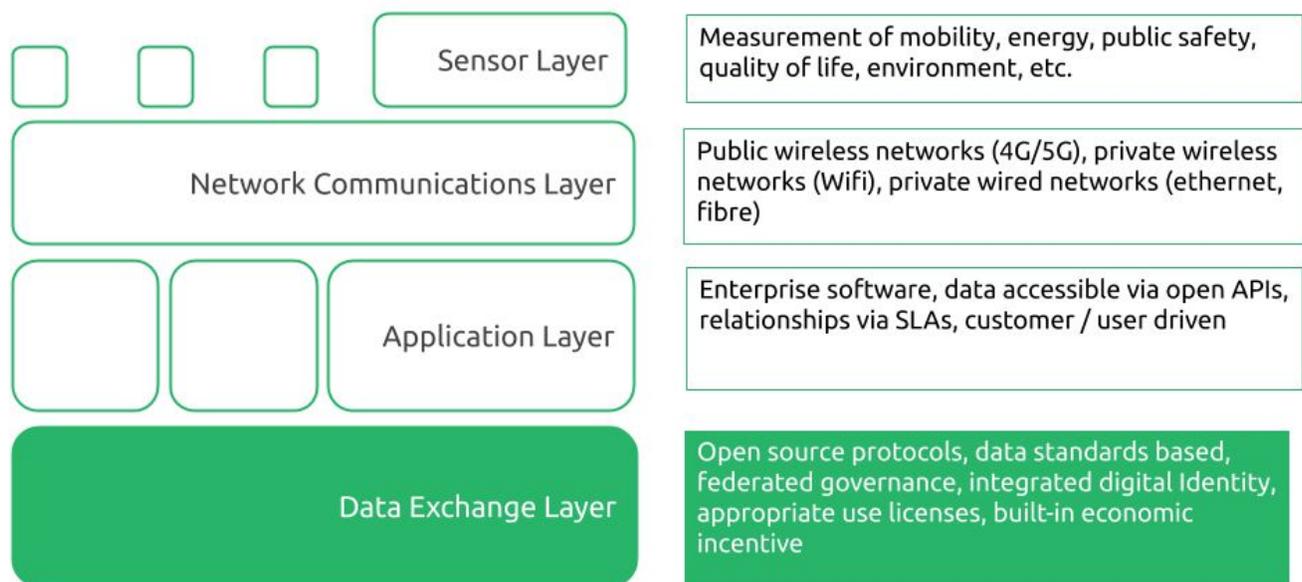
There are two main lessons from the project to date:

1. **Tech innovation is compatible with strong public governance.** While Waterfront Toronto has difficult work ahead, it took the right step in discarding the Sidewalk Labs proposals which grossly exceeded the scope of the original RFP. Contrary to the warnings made by Sidewalk Labs' public relations and lobbying campaign, the project continues.

2. **The most important issue when doing smart cities at scale is: who will build, set the rules and ultimately govern the underlying technology architecture.** This digital layer will be like an operating system, built on common standards and protocols which form a digital exchange layer. This is like X-Road, the digital layer underneath Estonia's world-leading e-government system, or the early work on the Canadian Digital Exchange Platform.

An operating system will eventually emerge for Canada's cities, underpinning the full range of public sector responsibility. It is where we will embed the answers to big societal questions around digital governance, privacy, value capture, and more.

On Quayside, let's assume that Sidewalk's original MIDP proposal was approved and implemented. It would have outsourced critical functions of government to Sidewalk Labs. Once you embed that level of private interest into the lifeblood a public sector organization, it would never come out. It would become the ultimate legacy system.

Architecture Concept : Digital Public Infrastructure

Sensor Layer	Measurement of mobility, energy, public safety, quality of life, environment, etc.
Network Communications Layer	Public wireless networks (4G/5G), private wireless networks (Wifi), private wired networks (ethernet, fibre)
Application Layer	Enterprise software, data accessible via open APIs, relationships via SLAs, customer / user driven
Data Exchange Layer	Open source protocols, data standards based, federated governance, integrated digital Identity, appropriate use licenses, built-in economic incentive

Today, we don't know whether that operating system for Canadian cities will be open source, or a closed system. Will it be under strong public governance, or heavily influenced by private interests? Will it be a public park, or a walled garden?

Canada needs digital public infrastructure (DPI) for our cities

The biggest risk posed by the collision of technology and democracy is that we may insert ungovernable technology into the heart of our cities, in the form of a private exchange layer to underpin critical public systems. This would cause a decline in public governance and control over our own infrastructure, digital systems and public data. This would be practically irreversible.

The solution is to build digital public infrastructure: smart city architecture, standards and exchange protocols, and to maintain them as critical public institutions, under public governance.

A focused effort to build digital public infrastructure can neutralize the democratic risk posed by a private exchange layer and serve as the foundation to modernize government at scale, by:

- delivering the major digital public works projects at the heart of smart cities. We can build systems that emphasize open architecture, the interoperability of government, public governance and which protect public data;

- embedding our democratic values in the technology that will run our governments, creating ongoing mechanisms for public oversight, maintenance and iteration of those systems;

- driving the economic benefits of modernization not to a few multinationals that may capture it, but to re-invigorated public institutions, a vibrant Canadian technology ecosystem, and more broadly to Canadian society;

- exploring how to unlock the value of public data in the public interest, creating a means to fund the significant infrastructure and technology investments required to modernize city institutions;

- catalyzing the sustained investments required in the digital and cultural modernization of our city institutions.

Open City Network

While all Canadian cities will need to confront this issue, Quayside has revealed a gap: there's no organization with the mandate, funding or coalition working to build DPI at the scale required for cities across Canada, nor are cities naturally set up or resourced for the collaboration that's needed.

The Open City Network is a not for profit founded in Spring 2019 to work with cities to build DPI as public infrastructure. Our members make up a working coalition across the public, private and NGO sectors. For cities in particular, the OCN aims to be a window into complex issues at the intersection of tech, cities and democracy, which affect all cities but which none can solve alone.

New national standards

The Open City Network is currently in discovery for a suite of national digital public infrastructure standards, covering data generation, exchange, and governance. This would codify vital rules, guidelines and policy choices into standards that could be used:

- As a reference document or roadmap for responsible smart city technology development, helping create open and interoperable municipal infrastructure and services, which neutralize democratic risk and information asymmetries;
- As a requirement in municipal IoT procurement;
- As a guide the development of the DPI exchange layer for our cities.

This work will proceed through our partnership with the CIO Strategy Council.

OCN membership

Jenna Sudds, Ottawa City Councillor

Funding and governance

We are a member-supported not-for-profit organization. The OCN received one-time start up support in 2019 from Compute Ontario, not-for-profit funded by Ontario's Ministry of Economic Development, Job Creation and Trade.

Our Board of Directors includes public, private and not-for-profit organizations:

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Partnerships

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