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# CASE STUDIES

INNOVATIVE GOVERNANCE OF LARGE URBAN SYSTEMS

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## Quayside **Smart Community**

**Case Study of Sidewalk Lab's  
'City as a Platform'**

**William Lim**



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# Biography

William Lim is a new urban technology professional focusing on the design, build and implementation of digital technologies to fulfill a vision of smart cities and intelligent communities. Mr. Lim is actively involved in Toronto's emerging urban technology sector and has participated in Waterfront Toronto's public consultations for the development of Quayside. He is a member of the Community Advisory Group for City of Toronto's Digital Infrastructure Plan.

# Abstract

Sidewalk Labs offered a unique vision of a new kind of mixed-use, complete community on Toronto's Eastern Waterfront at Quayside, which they called their 'city as a platform.' Key to this vision was a digital layer of highly complex digital infrastructure and systems that enabled the creation and management of digitally-enabled services. Their plan to build a digital layer would enable connectivity, access and data integration across the components of the city's physical layer. This cross-component integration suggests the potential for deep data interlinking between components of the digital layer with the city's physical layer. Sidewalk Labs' 'city as a platform' highlighted the potential high levels of complexity in the way interlinked systems and data flows interact within the digital layer, the potential unexpected outcomes in the physical layer and the diverse concerns about digital governance. Therefore, as this case study examined, planning for this transformation requires a holistic evaluation of the digital layer, the digitally-enabled services and its impact on the political, social, economic, institutional, and environmental dimensions.

## **B**ackground

In October 2017 Waterfront Toronto (a tripartite agency established by the Government of Canada, Province of Ontario and the City of Toronto) announced that it had selected Sidewalk Labs (a Google Alphabet company) as their innovation and funding partner “to design and develop a new kind of mixed-use, complete community on Toronto’s Eastern Waterfront.” (Waterfront Toronto Press Release, October 2017) Beginning with the creation of a smart community called Quayside, the new partnership, named ‘Sidewalk Toronto,’ promoted new technology innovation that “can address urban challenges such as sustainability, resiliency, economic development and prosperity.” (Waterfront Toronto Press Release, October 2017) On May 7, 2020 after almost two and a half years of joint planning, community consultation and civic engagement, Sidewalk Labs decided that they will no longer pursue the Quayside Project. (Doctoroff, May 2020)

Sidewalk Labs offered a unique vision of a smart community at Quayside, which they called their ‘city as a platform.’ Key to this vision was a digital layer of highly complex digital infrastructure and systems that enabled the creation and management of digitally-enabled services. However, as this case study examines, this transition to digitally-enabled services will not to succeed without the clear understanding of the political, social, economic, institutional, and environmental dimensions that must guide Quayside’s transformation into a smart community.

### **Problem Statement**

A key aspect of Sidewalk Labs’ ‘city as a platform’ proposal was their plan to build a digital layer that enables “connectivity, access and data integration across the components of the city’s physical layer.” (Sidewalk Labs, March 2018 p. 27) This cross-component integration suggests the potential for deep data interlinking between components of the digital layer with the city’s physical layer.

Deep data interlinking, based on interoperable data standards and protocols, enabled the exchange of smart city data between system components within the digital layer. The ability to manage the exchange of data raised several concerns about data control and accessibility. This concern was particularly centered

around dominant private interests who could capture more value asymmetrically due to their ability to aggregate data from multiple systems in the digital layer. This data dominance can lead to an uneven playing field and weaken fair and competitive participation for digital infrastructure, data and services.

Data interlinking of the digital and physical layers raised several concerns regarding the role of data in the digital layer, particularly around data collection, sharing, use, protection and privacy. A key challenge was the governance of data in the digital layer, either as an asset to reward technology innovation or as a citizen right that should be protected in the public interest.

Data interlinking capabilities were crucial to Sidewalk Labs’ ability in developing an integrated list of digitally-enabled services. (Sidewalk Labs DIA, November 2019 p. 43) These services were designed to fulfill Waterfront Toronto’s priority objectives for Quayside which were: sustainability, resiliency and urban innovation, complete communities, economic development and prosperity, partnership and investment. (Waterfront Toronto, March 2017 p. 9) However, data interlinking can expose multiple interdependency risks, with the potential for unexpected outcomes in the physical layer. Such unexpected outcomes may have unintended consequences that could impact the wider digital principles of the City of Toronto, such as equity and inclusion, a well-run city, social, economic and environmental benefits, privacy and security and democracy and transparency. (City of Toronto, December 2019 p. 2)

### **Situation Analysis**

Sidewalk Labs’ Master Innovation and Development Plan (MIDP) proposed a wide set of urban technology innovations that were designed to fulfill Waterfront Toronto’s priority objectives for Quayside (Waterfront Toronto, March 2017 p. 9). This set of urban technology innovations was further elaborated as part of a Digital Innovation Appendix (DIA). The DIA proposed a tightly integrated digital layer comprised of digital infrastructure and digitally-enabled services that interact with various aspects of Quayside’s physical layer.

Digital infrastructure was a set of urban technology innovations that supported the digitally-enabled services. This included new standardized outdoor mounts that provided access to power and communications connectivity, Software-Defined Networks

(‘SDN’) that enabled a more secure and resilient network infrastructure, Super Passive Optical Network (‘Super-PON’), that enabled scalable high speed internet service and Distributed Verifiable Credentials, a privacy-preserving technology that provided individuals with control and transparency over the personal information they share. (Sidewalk Labs DIA, November 2019 pp. 123 - 142)

Digitally-enabled services comprised of a set of core digital systems and subsystems representing a cross-section of smart city services required for a complete community at Quayside. These included core systems for the management of mobility, freight transportation, parking, public realm, energy, waste, and stormwater. A total of 18 major services/systems and 52 subsystems were proposed and described in detail as the Quayside Digitally Enabled Services List. (Sidewalk Labs DIA, November 2019 p. 43)

In addressing vocal concerns about the role of data within the digital layer, Sidewalk Labs proposed a trusted process for responsible data use. This was a recognition that smart city data needed to be protected in the public interest. A new data category, called ‘urban data’ was proposed and included both personal information and information that is collected in public and private environments within the city. (Sidewalk Labs MIDP Chapter 5, September 2019 p. 416)

By offering a cross-section of digital-enabled services, Sidewalk Labs needed to collect urban data from multiple sources and integrate these urban data flows among multiple systems within the digital layer. This suggested the need for an ‘Urban Data Platform’ (UDP) for the multi-system interoperability and data integration among otherwise traditionally siloed city systems. (European Innovation Partnership on Smart Cities and Communities, 2016 (EIP-SCC)) In the context of smart cities as technology systems, multi-system interoperability allowed a UDP to manage and coordinate Quayside’s digitally-enabled services across different systems. Application Programming Interfaces (APIs) enabled existing and new players to interface with the UDP to create new digitally-enabled services.

### **Problem Identification**

A key issue was the ability of Sidewalk Labs to equip Quayside with an array of interconnected devices and sensors that were embedded in the digital

infrastructure. This ‘Array of Things’ (AoT) can collect and monitor a wide range of urban data and activity from the urban environment. (Urban Center of Computation and Data, 2020) The digital layer would have brought together and integrated these AoT urban data flows across the UDP systems and subsystems that enable Quayside’s digitally-enabled services.

### **Problems with Urban Data**

The digital layer depended on a wide range of urban data types collected by a wide variety of AoT devices, sensors and cameras. This included the collection of personally identifiable data. While Sidewalk Labs offered assurances to protect the privacy of personally identifiable data by de-identification at source, the risk of re-identification through data linking and matching may still exist.

The potential application of Artificial Intelligence (AI) algorithms on different urban datasets raised major concerns regarding algorithmic bias. Bias and lack of transparency in AI algorithms using urban data may have unintended consequences that impact citizens in harmful and unexpected ways.

Multiple types of datasets can be combined from open, shared and closed AoT sources, blurring the distinctions between individual vs aggregate data, and personal vs non-personal data. The risk is that in the age of big data, processed data can be representative, implied or derived, thereby changing the original purpose of a given urban dataset. (Scassa, September 2018 p.3) This raised several issues about urban data’s fit for the purpose it was intended to be used.

### **Problems with Urban Data Platforms**

A major concern about the digital layer was the potential reliance of a single private entity, such as Sidewalk Labs, to build and manage the UDP. This reliance on a single entity for multiple core systems may present high path dependencies where any change in a system component will depend on a change in another system component. Given the interlinking of core systems proposed for Quayside the risk of interdependency is significant. The reliance on a single private entity also presented risks of irreversibility whereby major changes to original, early systems on cannot be undone for long periods of time. Together this may result in technology ‘lock-in’ by private entities in which cities are gradually ‘locked-out’ from

ownership and operation of the core systems within the digital layer.

The ability of a few private entities to own and operate multiple core systems within a UDP offers opportunities to collect, process and aggregate multiple datasets from AoT sensors and devices deployed on digital infrastructure. This raised several issues regarding the ownership, control and sovereignty of this valuable information. A major concern of this type of ownership and control is ‘information asymmetry’ in which private entities reap most of financial value from the data generated by digital public infrastructure at the expense of the public interest. (Open City Network, December 2019)

Given the high levels of complexity in the way the digital infrastructure, systems and dataflows interact and relate to each other, as in the case of Quayside, a UDP requires multidisciplinary design principles and approaches that considers all dimensions beyond technological. Inclusive design principles that are focused on human-centric needs require engaging citizens from different ethnic, social, economic and geographic backgrounds. New approaches to building algorithms require workflows and processes that are inherently ethical, transparent and trustworthy. The ability to assess the potential impact on affected citizens such as privacy, fairness, justice, bias etc. requires accountable stewardship and governance of the digital layer. Holistic evaluation of these complex systems requires Key Performance Indicators (KPI) that measure how the digitally-enabled services achieve Waterfront Toronto’s priority objectives and also Key Qualitative and Quantitative Indicators (KQI) that assess how the digitally-enabled services achieve quality of life indicators such as well-being and broader notions of fairness, justice and equality. (Open North, April 2016 p.13)

### **Problems with Governance of Urban Data and Urban Data Platforms**

Sidewalk Labs’ proposals for urban data and UDP revealed that not all the problems can be resolved at the design stage. Given the interaction between the digital infrastructure and core systems, the scope of the urban data collected and the interlinking of these data flows among multiple systems, there was strong public interest for appropriate governance of urban data and the UDP. The challenge was that the Quayside project was primarily a real estate and technology innovation initiative (which included the devel-

opment of a digital layer) between a private sector company and a non-profit corporation. Attempts to develop a data governance framework ‘on-the-fly’ without participation from all levels of government or consultations from all stakeholders can prove problematic. Therefore “an attempt to build governance in response to these diverse concerns led to a data governance framework that tried to do too much and for many different reasons.” (Scassa, July 2020 p. 56)

Given the infancy of urban data science, it is uncertain whether all data generated and collected in public, private, shared and communal spaces can be classified as urban data. Civic advocates have pointed out the potential non-neutrality of urban data, since many of the combined datasets may have multiple characteristics and jurisdictions. Therefore, as a new category, “urban data made it difficult to identify how existing legal frameworks would apply.” (Scassa, July 2020 p. 51)

### **Case Analysis**

#### ***Sidewalk Labs Response to the Urban Data Problem***

In response to the issues and concerns regarding urban data, Sidewalk Labs proposed several innovative approaches that addressed the ethical, privacy and governance issues throughout the urban data lifecycle. This included the following:

**Establish best practices for ethical data design for digitally-enabled services:** Sidewalk Labs proposed to support best practices for the ethical data design of its digitally-enabled services. This included data privacy and security by design as well as data minimization and de-identification by default. It also proposed to adopt best practices for new ethical challenges such as the implementation of a responsible AI framework. (Sidewalk Labs MIDP Chapter 5, September 2019 p. 411)

**Establish guidelines for responsible data use:** Sidewalk Labs proposed a set of Responsible Data Use Guidelines (RDU Guidelines) for the collection, sharing and use of urban data within its digitally-enabled services. These guidelines outlined beneficial purpose, transparency, openness, proactive engagement, community trust, and people first. (Sidewalk Labs MIDP Chapter 5, September 2019 p. 424)

**Conduct assessments of compliance to responsible data use:** In addition to supporting privacy impact assessments, Sidewalk Labs proposed a Re-

sponsible Data Use Assessment (RDU). The RDU served as an auditing mechanism that assessed compliance for responsible data use as well as the beneficial uses, risks and ethical questions related to the use of urban data. (Sidewalk Labs MIDP Chapter 5, September 2019 p. 429)

**Establish an Urban Data Trust:** Sidewalk Labs proposed to create an Urban Data Trust that will act as a steward to oversee the governance of urban data in the public interest. The Urban Data Trust was responsible for the review and approval of urban data collected by AoT devices in the public realm through the management of the RDU review process. (Sidewalk Labs MIDP Chapter 5, September 2019 p. 420)

### ***Sidewalk Labs Response to the Urban Data Platform Problem***

In response to issues and concerns regarding urban data platforms Sidewalk Labs proposed an open architecture approach. Sidewalk Labs believed that this open architecture will enable (1) a level-playing field for all urban tech companies to compete, (2) prevent any single company from monopolizing a critical digital system or component and (3) inspire innovation of third-party urban technology companies. This open architecture approach was based on a three-part plan:

**Open standards:** Sidewalk Labs proposed to use ‘public standards’ that will “prevent any single company from monopolizing a critical digital system or component” (Sidewalk Labs MIDP Chapter 5, September 2019 p. 404) To achieve this Sidewalk Labs planned to use relevant industry-standards where they exist. Where public standards do not exist, Sidewalk Labs planned to work with others to define formats and develop new industry standards. (Sidewalk Labs MIDP Chapter 5, September 2019 p. 405)

**Open access:** Sidewalk Labs believed that data collected in the public realm should be publicly accessible through open data portals. Sidewalk Labs planned to make its own Application Programming Interfaces (APIs) publicly available that will enable third-parties to build digital services on top of available information. (Sidewalk Labs MIDP Chapter 5, September 2019 p. 406)

**Open source:** Sidewalk Labs planned to make their software source code publicly available to third-par-

ties to enable integration into its core digital systems under a free software licence. (Sidewalk Labs MIDP Chapter 5, September 2019 p. 406)

### ***Waterfront Toronto’s Response to Problems Related to Governance of Urban Data and Urban Data Platforms***

In response to the issues and concerns regarding governance of urban data and urban data platforms, Waterfront Toronto undertook a review and evaluation process of the MIDP and DIA. Feedback from public consultations resulted in the development of draft digital principles to “evaluate proposals it receives from Sidewalk Labs, or other entities, related to digital technologies in emerging neighbourhoods.” (Waterfront Toronto Digital Neighbourhoods and Digital Literacy, May 2019 p. 1) Expert advice came from the Digital Strategy Advisory Panel (DSAP) whose mandate included providing “objective, professional advice to ensure the ethical use of technology, accountability, transparency, protection of personal privacy, data governance, cyber security.” (Waterfront Toronto DSAP, March 2018 p.2)

Waterfront Toronto’s hosted a series of Civic Labs workshops that focused on digital governance, digital stewardship and the value of data. These workshops served as inputs in the development of its draft digital principles. The five key principles were defined as follows:

**Inclusivity, accessibility, and shared benefit:** Principle #1 focused on inclusive design of digital services, use of aggregated data and algorithmic transparency. Non-personal and de-identified data was to be shared with the open data community or other third-party organizations. (Waterfront Toronto Draft Digital Principles, July 2019 p. 2)

**Innovation, agility, flexibility:** Principle #2 focused on use of protocols, standards and operating agreements that do not foster monopolies, or create vendor lock-in, or dependency on a sole vendor to provide related products or services. (Waterfront Toronto Draft Digital Principles, July 2019 p. 2)

**Transparency, accountability, responsibility:** Principle #3 focused on access to information about key digital systems and the ability to change biased or discriminatory digital systems. Principle #3 also focused on measures to ensure transparency of col-

lection, use, retention and disclosure of personal data as well as rights of individuals to access and correct their data. (Waterfront Toronto Draft Digital Principles, July 2019 p. 2)

**Privacy, data protection, cyber security and resiliency:** Principle #4 focused use of personal data, subject to a Privacy Impact Assessment, and privacy compliance through Privacy by Design. Personal data was to be de-identified at source. Profiling was prohibited and collection and use of personal information was to be limited through use of non-identifying technology. (Waterfront Toronto Draft Digital Principles, July 2019 p. 3)

**Architecture, ownership and technological sovereignty:** Principle #5 focused on policies regarding data residency and routing. Solutions would have been accompanied by commercial terms that strive to minimize the impact of information asymmetry. As a first principle, data collected in waterfront neighbourhoods was to remain in Canada. (Waterfront Toronto Draft Digital Principles, July 2019 p. 3)

The key commentaries by DSAP regarding governance of urban data and urban data platforms focused primarily on the Urban Data Trust, the need for the public sector to lead on governance, and the need to establish a firm requirement for data localization. The DSAP reaffirmed that “digital governance belongs exclusively in the purview of Waterfront Toronto and its government partners, (and) the most significant outstanding issues...was generally the lack of a fully realized digital governance framework and the need for expedited public sector leadership.” (DSAP Supplemental Report February 2020 p. 2) DSAP’s key commentaries guided the final terms of the Plan Development Agreement Threshold Issues between Waterfront Toronto and Sidewalk Labs. (Waterfront Toronto and Sidewalk Labs Plan Development Agreement Threshold Issues, October 2019)

## Conclusions

Sidewalk Labs’ ‘city as a platform’ vision for Quayside was an example of a transformation of a piece of Toronto’s Eastern Waterfront towards a smart community. It highlighted the potential high levels of complexity in the way interlinked systems and data flows interact within the digital layer, the potential unexpected outcomes in the physical layer and the diverse concerns about digital governance. Therefore, as this case study examined, planning for this transformation requires a holistic evaluation of the digital layer, the

digitally-enabled services and its impact on the political, social, economic, institutional, and environmental dimensions.

With regards to data standards, it was Sidewalk Labs, as the primary developer of Quayside, who was defining (and perhaps creating) the de facto standards for urban data. The proposed definition of ‘urban data’ avoids “the traditional dichotomy of public and private data (and)...evades both ownership and control issues.” (Scassa, July 2020 p.52) With regards to data accessibility, it was Sidewalk Labs who owned the open source software and APIs and therefore maintained version control of the software code.

On the issue of data security and privacy, while Sidewalk Labs proposed to protect personally identifiable data collected in the urban realm, however the risk of re-identification may still exist. Finally, on the issue of the location of urban data, there were concerns about data sovereignty, specifically how to ensure the local residency and routing of personal data.

With regards to the digital layer it was Sidewalk Labs who planned to build the core digital infrastructure, digital systems as well as a cross-section of critical digitally-enabled services for Quayside. This reliance to a single entity for the entire ‘digital stack’ presented high path dependencies and significant risk of vendor lock-in. This also exposed the opportunity for one single entity to manage and control multiple UDP datasets collected from the digital infrastructure. Therefore, it was uncertain (at least not proven) whether Sidewalk Labs’ open architecture approach could mitigate all the risks of ‘information asymmetry’ so that all players have a fair playing field within digital layer and that all third-party services are enabled and supported. Governance and oversight for a digital layer like the one proposed for Quayside was challenging since the digital layer was a tight integration of digital infrastructure, platform and services.

Sidewalk Labs represented an emerging urban technology sector using digital innovation to address the challenges of smart communities and cities. The key question was the extent of private sector participation in areas traditionally the responsibility of public works and civic government. The Quayside project offered an important case study of the significant role the digital layer will play in future smart city planning and development.

## References

- Array of Things, *Urban Center of Computation and Data*, A Joint initiative of the Argonne National Laboratory and the University of Chicago. <https://arrayofthings.github.io/#>.
- City of Toronto, *Digital Infrastructure Plan – Update*. December 2019. <https://www.toronto.ca/legdocs/mmis/2020/ex/bgrd/backgroundfile-141665.pdf>
- Daniel L. Doctoroff, “*Why we’re no longer pursuing the Quayside project - and what’s next for Sidewalk Labs.*” Medium.com. May 7 2020. <https://medium.com/sidewalk-talk/why-were-no-longer-pursuing-the-quayside-project-and-what-s-next-for-sidewalk-labs-9a61de3fee3a>
- European Innovation Partnership on Smart Cities and Communities, *Urban Platform Management Framework*. <https://eu-smartcities.eu/initiatives/68/description>
- Open City Network, *Digital Public Infrastructure Briefing*. December 2019. <https://theopencity.org>
- Open North, *Open Smart Cities Guide v1.0*. April 2018. <https://www.opennorth.ca/publications/#-data-governance-and-digital-infrastructure-analysis-and-key-considerations-for-the-city-of-toronto>
- Sidewalk Labs, *Presentation to York Quay Neighbourhood Association*. March 2018. <https://quaysideto.ca/wp-content/uploads/2019/04/York-Quay-Neighbourhood-Association-Presentation-March-13-2018.pdf>
- Sidewalk Labs, *Master Innovation and Development Plan, Digital Innovation Appendix, Proposed Digitally Enabled Services for Quayside*. November 2019. <https://quaysideto.ca/wp-content/uploads/2019/11/Sidewalk-Labs-Digital-Innovation-Appendix.pdf>
- Sidewalk Labs, *Master Innovation and Development Plan, Digital Innovation Appendix, Proposal for Digital Infrastructure that supports Digitally Enabled Services*. November 2019. <https://quaysideto.ca/wp-content/uploads/2019/11/Sidewalk-Labs-Digital-Innovation-Appendix.pdf>
- Sidewalk Labs, *Master Innovation and Development Plan, Chapter 5 Digital Innovation: Creating a Trusted Process for Responsible Data Use*. September 2019. <https://storage.googleapis.com/sidewalk-toronto-ca/wp-content/uploads/2019/09/03134040/MIDP-Vol-ume-2-Chapter-5-Digital-Innovation-Accessible.pdf>
- Sidewalk Labs, *Master Innovation and Development Plan, Chapter 5 Digital Innovation: Setting Data Standards that are Open and Secure*. September, 2019. <https://storage.googleapis.com/sidewalk-toronto-ca/wp-content/uploads/2019/09/03134040/MIDP-Vol-ume-2-Chapter-5-Digital-Innovation-Accessible.pdf>
- Teresa Scassa. *Data Ownership*. Center for International Governance Innovation. September 2018. <https://www.cigionline.org/publications/data-ownership>
- Teresa Scassa. *Designing Data Governance for Data Sharing: Lessons from Sidewalk Toronto*. Technology and Regulation. July 2020. <https://techreg.org/index.php/techreg/article/view/51>
- Waterfront Toronto, *Request for Proposals for an Innovation and Funding Partner for the Quayside Development Opportunity*. March, 2017. <https://quaysideto.ca/wp-content/uploads/2019/04/Waterfront-Toronto-Request-for-Proposals-March-17-2017.pdf>
- Waterfront Toronto. *Draft Digital Principles*, July, 2019. <https://quaysideto.ca/wp-content/uploads/2019/11/Final-Draft-Digital-Principles.pdf>
- Waterfront Toronto Press Release. *Waterfront Toronto and Alphabet’s Sidewalk Labs to Create Neighbourhoods That Blend People-Centred Urban Design with Cutting-Edge Technology* October, 2017. <https://waterfronttoronto.ca/nbe/portal/waterfront/Home/waterfronthome/newsroom/newsarchive/news/2017/october/new+district+in+toronto+will+tackle+the+challenges+of+urban+growth>
- Waterfront Toronto Meeting Summary. *Digital Neighbourhoods and Digital Literacy*. May 22, 2019. <https://quaysideto.ca/wp-content/uploads/2019/07/Final-Summary-Digital-Literacy-and-Digital-Neighbourhoods.pdf>
- Waterfront Toronto Digital Strategy Advisory Panel. *Mandate and Operating Protocols*. March 16, 2018. [https://waterfronttoronto.ca/nbe/wcm/connect/waterfront/7a14158a-be29-4e60-a420-b99fcb-2d4382/20180427+Digital\\_Strategy\\_Advisory\\_Panel\\_Mandate.pdf?MOD=AJPERES](https://waterfronttoronto.ca/nbe/wcm/connect/waterfront/7a14158a-be29-4e60-a420-b99fcb-2d4382/20180427+Digital_Strategy_Advisory_Panel_Mandate.pdf?MOD=AJPERES)
- Waterfront Toronto Digital Strategy Advisory Panel. *Supplemental Report on the Sidewalk Labs Digital Innovation Appendix (DIA)*. February, 2020. <https://quaysideto.ca/wp-content/uploads/2020/02/>

DSAP-Supplemental-Report-on-Sidewalk-Labs-Digital-Innovation-Appendix-DIA-Appendices-FINAL.pdf

Waterfront Toronto and Sidewalk Labs. *Plan Development Agreement Threshold Issues*. October, 2019. <https://waterfrontoronto.ca/nbe/wcm/connect/waterfront/86d92f81-20be-4029-a616-00522abbd34a/Concurrence+Letter.pdf?MOD=AJPERES>

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IGLUS Quarterly is an analytical open access journal dedicated to the analysis of Governance, Innovation and Performance in Cities and is edited at EPFL ME, Ras Al Khaimah, U.A.E. IGLUS Quarterly aims to facilitate knowledge and experience sharing among scholars and practitioners who are interested in the improvement of urban system's performance in terms of the service efficiency, sustainability and resilience.

IGLUS Quarterly applies the highest academic standards to analyze real world initiatives that are dealing with today's urban challenges. It bridges the gap between practitioners and scholars. IGLUS Quarterly therefore adopts a multidisciplinary perspective, simultaneously considering political, economic, social and technological dimensions of urban systems, and with a special focus on how governance affects and is affected by the use of technologies in general, and especially the pervasive application of the ICTs.

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Our Executive Master in Innovative Governance of Large Urban Systems (IGLUS) responds to today's needs: growing cities evolve into metropolitan areas with their major infrastructures – transport, energy, buildings, water and greens – becoming increasingly interdependent, not the least because of the pervasive nature of the information and communication technologies. Managers and policy-makers concerned with such large urban infrastructure systems not only need to learn how to operate them, but must also become experts in maintaining, planning, and financing them in order to better respond to changing customer demand and evolving citizen needs. In short, the complexity of cities faced with ever more pressing challenges requires skills and expertise that our Executive Master's program offers.

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### Smart Cities

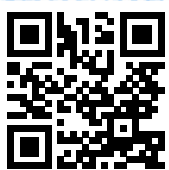
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