

Data-Driven Approaches to Main Street Challenges:

Planning Data and Technology Projects to Support Smart Civic
Infrastructure Investments

Open North

December 2023

Contents

- 0
- Acknowledgements..... ii
- Executive Summary..... iii
- Introduction..... 1
 - How to read this research brief 1
- Part 1: The Role of Data in Main Street Decision-Making.....2
 - Developing a vision for infrastructure investments2
 - Engaging the public and main street stakeholders3
 - Mapping existing conditions, assessing gaps, identifying opportunities4
 - Modelling future infrastructure investments5
 - Prioritizing and budgeting for infrastructure investments6
 - Evaluating impacts of investments 8
 - Summary9
- Part 2: Planning Data and Technology Projects for Main Street Challenges10
 - Framing the challenge.....10
 - Developing an effective challenge statement.....10
 - Engaging and collaborating with stakeholders 11
 - Sourcing and managing data12
 - Identifying data needs.....12
 - Accessing existing data12
 - Collecting new data13
 - Creating a data management plan14
 - Assessing implementation capacity14
 - Staff capacity.....14
 - Technology procurement15
 - Access to funding.....15
 - Summary16
- Conclusion16
- References.....18
- Tool: Readiness Checklist for Planning Main Street Data and Technology Projects 1

Acknowledgements

We want to thank the many municipal staff, BIA leaders, and other stakeholders who participated in our research.

This research was conducted in partnership with the Canadian Urban Institute and supported with funding from Infrastructure Canada's Research & Knowledge Initiative.

The views expressed in this research brief are those of the authors and do not necessarily reflect those of the funder.

Authors: Steven Coutts (Open North), Sanjida Rabbi (Open North)

With contributions from Gregory Spencer (Canadian Urban Institute), Jennifer Barrett (Canadian Urban Institute), Merlin Chatwin (Open North), Thomas Linder (Open North), aimee whitcroft, Pamela Robinson

Executive Summary

Main streets across the country are struggling, and the civic infrastructure that sustains them needs significant reinvestment. With the pressure to confront soaring housing costs and accelerating climate change, local governments (towns and cities) will need to make intelligent decisions about where to invest limited funds in infrastructure. Moving forward, the capacity of local governments and their main street stakeholders to leverage data – and the tools to collect, manage, analyze data and communicate its insights – will play a key role in better decision-making.

This research brief outlines key opportunities for local governments to better integrate data and technology initiatives into the planning of infrastructure investments to address main street challenges. It also highlights examples from local governments who are already strategically integrating data and technology into their city-building work and offers guidance for local government staff seeking to do the same in their communities.

- Part 1: The Role of Data in Main Street Decision-Making provides an overview of the main street decision-making landscape as it concerns civic infrastructure -- and the role of data and technology-based support in that decision-making.
- Part 2: Planning Data and Technology Projects for Main Street Challenges outlines key issues and questions that local government staff should consider when embarking on a pilot data project focused on a main street challenge, including defining a challenge statement, developing a plan to acquire and manage the necessary data, and navigating common implementation challenges. This section is a companion piece to the Tool: Readiness Checklist for Planning Main Street Data and Technology Projects, which local government staff can use to assess their readiness to plan and implement a data and technology project to address a main street challenge in their own community.

Introduction

Main streets have always been centres of community life, not just because of their importance for local economies but also because of the diverse social processes, cultural practices, and placemaking activities made possible thanks to civic infrastructure.

From the streets, sidewalks, and parks to nearby public libraries, community centres, and other spaces that connect the private sphere with the public sphere, civic infrastructure is the foundation of every healthy, vibrant main street.

However, main streets across the country are struggling, and the civic infrastructure that sustains them needs significant reinvestment. With the pressure to confront soaring housing costs and accelerating climate change, local governments (towns and cities) will need to make intelligent decisions about where to invest limited funds in infrastructure.

This means prioritizing the development of complete communities centred around thriving, healthy main streets supported by high-quality civic infrastructure that meets the needs of current and future residents. These urban environments proved their value during the COVID-19 pandemic, making it easier for people to access essential services and amenities as supply chains were disrupted. Outdoor public spaces like parks and open streets became vital lifelines, providing opportunities for safe, socially distanced interactions.

The need to respond to the impacts of the COVID-19 pandemic permitted many communities to experiment with innovative urban design and programming to adapt main streets to the new reality, showing that making better decisions about our civic infrastructure is possible.¹ However, no two main streets are the same: business district main streets have different civic infrastructure needs than neighbourhood main streets, which have different needs than small town main streets.²

Moving forward, the capacity of local governments and their main street stakeholders to leverage data – and the tools to collect, manage, analyze data and communicate its insights – will play a key role in better decision-making.

How to read this research brief

This research brief outlines key opportunities for local governments to better integrate data and technology initiatives into the planning of infrastructure investments to address main street challenges. It also highlights examples from local governments who are already strategically integrating data and technology into their city-building work and offers guidance for local government staff seeking to do the same in their communities.

- Part 1: The Role of Data in Main Street Decision-Making provides an overview of the main street decision-making landscape as it concerns civic infrastructure -- and the role of data and technology-based support in that decision-making.
- Part 2: Planning Data and Technology Projects for Main Street Challenges outlines key issues and questions that local government staff should consider when embarking on a pilot data project focused on a main street challenge, including defining a challenge statement,

¹ Canadian Urban Institute, “In It Together: Bringing Back Canada’s Main Streets - Action Report”; Archer and Morgan, “Supporting Main Street Recovery through Small-Business-Friendly Policy”; Fathom Studio, “Planning & Urban Design: Bring Back Main Street.”

² Canadian Urban Institute, “In It Together: Bringing Back Canada’s Main Streets - Action Report.”

developing a plan to acquire and manage the necessary data, and navigating common implementation challenges. This section is a companion piece to the Tool: Readiness Checklist for Planning Main Street Data and Technology Projects, which local government staff can use to assess their readiness to plan and implement a data and technology project to address a main street challenge in their own community.

Part 1: The Role of Data in Main Street Decision-Making

Local governments are typically responsible for planning, delivering, and maintaining most of the essential civic infrastructure that underpins communities and supports main streets.³ Investments in main streets represent significant expenditures and are the product of not one but a whole chain of decisions influenced by a variety of players. In this section, we will cover several key moments in the early planning stages of infrastructure investments that are informed by data of one kind or another, whether during visioning and stakeholder engagement, prioritizing and budgeting, monitoring and evaluating the impacts of investments, and beyond.

Developing a vision for infrastructure investments

Infrastructure investments on main streets should ideally be guided by long-term planning processes, beginning with the official or comprehensive plan setting out the community's overall planning priorities (see Box 1: Elements of main street planning). Additional layers of planning can be undertaken from the official plan, including transportation master planning and secondary plans for neighbourhoods, heritage districts, or business improvement areas. Through these plans, current infrastructure assets are evaluated, historical and current demand is analyzed, future demand is forecast, and new investments are identified and prioritized. Plans may be implemented through specific policy tools, such as a complete streets policy or zoning by-laws to promote mixed uses along street corridors.

Box 1: Elements of main street planning

Main streets are constituted by their surrounding built environment and land uses, and all of them must be considered when deciding where to invest in infrastructure.

- **Commercial:** Businesses such as retail stores and offices not only underpin the local economy, but the form, size and spacing of commercial storefronts significantly impact how people experience the street. The more vibrant main streets feature smaller commercial spaces oriented toward the street and occupied by local, independent businesses. These main streets generally attract more foot traffic than those featuring exclusively chain retail stores occupying large, uniform commercial spaces.
- **Residential:** Housing has a major impact on the character of main streets, bringing foot traffic outside business hours and on weekends. Its built form and density affect walkability and activity levels, while different housing tenure types influence the mix of residents in an area.⁴
- **Transportation:** Main streets are vital links within the local transportation network and integral public spaces defining community identity. Enhanced public transit infrastructure can foster transit-oriented developments (TODs) characterized by density, mixed land use, affordability, and access to amenities.

³ Federation of Canadian Municipalities, "Infrastructure."

⁴ Federation of Canadian Municipalities, "Backgrounder: New Research—Canada's Housing Challenge Is Also an Infrastructure Challenge."

- Public realm: Parks, green spaces, and plazas are often located on or near main streets, providing open space for a range of activities and programming, as well as integrating climate-resilient green infrastructure.⁵
- Social infrastructure: This includes public buildings such as libraries,⁶ community centres, recreation facilities, and social services and programs delivered by community-based non-profit organizations operating out of privately owned (usually leased) space. In some cases, several social infrastructure assets may be co-located in a model known as a 'community hub' that "provide[s] a central access point for a range of needed health and social services, along with cultural, recreational, and green spaces to nourish community life."⁷ Due to its essential role in the community, social infrastructure is often located directly on or close to main streets.

Data and digital tools can support local government staff in developing evidence-based plans aligned with community priorities by engaging the public and main street stakeholders, mapping community assets, identifying needs, and modelling future scenarios. In fact, some local governments across Canada have established data principles, strategies or governance frameworks intended specifically to guide the use of data in planning and other decision-making processes. Examples include:

- The [City of Montreal's Digital Data Charter](#) outlines a comprehensive strategy for the ethical and responsible collection, management, and use of data in the urban space. The charter is rooted in 13 principles grouped into three commitments: covering human rights in the digital era, the common good, and building a brighter future through data.
- The [City of Toronto's Data for Equity Strategy](#) focuses on leveraging disaggregated data to advance equity goals by informing inclusive and responsive program planning, policy development, and service delivery. It prioritizes collecting high-quality socio-demographic data, analyzing and reporting it by sociodemographic groups to assess equity impacts, and using existing population-level data to inform equitable decision-making.
- The [City of Calgary's Gender Equity, Diversity and Inclusion Strategy](#) enabled multiple City departments to demonstrate their commitment to inclusive and equitable planning by piloting the use of GBA+⁸ as an analytical tool to access additional data sources, to enhance understanding of the needs of diverse user populations expected to use a proposed multi-use facility with co-located community and City services (and situated near the [17 Avenue Main Streets initiative](#) and the planned [52 Street SE BRT route](#)).

Engaging the public and main street stakeholders

Stakeholder engagement is essential in planning and prioritizing civic infrastructure investments for understanding local infrastructure needs and prioritizing investments in main streets. Various digital tools have emerged over the years, and their integration into local government public engagement practices has accelerated post-COVID.⁹ Public engagement platforms such as [Maptionnaire](#),

⁵ Rutgers, "Can Natural Infrastructure Help Revitalize Winnipeg's Downtown?"

⁶ Canadian Urban Institute, *OVERDUE: The Case for Canada's Public Libraries*.

⁷ Government of Ontario. Premier's Community Hubs Framework Advisory Group, "Community Hubs in Ontario: A Strategic Framework and Action Plan," 7.

⁸ GBA+ (Gender-Based Analysis Plus) is a systematic approach that assesses how various gender identities and intersecting identity factors may impact policies, programs, services, and initiatives, with the goal of promoting greater equity and inclusivity.

⁹ Robinson and Johnson, "Pandemic-Driven Technology Adoption."

[PlaceSpeak](#), or [EngagementHQ](#) (formerly Bang the Table) can be used for one-way exchanges of information, such as sharing project proposals and updates with stakeholders via virtual town hall meetings, to soliciting in-depth feedback to inform specific project decisions through surveys and ranking exercises (see Box 7: Participatory budgeting exercise in Lethbridge, AB).

However, while digital tools can appear to facilitate greater participation, “as citizens become removed from the more challenging, involved, slower, traditional forms of citizen engagement, and funnelled towards transactional forms of engagement, supported by technology, opportunities for robust, quality, civic discourse are lost, replaced with an emphasis on speed and quantity of connections.”¹⁰

Digital public engagement tools can also create barriers for other stakeholders, often from the same marginalized groups who end up excluded from traditional in-person engagement processes. Since public consultations are to reflect the whole community, engagement strategies cannot be based solely on digital tools but should use whichever tools will enable as many stakeholder groups as possible to participate and have their voices heard. This may mean a hybrid engagement strategy involving both in-person and digital methods. Prioritizing inclusion in main street engagement strategies may require more time and effort, but also increases the odds that the outcome will reflect the needs of the whole community.

Mapping existing conditions, assessing gaps, identifying opportunities

Digital tools, particularly those based on geospatial data,¹¹ can be highly effective in a main street context, allowing decision-makers, stakeholders, and the public to visualize local challenges and opportunities. This helps local governments to maximize the benefits of civic infrastructure investments, build a case for new or improved policy tools to unlock the potential of existing assets and encourage desirable types of development in a main street area (see Box 2: Visualizing main street vacancies).

Box 2: Visualizing main street vacancies

With shifting employment patterns and the rise of e-commerce, there is an increasing amount of underutilized space on main streets, whether commercial storefront vacancies or municipally-owned properties that aren't being used to their fullest potential.¹² Better use of data can help identify pockets of underutilized space on main streets as part of a coordinated effort to boost local economic development while investing in civic infrastructure, housing,¹³ and public transportation. Since 2020, the **City of Vancouver** has been conducting an [annual survey of storefronts](#) each March to assess the state of local shopping areas, initially starting in 2020 and expanding each year, covering nearly 9,000 storefronts in the city. City staff use handheld GIS units to collect data on occupancy, business mix, turnover, and vacancy rates. Data is used to inform policy decisions and support storefront occupancy through various initiatives, including streamlining regulations for changing the use

¹⁰ Robinson and Johnson, 62.

¹¹ British Columbia. Ministry of Housing and Urban Systems, “Complete Communities: A Guide to Geospatial Land Use Assessments for British Columbia’s Communities.”

¹² Siemiatycki, Giritharan, and Alimovski, *How to Leverage Underutilized Municipality-Controlled Real Estate to Create Vibrant Communities*.

¹³ Draaisma, “Use Surplus Public Lands ‘more Aggressively’ to Create Affordable Housing, Researcher Says.”

of commercial spaces, providing multilingual resources to aid businesses in relocating, and aligning multiple support programs with the needs of local businesses.

The ability to layer different data sets on top of each other can also surface otherwise hidden connections, such as the relationship between neighbourhood income levels and the quality of the public realm that may not be immediately apparent just by looking at a table or chart.¹⁴ (see Box 3: Mapping equity gaps and opportunities)

Box 3: Mapping equity gaps and opportunities

Main streets need high-quality urban spaces and places that are inclusive and accessible to everyone,¹⁵ not only higher-spending visitors and office workers. Better use of data can assist local governments in focusing civic infrastructure investments to meet their equity goals.

The **City of Montreal** developed its [Living Environment Equity Index](#) tool to support the rollout of its Inclusive and Resilient Neighbourhoods (*Quartiers inclusifs et résilients*) urban planning approach. This new strategy seeks to minimize competition for urban projects while empowering vulnerable boroughs to create an infrastructure that aligns with their unique requirements. Areas with multiple vulnerabilities, such as heat islands, limited green spaces, and safety concerns, are prioritized under this strategy, with three neighbourhoods having been initially selected for improvement by 2030.¹⁶

The **Vancouver Park Board** “invests in data-informed tools using an equity-based lens that can help allocate scarce resources where they’re needed most.”¹⁷ It uses geospatial data to pinpoint areas needing more park investments, referred to as Initiative Zones. These zones are determined by analyzing three main factors: gaps in park access, demand for accessible recreation options, and the extent of tree canopy coverage. Additionally, the system allows for the inclusion of extra factors like income, community involvement, capital investments, and demographic information over time. This comprehensive approach enables the Park Board to better understand specific community needs and make well-informed policy decisions.

Modelling future infrastructure investments

Digital tools can also give local governments a better understanding of the financial implications of their infrastructure investments throughout the asset's entire lifecycle, encompassing construction, operation, maintenance, and eventual replacement or decommissioning (see Box 4: Forecasting civic infrastructure lifecycle costs). By more accurately forecasting future costs and allocating resources efficiently, cities will be better positioned to prioritize maintenance and renewal activities while avoiding unexpected budgetary challenges in the future.

Box 4: Forecasting civic infrastructure lifecycle costs

British Columbia's [community lifecycle infrastructure costing tool](#) (CLIC tool) helps estimate infrastructure lifecycle costs for different land use patterns. The CLIC tool is an Excel-based tool that generates long-term infrastructure cost implications and allows for comparison analysis. The City of Prince George has used this tool to make informed decisions about taking on new assets through the long-range planning function. By comparing and contrasting the cost-effectiveness of two common

¹⁴ Gardner, “Equity as Practice, Not Product.”

¹⁵ Pitter, “Equitable Infrastructure: A Resource Framing Infrastructure Types Using an Equitable Placemaking Lens.”

¹⁶ Zogalis, “Montreal Announces New Plan to Tackle Urban Inequalities.”

¹⁷ Kinman, “Embedding Equity in Park Planning.”

development scenarios — low-density new subdivision vs. medium-density infill development — they were able to make a more informed decision about which development scenario the City should encourage and facilitate.¹⁸

As communities become more vulnerable to the effects of climate change, local governments are ramping up their mitigation and adaptation efforts. Data and digital tools will play an essential role¹⁹ in identifying civic infrastructure at risk of heightened climate stresses,²⁰ locating investments in green spaces to combat the urban heat island (UHI) effect,²¹ and modelling urban growth patterns to meet future infrastructure needs effectively.²² (see Box 5: Planning climate-resilient infrastructure)

Box 5: Planning climate-resilient infrastructure

The **City of Calgary** used the [AI for the Resilient City](#) the tool to create "Community Climate Risk Profiles" for each Calgary community, supporting evidence-based decision-making for climate risk reduction during multi-community planning projects. Developed by Evergreen, the tool helps Canadian municipalities address climate change impacts, particularly urban heat and extreme temperatures. It provides data visualization and analytics for informed decision-making and supports policy changes at the community level. Its Urban Heat Island (UHI) maps have informed planning and public infrastructure projects, including quantifying the cooling benefits of natural assets and demonstrating the impact of paved spaces and green areas on nearby community temperatures.²³

Prioritizing and budgeting for infrastructure investments

Local governments have limited sources of revenue to finance civic infrastructure projects aside from user fees and property taxes.²⁴ Larger-scale civic infrastructure projects can be funded through development and community benefits charges collected from developers and other land value capture mechanisms.²⁵ However, the mechanisms for allocating these funds are not always transparent.²⁶ Smaller-scale projects like streetscape enhancements, public art installations, or pedestrian-friendly initiatives may be funded by special levies collected from local businesses and accessed by Business Improvement Areas to invest in local infrastructure projects.²⁷

¹⁸ Sheppard, "A New Tool to Calculate the Lifecycle of Infrastructure."

¹⁹ Open North, "Finding Common Ground: Integrating Climate Action for Open Smart Communities in Canada."

²⁰ Hannah Mira Friedland and Marta Olmos, "Main Spotlight."

²¹ Nitoslowski, "Managing Urban Green Infrastructure for Climate Change Through an Open Smart City Lens."

²² Climate Atlas of Canada, "Building a Climate-Resilient City."

²³ Evergreen, "AI for the Resilient City: A Communications Toolkit - City of Calgary."

²⁴ Slack and Tassonyi, "Financing Urban Infrastructure in Canada."

²⁵ Siemiatycki, Fagan, and Arku, "Land Value Capture Study: Paying for Transit-Oriented Communities."

²⁶ Biggar, "Investing in the Public Realm: Challenges, Opportunities, and Lessons for Toronto."

²⁷ BIAs (also known as Business Improvement Districts (BID), Business Improvement Zones (BIZ), or Sociétés de développement commercial (SDC)) are geographic districts within municipalities

Municipalities typically rely on a capital improvements program (CIP), which serves as a comprehensive planning and budgeting framework, to strategically prioritize and fund vital infrastructure projects identified in the various plans. Within the context of main streets, these projects may encompass significant streetscape revitalizations, enhancements to parks and public spaces, and the construction of essential buildings like libraries, community centres, or recreational facilities. Routine maintenance tasks such as pothole repairs, street cleaning, and minor road resurfacing are typically handled through operating budgets rather than the capital budget used for CIP projects.

Box 6: Incentivizing smart civic infrastructure investments through grant programs

Grants from higher levels of government have long been a critical source of funding for infrastructure projects in municipalities. However, more funding dedicated to main street infrastructure may be needed: IDA Canada has recommended the allocation of \$500 million annually from the Investing in Canada Plan for skills and infrastructure development to enhance main streets and downtown areas.²⁸ Recent funding programs administered by the federal government appear to be increasingly aimed at rewarding communities willing to make overdue investments in affordable housing, the public realm, social infrastructure, active transportation, and transit systems. For example, the [Canada Community-Building Fund](#) (formerly the Gas Tax Fund) annually allocates over \$2 billion to support projects like the Queen's Street Placemaking Project in Kitchener²⁹ and street conversions in Oakville, Ontario, both of which aimed to revitalize downtown cores.³⁰ More recently, CMHC's [Housing Accelerator Fund](#) is a grant program designed to encourage municipalities to relax zoning regulations, implement regulatory reforms, and plan for increased housing construction — including investments in community-related infrastructure that supports housing. Ultimately, the need to remain competitive for government infrastructure funding may be enough to incentivize local governments to shift toward smarter decision-making practices.

Data is used extensively during the CIP process, as each department submits its proposals for projects, and must effectively articulate how their proposals align with community goals, and demonstrate the level of local stakeholder support, assess the benefits relative to resources required, and determine the priority and sequencing of investments.³¹

Some local governments are beginning to incorporate a Triple Bottom Line (TBL) assessment into their budgeting processes,³² which go beyond traditional cost analysis, encompassing sociocultural, economic, and environmental factors and considering goals such as addressing climate change, promoting social equity and enhancing efficiency to achieve sustainable solutions.

Decisions about planning, prioritization and implementation of individual civic infrastructure projects also involve politics, as elected officials mediate their constituents' varied interests,

where local businesses and property owners team up to boost economic vitality and enhance the area's physical appeal. There are currently around 500 Business Improvement Areas

²⁸ International Downtown Association (IDA) Canada, "Written Submission for the Pre-Budget Consultations in Advance of the Upcoming Federal Budget."

²⁹ Clark and Edwards, "Bandwagon Placemaking: Kitchener's Collaborative Approach to Urban Design - Building."

³⁰ Federation of Canadian Municipalities, "The Canada Community-Building Fund."

³¹ British Columbia. Ministry of Housing and Urban Systems, "Complete Communities: A Guide to Geospatial Land Use Assessments for British Columbia's Communities."

³² City of Saskatoon, "Triple Bottom Line."

including individual residents, business owners, and local interest groups.³³ Digital tools can be useful at this stage in collecting data in a structured way that can feed into the budgeting and prioritization process (see Box 7: Participatory budgeting exercise in Lethbridge, AB).

Box 7: Participatory budgeting exercise in Lethbridge, AB

In 2021, when the **City of Lethbridge** was prioritizing capital projects for its forthcoming decade-long Capital Improvement Program (CIP), it opted to use [Ethelo's Citizen Budget](#) platform to involve residents more effectively in the process. Over 100 projects were considered (including an Urban Core Public Realm Enhancement Program), and Ethelo's assistance helped present these options in a more manageable way, leading to a significant increase in participation with over 4,000 unique visits and 2,007 participants. The platform's user-friendly, visually appealing, and informative features encouraged engagement and allowed participants to weigh priorities and make informed choices, providing the city with valuable data on community-supported projects.³⁴

Evaluating impacts of investments

Even with the most sophisticated tools, predicting the outcomes of a particular civic infrastructure investment strategy is almost impossible. Whether a city is implementing a single large infrastructure project or a series of small pilot projects, a crucial aspect of these initiatives is measuring their impact by identifying a clear set of desired outcomes, selecting appropriate metrics aligned with these outcomes, and collecting high-quality data before, during, and after implementation that enable local government staff and main street stakeholders to build compelling narratives for further main street transformations.³⁵ (see Box 8: City of Calgary's Main Street Program)

Box 8: City of Calgary's Main Street Program

While the **City of Calgary's** [Main Street program](#) identified twenty-four Main Streets to develop and improve, the program aimed to focus on a select few main streets initially, ensuring success before implementing insights to boost growth across all main streets.³⁶ To measure success systematically, the Main Street Metrics program launched in 2022 with two annual surveys for main street businesses and the general public. The City hired a planning firm to develop a manual to guide staff in collecting and analyzing data to inform metrics related to the program's four principles. The goal is to combine these metrics with census and economic data to support a comprehensive evaluation of progress towards Main Streets Program objectives, which staff can visualize through a data dashboard.³⁷

For example, in response to COVID, many Canadian communities launched programs and pilot initiatives, such as pedestrianizing streets or installing temporary bike lanes, to make public spaces safer and encourage residents to support main street businesses. Pilot projects not only provide local governments with opportunities to experiment with different configurations of civic infrastructure before committing to more permanent investments but also to build up an evidence base demonstrating how small investments in civic infrastructure, when located strategically with other

³³ Nussbaum and Spessot, "The Five i's of Failed Urban Planning."

³⁴ Payne, "Lethbridge Capital Planning Case Study."

³⁵ Global Designing Cities Initiative, "How to Measure Streets"; Global Designing Cities Initiative, "How to Evaluate Street Transformations."

³⁶ City of Calgary, "The Main Streets Initiative: What We've Learned."

³⁷ O2 Planning and Design Inc., "Main Streets Streetscape."

assets, can positively impact local business activity and act as a catalyst for further revitalization of main streets.³⁸

Collecting data to monitor and evaluate the impact of civic infrastructure investments may also show that some strategies are less effective than others. For example, small investments that are spread too thin or not ambitious enough may not have an appreciable effect on overall main street conditions compared to a more targeted investment approach. There may also be negative consequences, such as the displacement of current businesses and residents due to commercial and residential rent increases after a significant public realm investment. Data can be used to identify shortcomings in the procurement and construction stages (see Box 9: Improving transparency and accountability for infrastructure investments through open contracting). For example, it can help to uncover unexpected cost overruns caused by inadequate planning or contractor inexperience. These insights are valuable and can be used by decision-makers to avoid similar mistakes in the future.

Box 9: Improving transparency and accountability for infrastructure investments through open contracting

As financial resources become more constrained and local governments are under pressure to do more with less, public-private partnerships (P3s) have become a popular strategy for financing and procuring new infrastructure investments.³⁹ In a main street context, these might take the form of Privately Owned Public Spaces (POPS), in which a public space is managed by a private entity and subject to private rules. P3 contracts can be very complex, involving multiple vendors and contractors. Monitoring procurement and contract costs and long-term expenses associated with higher private-sector financing costs is crucial in such cases.

However, without good data tracking the performance of municipal procurement processes, it can be nearly impossible to evaluate whether public funds are being spent in an accountable and transparent manner. The [Open Contracting Data Standard](#) is a key element of implementing open contracting as a practice into data management activities. Not only does this approach support municipalities in monitoring costs, but it also allows them to track contractor performance against other criteria, such as sustainable and equitable business practices, and can inform how the municipality approaches future contracts.⁴⁰ Under its National Action Plan on Open Government 2018-2020, the Government of Canada initiated a [pilot project testing the implementation of OCDS](#). However, to date, no Canadian municipalities have adopted the standard.

Summary

In this section, we have provided an overview of the key moments involved in the decision-making process related to civic infrastructure investments on main streets with a focus on the role of planning. As illustrated by the examples, there are several ways in which data and digital tools can be integrated into these decision points. Some projects are simple, while others are complex and ambitious, requiring significant resources to plan and implement successfully.

When considering a new data and technology-based project to address a main street challenge, it is essential to invest time at the beginning to thoroughly explore the problem and potential solutions. Without a good understanding of the problem, introducing a new piece of software or purchasing an

³⁸ Reimagining the Civic Commons, “Lessons on Leveraging Investments in the Public Realm.”

³⁹ Loxley and Loxley, “Asking the Right Questions.”

⁴⁰ Sklar, “A Procurement Path to Equity: Strategies for Government and the Business Ecosystem.”

expensive dataset can lead to investing limited resources in a project that does not make sense for the problem at hand, lacks stakeholder buy-in, or is mismatched to available capacity and resources.

In the next section, we outline key considerations and questions to guide local government staff in planning a main street-focused data project. This includes defining a challenge statement, developing a plan to acquire and manage the necessary data, and navigating common implementation challenges.

Part 2: Planning Data and Technology Projects for Main Street Challenges

This section is a companion piece to **Tool: Readiness Checklist for Planning Main Street Data and Technology Projects**. Use this checklist as a tool to help you think through your potential use case and assess your readiness to take on a data and technology project to tackle your main street challenge.

Framing the challenge

Developing an effective challenge statement

Before heading straight toward the implementation of a data and technology project, the first step is developing an effective challenge statement. A challenge statement should define the problem you want to address, why it is important, what outcomes are desired, and how a solution would achieve these outcomes. A well-designed challenge statement should balance vision with action,⁴¹ connecting local government priorities as set out in various plans and strategies (e.g., the Official Plan or Main Street strategy), specific civic infrastructure investment objectives, decision points required to realize them, and how data supports these decision points.

It is essential to approach a challenge with a realistic view as to what better use of data and technology can – and cannot – do. Not all challenges require a data and technology-based solution. There are many reasons that infrastructure investments on main streets fail to produce meaningful outcomes. These include:

- **Political influence:** Planning inherently involves politics, with stakeholders advocating for or against main street investments, often resulting in compromises.
- **Lack of coordination:** Challenges may arise from information siloes and poor communication among departments, agencies, and other stakeholders involved in civic infrastructure projects.
- **Budgeting and resource constraints:** Insufficient funding capacity can hinder the initiation of new infrastructure investments.

If your organization does not have an existing culture of data-informed decision-making, it may be difficult to secure the necessary buy-in to move forward with the proposed project if it is overly ambitious. In these cases, consider how the project could be right-sized to demonstrate its value through a successful pilot use case or quick win. Starting with a more realistic and achievable objective, such as a data-sharing initiative to create a dashboard tracking critical main street metrics,

⁴¹ Claudel and Nitoslawski, “Creating Civic Value in Open Smart Communities.”

may make it easier to build a business case for scaling up the project to involve new main street areas or support a broader range of decision-making processes.

Engaging and collaborating with stakeholders

Local governments are typically best positioned to lead the planning of data and technology-based projects as they are closest to the decision-makers. However, city-building is a collective endeavour, many projects can benefit from collaboration with other stakeholders — residents, local businesses, community-based organizations and service providers, academic and research institutions, developers, and third-party data providers.

Conducting a thorough stakeholder mapping and engagement exercise will help staff understand the challenge from as many angles as possible and design a more effective solution. Consider which individuals or groups are directly or indirectly affected by the issue, what outcomes they want to see, what type of evidence would convince them that those outcomes have been achieved.

Stakeholder engagement may reveal opportunities to partner with other main street stakeholders invested in the same issue and share data, tools, expertise, and resources.⁴² For example, collaborations between local governments and non-profit organizations or academic institutions can prove to be mutually beneficial; the former can leverage needed expertise in data science and digital capacity, while the latter benefit from a direct connection with the city to inform their research on urban areas.

Local governments may also identify a main street stakeholder organization, such as a BIA, community-based organization, or service provider, that is willing to share data free of charge in return for non-monetary benefits. For example, smaller BIAs or local organizations may collect useful data that they do not have the staff or technical capacity to analyze and extract insights from. A collaboration in which the BIA or organization provides their data to the local government, which is then combined with other insights into a custom report to inform the BIA/organization's program delivery, could prove beneficial to all participants.⁴³

The decision about who to partner with and how to collaborate with them should align with the specific goals, risks, resources, and context of the project. Successfully navigating these dimensions requires careful planning, clear governance structures, and a shared commitment to realizing the benefits of data collaboration while addressing potential challenges.⁴⁴

⁴² Gagnon-Turcotte, Sculthorp, and Coutts, “Digital Data Partnerships: Building the Foundations for Collaborative Data Governance in the Public Interest.”

⁴³ Ontario Business Improvement Area Association (OBIAA) and Toronto Area Business Improvement Association (TABIA), “Return on Investment of BIAs Report.”

⁴⁴ GovLab, “Data Collaboratives.”

Sourcing and managing data

Identifying data needs

Once you have a challenge statement, the next step is identifying the types of data and analytical techniques that make sense for the project. This should be as much as possible based on evidence and best practices (e.g., from similar projects in other jurisdictions).⁴⁵

It may not always be possible to use quantitative data to establish direct causal connections between specific infrastructure investments and specific main street outcomes, especially regarding infrastructure assets that are part of a larger network/system (e.g., libraries, community centres, etc.). For this reason, projects can and should incorporate both quantitative data (e.g., vehicle, pedestrian and cyclist counts, amount of space dedicated to the public realm) as well as qualitative data (e.g., feedback from visitors, residents and main street stakeholders) to construct a well-rounded narrative that will resonate with key decision-makers.⁴⁶

It is important to establish a clear connection between the data analysis you want to do and the decision point you are seeking to influence. For example, staff may be aware that commercial storefront vacancies along a main street corridor are negatively affecting perceptions of the area, resulting in reduced foot traffic for remaining businesses. While the local government may already have programs that could be leveraged to animate vacant spaces or provide rent support to tenants, they may be ineffective without better data about how many vacant spaces exist, where they are located, and what factors have led to the vacancies. A compelling challenge statement would recognize the problem and its importance (commercial vacancies impact main street vitality), the desired outcome (fewer vacancies), and the role of data and technology in a solution (better data to help target existing supports where they are needed) (see Box 2: Visualizing main street vacancies).

Accessing existing data

Once data needs have been defined, the next step is identifying who holds relevant data for your use case, how you will access or obtain it, and how you will manage it once you get it. Data projects can often leverage data that has been collected for another purpose, such as data that has already been published under an open license (e.g., on a municipal open data portal). However, are many other data-sharing approaches that can be used to provide access under specific conditions, depending on the characteristics of the dataset in question.⁴⁷

Accessing data held by other departments

Local governments create or collect large amounts of data that can inform better decision-making throughout the infrastructure lifecycle. This includes data generated through administrative processes (e.g., property tax assessment, licensing and permitting), service delivery (e.g., client records), field observations (e.g., condition of infrastructure assets), and consultations conducted by city staff, among other activities. However, the organizational structure of many local governments means that each department or unit may have developed its own data practices over the years to fit its specific needs, not anticipating other potential use cases for their data. This can often lead to a

⁴⁵ Community Science, “Measuring Progress Toward Downtown Revitalization and Engaging Public Spaces: A Review of Existing Research.”

⁴⁶ Reimagining the Civic Commons, “Measuring the Civic Commons.”

⁴⁷ Open Data Institute, “The Data Spectrum.”

situation in which staff face significant difficulties in accessing other departments' data or may not even know it exists in the first place.

If a proposed data project involves only data that is held within the same organization, staff will need to factor in the necessary lead time to ask around various departments to find out what data exists within the organization and who holds it.

Accessing third-party data

Sometimes, a project will require data that is collected by a third party. Private-sector data aggregators compile information from various sources into comprehensive datasets that may provide important insights into main street conditions that would not be possible using only public data, on topics ranging from consumer behaviour to market trends, as well as main street foot traffic and visitor origins/destinations based on mobile device locations. Non-profit organizations and local service providers may collect data during the delivery of social services and programs that could provide insights that would support more inclusive civic infrastructure investments.

Whether data is licensed for a fee or provided free of charge, all parties need to be clear about the terms under which the data has been made available. Data-sharing agreements⁴⁸ or Memorandums of Understanding (MOUs) establish a set of shared expectations and build trust among partners. Elements that should be defined in data-sharing agreements include: the parties involved; the purpose and scope of the agreement; a clear definition of the data to be shared; the term of the agreement; specific data management standards that will be adhered to throughout the data lifecycle; and mechanisms for resolving disputes and amending the terms of the agreement.

For example, using data held by local service providers would first require clearly defining the proposed use case, identifying what kind of data points are required, identifying the level of data granularity required to achieve the project goals, and conducting a privacy impact assessment. If all parties can agree on a use case, the data-sharing agreement may stipulate that the data undergo an anonymization and aggregation process to ensure that no personally identifiable or sensitive details are disclosed in the version of the dataset provided to the local government users.⁴⁹

When considering licensing proprietary datasets, local governments should evaluate the financial implications and usage restrictions associated with them and explore the availability of open data sources. If it is determined that a particular dataset is necessary for the proposed use case but is cost-prohibitive, there may be an opportunity to explore a collective purchasing arrangement with other organizations to reduce individual costs.

Collecting new data

A local government looking to undertake a completely novel type of main street data and technology-based project may not be able to leverage existing data sources. In this case, new data collection may be required. Staff will need to determine the practicality of collecting data, considering factors such as resources, expertise, and adherence to established standards or best practices.

If staff will be deploying digital technologies (e.g., cameras or sensors) to collect data for the project, they should develop a plan to communicate to the public and other main street stakeholders about

⁴⁸ Zahuranec, Chafetz, and Verhulst, "Moving from Idea to Practice: Three Resources for Harnessing the Power of Data Sharing Agreements."

⁴⁹ Hawn Nelson et al., "Introduction to Data Sharing and Integration."

what data is being collected and how it will be used (e.g., by piloting the [Digital Trust for Places & Routines \(DTPR\)](#) open-source communication standard).

Ultimately, if there prove to be too many barriers to new data collection, staff may need to reassess their use case and consider alternative sources of data that could offer comparable insights with less effort and lower costs.

Creating a data management plan

To ensure the success of a data project, it's important to have a plan not just for acquiring the data, but also for managing it throughout its lifecycle. The specific data management requirements will vary depending on the type of project, but there are a few common elements that must be addressed in most data management plans:

- **Data quality management:** This means ensuring that the information collected is fit-for-use, complete, accurate, up-to-date, and reliable.
- **Metadata management:** Metadata provides context and structure to datasets, enabling data discovery across teams and organizations, and making it easier for decision-makers to understand and use the information. Metadata is also important when integrating third-party data sets, such as market research data, which may have usage restrictions as part of their data licensing agreements. A data inventory is a key document for managing metadata.
- **Access controls:** Data access controls are required to safeguard privacy and confidentiality and preserve intellectual property rights by ensuring that only authorized personnel can access and use a dataset. If you have obtained data via a data-sharing or licensing agreement, it may already specify the type of access controls that are required.

Depending on the specific software and hardware tools selected for the project (see Technology procurement), the data management plan may need to be adjusted to ensure that data is protected within that system in compliance with municipal legislation as well as any data-sharing or licensing agreements that may apply.

Assessing implementation capacity

While access to relevant data is a concern when embarking on a data project to inform a specific aspect of decision-making around main street civic infrastructure investments, the capacity to plan and implement the project is just as critical. Larger local governments may have the financial resources, administrative and staff capacity, procurement expertise required to plan and implement a project, but smaller local governments often do not.

Staff capacity

Successful data and technology projects need to be supported by adequate staff capacity. While larger cities may have IT teams who can support data and technology projects, many smaller communities may only have a single individual supporting their IT needs. Across organizations of all sizes, staff in departments or units that work most closely on main street-related issues may not have the ability to take on additional responsibilities or dedicate time to acquiring new technical skills required for implementing a new project to support data-informed decision-making.

A lack of staff capacity can be supplemented by bringing in temporary support from the civic technology community (for example, through [Code for Canada](#)) or hiring a student from a local academic institution through federal programs (e.g., [Canada Summer Jobs program](#)) or non-profit organizations such as [MITACS](#), which provides funding and connects local governments to post-secondary researchers who can support on a variety of municipal projects. Smaller main street data challenges may be a better fit as a studio project in partnership with urban planning programs at

post-secondary institutions, which allow undergraduate or graduate students to gain practical experience while working with community-based clients and bringing additional capacity and fresh perspectives to local planning issues.

However, while bringing in outside support for data and technology projects can be an effective strategy to shore up a lack of in-house capacity, local governments need to be aware that these are temporary solutions. Regular outsourcing can lead to a state of chronic underinvestment in an organization's digital skills and capabilities.⁵⁰

Technology procurement

Collecting and extracting insights from data requires the use of digital tools (i.e., software and hardware). Many local governments will already have basic tools (e.g., Excel) as well as more advanced ones (e.g., GIS, business intelligence software) at their disposal. If the proposed project requires capabilities beyond those of the organization's existing technology holdings, then project champions will need to consider procuring new technology.⁵¹

Regardless of the type of technology being procured, project leads will need to identify their requirements, conduct a market scan to identify available options, and evaluate these options against their project requirements to select the best option. When it comes to software for a new project, it may be preferable to go with an option that has modular feature sets that can be right-sized to municipal needs and available hardware. Beyond the features of the software itself, staff should perform due diligence before entering into service agreements with a software vendor to avoid potential vendor lock-in and unsustainable long-term costs. Open-source software can also be used in a variety of projects, from creating a simple dashboard of main street indicators to more involved projects such as a main street-focused open data portal. However, while it can appear to be a more cost-effective option up front, open-source software carries risks as it may not come with access to technical support and may require more time and resources to set up and maintain properly.

New hardware may be required in cases where data needs to be collected, such as handheld GIS units to record precise location-based data (see Box 2: Visualizing main street vacancies). Connected technologies such as sensors and cameras integrated into the main street landscape can also collect data about activity levels, environmental conditions, etc. However, as shown by the public response to the Sidewalk Labs' proposal for a neighbourhood built "from the internet up" on Toronto's waterfront, or smaller initiatives like the installation of street furniture such as LinkNYC's smart kiosks, public concerns need to be taken seriously when considering new deployments of data-collecting technology in public spaces. As part of the procurement process, local government staff will need to systematically assess the technology's features and capabilities,⁵² and carefully consider privacy risks, data ownership, ongoing costs and maintenance requirements.⁵³

Access to funding

Many capacity challenges ultimately come down to funding, which is always limited. Project champions may be able to leverage more resources if the value proposition (see Framing the challenge) for the project is broad enough to create buy-in from multiple departments or business

⁵⁰ Claudel and Nitoslawski, "Creating Civic Value in Open Smart Communities."

⁵¹ Claudel and Wylie, "Technology Procurement: Shaping Future Public Value."

⁵² City of Asheville, "Technology Procurement Governance Checklist."

⁵³ Robinson, "The State of Good Repair: Maintenance & Innovation in Smart City Projects."

units (e.g., planning, public works, economic development, transportation) and a willingness to share costs across their respective budgets.

Federal and provincial support programs are often instrumental in helping less well-resourced local governments to develop the necessary digital capacities to use data effectively in their decision-making that they otherwise would not be able to develop on their own. The Federation of Canadian Municipalities (FCM) administers several major funding programs that can be accessed by local governments, such as the [Green Municipal Fund](#) (GMF) and the [Municipal Asset Management Program](#) (MAMP). Programs such as these could be leveraged to fund studies and build capacity that supports better decision-making for main streets as part of a larger municipal initiative, if it is aligned with the funding organization's mandate. However, funding sources may only be available as a one-time offering which cannot be relied upon to sustain the project over time.

Summary

In this section, we outline key issues and questions that local government staff should consider when assessing their readiness to plan and implement a data and technology project to address a main street challenge in their own community.

While planning stages of a data and technology project are critical for setting it up for a successful launch, the work doesn't end at implementation. Once the data project is up and running, it is important to keep track of how well the project is meeting its objectives, identify areas where it can be scaled up for greater impact, and communicate its success stories to main street decision-makers, stakeholders, and the public.

Conclusion

Local governments are faced with a dilemma when it comes to making investments in civic infrastructure that support main streets: with limited resources, they need to be strategic and deliberate about where to focus their investments, make tough choices, and prioritize accordingly to deliver better social, environmental, and equity outcomes in addition to value for money.⁵⁴

This will not happen if local governments stick to business-as-usual decision-making processes that lead to infrastructure investments with long-term liabilities and unsustainable maintenance obligations.⁵⁵

The time has come for local governments to recognize how better use of data and technology can help them understand what is happening in their communities, offer insights into potential solutions, and eventually support better decisions about when, where, and how to invest in civic infrastructure to create healthy, vibrant main streets.

Transitioning to a culture of data-informed decision-making necessitates acknowledging data as a strategic asset for achieving organizational goals, whether it's fostering livable communities, enhancing civic participation, promoting innovation, or improving service delivery. These goals drive decisions about managing and utilizing data responsibly and effectively, with a data governance framework serving as a roadmap for success.

For local government staff in organizations still evolving in their data maturity, there are abundant opportunities to integrate data into main street decision-making processes. However, when local

⁵⁴ Robinson, 9.

⁵⁵ Herriges, "How Should Canada's Cities Use the Housing Accelerator Fund?"

governments demonstrate vision and embrace a deliberate approach to data governance, the benefits go beyond just improvements to data management practices. Establishing a data governance framework involves cultural shifts, the development of strategic capabilities, fostering partnerships across stakeholder groups, and aligning vision with concrete actions⁵⁶ — all essential ingredients for planning data and technology initiatives that align with broader strategies aimed at revitalizing main streets across Canadian communities.

⁵⁶ Claudel and Nitoslowski, “Creating Civic Value in Open Smart Communities.”

References

- Archer, John, and Judy Morgan. “Supporting Main Street Recovery through Small-Business-Friendly Policy.” *Bring Back Main Street Solution Briefs*. Canadian Urban Institute, September 2020. https://bringbackmainstreet.org/s/360-Solutions-Brief_FINAL_13Oct2020.pdf.
- Biggar, Jeff. “Investing in the Public Realm: Challenges, Opportunities, and Lessons for Toronto.” ERA Architects, May 2015. <https://www.eraarch.ca/wp-content/uploads/2015/06/Investing-in-the-Public-Realm-Jeff-Biggar.pdf>.
- British Columbia. Ministry of Housing and Urban Systems. “Complete Communities: A Guide to Geospatial Land Use Assessments for British Columbia’s Communities.” Province of British Columbia, 2023. <https://toolkit.bc.ca/tool/complete-communities-a-guide-to-geospatial-land-use-assessments-for-british-columbias-communities/>.
- Canadian Urban Institute. “In It Together: Bringing Back Canada’s Main Streets - Action Report,” October 2020. <https://canurb.org/publications/in-it-together-bringing-back-canadas-main-streets/>.
- . *OVERDUE: The Case for Canada’s Public Libraries*. Canadian Urban Institute and the Canadian Urban Libraries Council, 2023. https://canurb.org/wp-content/uploads/CUI_Overdue_report_10.04.23.pdf.
- City of Asheville. “Technology Procurement Governance Checklist.” Google Drive, January 4, 2023. <https://docs.google.com/spreadsheets/d/e/2PACX-1vTNefGUaZ7E1eLfgcaukzdbqYKpTPyl6G9DvNqOyM9kPAodKr-zPmBU7syKIQeQodWiQvzq66HwvWHs/pubhtml?gid=0&single=true>.
- City of Calgary. “The Main Streets Initiative: What We’ve Learned,” 2015. <https://www.calgary.ca/content/dam/www/pda/pd/documents/main-streets/main-streets-what-we-ve-learned.pdf>.
- City of Saskatoon. “Triple Bottom Line,” January 15, 2024. <https://www.saskatoon.ca/city-hall/our-strategic-plan-performance/triple-bottom-line>.
- Clark, Adam, and Dayna Edwards. “Bandwagon Placemaking: Kitchener’s Collaborative Approach to Urban Design - Building.” *Building*, November 6, 2020. <https://building.ca/feature/bandwagon-placemaking-kitcheners-collaborative-approach-to-urban-design/>.
- Claudel, Matthew, and Sophie Nitoslawski. “Creating Civic Value in Open Smart Communities.” *Community Solutions Network White Paper*. Future Cities Canada, October 2021. https://opennorth.ca/wp-content/uploads/legacy/2021-Creating_Civic_Value_in_Open_Smart_Communities-Claudel____Nitoslawski.pdf.
- Claudel, Matthew, and Bianca Wylie. “Technology Procurement: Shaping Future Public Value.” *Community Solutions Network Research Brief*. Open North, 2021. <https://opennorth.ca/resources/technology-procurement-shaping-future-public-value/>.
- Climate Atlas of Canada. “Building a Climate-Resilient City.” *Climate Atlas of Canada*. Accessed October 5, 2023. <https://climateatlas.ca/building-climate-resilient-city>.
- Community Science. “Measuring Progress Toward Downtown Revitalization and Engaging Public Spaces: A Review of Existing Research.” Knight Foundation, July 2020.

- <https://knightfoundation.org/wp-content/uploads/2020/07/KF-Measuring-Progress-toward-Downtown-Final.pdf>.
- Draaisma, Muriel. “Use Surplus Public Lands ‘more Aggressively’ to Create Affordable Housing, Researcher Says.” CBC News, April 29, 2019. <https://www.cbc.ca/news/canada/toronto/ryerson-university-report-affordable-housing-downtown-parcel-sold-1.5115645>.
- Evergreen. “AI for the Resilient City: A Communications Toolkit - City of Calgary.” Evergreen, December 2022. <https://futurecitiescanada.ca/portal/wp-content/uploads/sites/2/2022/12/ai-for-the-resilient-city-a-communications-toolkit.pdf>.
- Fathom Studio. “Planning & Urban Design: Bring Back Main Street.” Bring Back Main Street Solution Briefs. Canadian Urban Institute, 2021. https://bringbackmainstreet.org/s/BBMS-URBAN-DESIGN_Oct-16-FINAL.pdf.
- Federation of Canadian Municipalities. “Backgrounder: New Research—Canada’s Housing Challenge Is Also an Infrastructure Challenge,” November 27, 2023. <https://fcm.ca/en/news-media/news-release/new-research-canadas-housing-challenge-also-infrastructure-challenge/backgrounder>.
- . “Infrastructure.” Federation of Canadian Municipalities, October 6, 2023. <https://fcm.ca/en/focus-areas/infrastructure>.
- . “The Canada Community-Building Fund,” December 1, 2023. <https://fcm.ca/en/focus-areas/infrastructure/canada-community-building-fund>.
- Gagnon-Turcotte, Sarah, Miranda Sculthorp, and Steven Coutts. “Digital Data Partnerships: Building the Foundations for Collaborative Data Governance in the Public Interest.” Open North, February 2021. https://opennorth.ca/wp-content/uploads/legacy/Digital_Data_Partnerships_Report-EN.pdf.
- Gardner, Betsy. “Equity as Practice, Not Product.” *Data-Smart City Solutions* (blog), June 21, 2023. <https://datasmart.hks.harvard.edu/equity-practice-not-product>.
- Global Designing Cities Initiative. “How to Evaluate Street Transformations.” Global Designing Cities Initiative. Accessed August 28, 2023. <https://globaldesigningcities.org/publication/how-to-evaluate-street-transformations-english/>.
- . “How to Measure Streets.” Global Designing Cities Initiative. Accessed December 5, 2023. <https://globaldesigningcities.org/publication/global-street-design-guide/measuring-evaluating-streets/how-to-measure-streets/>.
- Government of Ontario. Premier’s Community Hubs Framework Advisory Group. “Community Hubs in Ontario: A Strategic Framework and Action Plan.” Government of Ontario, 2015. <http://www.ontario.ca/page/community-hubs-ontario-strategic-framework-and-action-plan>.
- GovLab. “Data Collaboratives,” September 13, 2022. <http://datacollaboratives.org/explorer.html>.
- Hannah Mira Friedland and Marta Olmos. “Main Spotlight: Four Steps Toward More Resilient Main Streets,” September 13, 2022. <https://www.mainstreet.org/blogs/national-main-street-center/2022/09/13/main-spotlight-four-steps-toward-more-resilient-ma>.
- Hawn Nelson, A., D. Jenkins, S. Zanti, M. Katz, T. Burnett, D. Culhane, and K. Barghaus. “Introduction to Data Sharing and Integration.” Philadelphia: Actionable Intelligence for

- Social Policy. University of Pennsylvania, 2020. <https://aisp.upenn.edu/introduction-to-data-sharing/>.
- Herriges, Daniel. “How Should Canada’s Cities Use the Housing Accelerator Fund?” *Strong Towns*, July 25, 2023. <https://www.strongtowns.org/journal/2023/10/25/how-should-canadas-cities-use-the-housing-accelerator-fund>.
- International Downtown Association (IDA) Canada. “Written Submission for the Pre-Budget Consultations in Advance of the Upcoming Federal Budget,” August 2023. <https://downtown.org/wp-content/uploads/2023/08/IDA-Canada-2024-Pre-Budget-Submission.pdf>.
- Kinman, Lexi. “Embedding Equity in Park Planning.” *The 2023 Canadian City Parks Report*, 2023. <https://ccpr.parkpeople.ca/2023/stories/embedding-equity-in-park-planning>.
- Loxley, John, and Salim Loxley. “Asking the Right Questions: A Guide for Municipalities Considering P3s.” *Canadian Union of Public Employees (CUPE)*, October 15, 2020. <https://cupe.ca/guide-municipalities-p3s>.
- Nitoslawski, Sophie. “Managing Urban Green Infrastructure for Climate Change Through an Open Smart City Lens.” *Community Solutions Network Research Brief*. Future Cities Canada, April 2021.
- Nussbaum, Tobi, and Miranda Spessot. “The Five i’s of Failed Urban Planning.” *Policy Options*, November 8, 2017. <https://policyoptions.irpp.org/magazines/november-2017/the-five-is-of-failed-urban-planning/>.
- O2 Planning and Design Inc. “Main Streets Streetscape.” O2. Accessed October 4, 2023. <https://www.o2design.com/main-streets-streetscape>.
- Ontario Business Improvement Area Association (OBIAA) and Toronto Area Business Improvement Association (TABIA). “Return on Investment of BIAs Report,” April 2017. <https://obiaa.com/wp-content/uploads/2017/11/roi-of-bias-report.pdf>.
- Open Data Institute. “The Data Spectrum.” Accessed September 9, 2020. <https://theodi.org/about-the-odi/the-data-spectrum/>.
- Open North. “Finding Common Ground: Integrating Climate Action for Open Smart Communities in Canada.” *Open North*, April 2022. <https://opennorth.ca/publications/finding-common-ground-integrated-climate-action-for-open-smart-communities-in-canada/>.
- Payne, Colin. “Lethbridge Capital Planning Case Study.” *Ethelo* (blog). Accessed November 16, 2023. <https://ethelo.com/case-studies/lethbridge-capital-planning-case-study/>.
- Pitter, Jay. “Equitable Infrastructure: A Resource Framing Infrastructure Types Using an Equitable Placemaking Lens.” *Community Foundations of Canada*, August 2021. <https://communityfoundations.ca/wp-content/uploads/2019/04/Equitable-Infrastructure-National-Infrastructure-Assessment-Final-English-Ver.-August-10-2021.pdf>.
- Reimagining the Civic Commons. “Lessons on Leveraging Investments in the Public Realm.” *Reimagining the Civic Commons* (blog), August 3, 2021. <https://medium.com/reimagining-the-civic-commons/lessons-on-leveraging-investments-in-the-public-realm-e608fo22df8c>.
- . “Measuring the Civic Commons.” *Reimagining the Civic Commons* (blog), January 18, 2018. <https://civiccommons.us/2018/01/measuring-civic-commons/>.

- Robinson, Pamela. “The State of Good Repair: Maintenance & Innovation in Smart City Projects.” Community Solutions Network Research Brief. Open North and Evergreen, February 2021. <https://opennorth.ca/wp-content/uploads/2022/06/RB-State-of-Good-Repair.pdf>.
- Robinson, Pamela, and Peter A. Johnson. “Pandemic-Driven Technology Adoption: Public Decision Makers Need to Tread Cautiously.” *International Journal of E-Planning Research (IJEPR)* 10, no. 2 (2021): 59–65. <https://doi.org/10.4018/IJEPR.20210401.0a5>.
- Rutgers, Julia-Simone. “Can Natural Infrastructure Help Revitalize Winnipeg’s Downtown?” *The Narwhal* (blog), January 4, 2023. <https://thenarwhal.ca/downtown-winnipeg-natural-infrastructure/>.
- Sheppard, Seaira. “A New Tool to Calculate the Lifecycle of Infrastructure.” Strong Towns, March 28, 2023. <https://www.strongtowns.org/journal/2023/2/23/new-tool-calculate-lifecycle-infrastructure>.
- Siemiatycki, Matti, Drew Fagan, and Robert Nutifafa Arku. “Land Value Capture Study: Paying for Transit-Oriented Communities.” Toronto: Infrastructure Institute, School of Cities, University of Toronto, April 2023. <https://infrastructureinstitute.ca/wp-content/uploads/2023/04/CIB-Land-Value-Capture-Study-April-2023.pdf>.
- Siemiatycki, Matti, Dipika Giritharan, and Ismail Alimovski. *How to Leverage Underutilized Municipality-Controlled Real Estate to Create Vibrant Communities*. Evergreen and Future Cities Canada, 2023. <https://futurecitiescanada.ca/portal/wp-content/uploads/sites/2/2023/03/csn-research-brief-how-to-leverage-underutilized-real-estate-march-2023.pdf>.
- Sklar, Kaye. “A Procurement Path to Equity: Strategies for Government and the Business Ecosystem.” Open Contracting Partnership and Aspen Institute Center for Urban Innovation, 2020. <https://www.open-contracting.org/wp-content/uploads/2020/11/OCP-AspenCUI-2020-Pathway-to-Equity.pdf>.
- Slack, Enid, and Almos T Tassonyi. “Financing Urban Infrastructure in Canada: Who Should Pay?” Toronto: Institute on Municipal Finance and Governance, Munk School of Global Affairs University of Toronto, 2017. https://tspace.library.utoronto.ca/bitstream/1807/79554/1/imfgpaper_no34_financinginfrastructure_slack_tassonyi_Nov_9_2017.pdf.
- Zahuranec, Andrew J, Hannah Chafetz, and Stefaan Verhulst. “Moving from Idea to Practice: Three Resources for Harnessing the Power of Data Sharing Agreements.” The GovLab, 2023. <https://www.dsa.opendatapolicylab.org/s/A-Guide-to-Data-Sharing-Agreements.pdf>.
- Zogalis, Elizabeth. “Montreal Announces New Plan to Tackle Urban Inequalities.” Global News, October 6, 2023. <https://globalnews.ca/news/10010647/montreal-announces-new-plan-to-tackle-urban-inequalities/>.

Tool: Readiness Checklist for Planning Main Street Data and Technology Projects

Framing the challenge

Developing an effective challenge statement

- What is the main street challenge you want to address with this project?
 - Why is addressing this challenge important?
 - What are the short-term and long-term implications of not addressing this challenge?
- What outcomes are you hoping to achieve?
 - How do these outcomes align with broader community objectives?
 - Is there a role for a data and technology project in supporting these outcomes?

Engaging and collaborating with stakeholders

- Have you engaged stakeholders in defining the challenge?
 - Are there any stakeholders not currently engaged who may offer valuable perspectives?
- Would the proposed project benefit from collaboration with others?
 - Do you have existing relationships you could leverage into a partnership?
 - Have you defined a clear value proposition for potential partners?
 - Does each partner have the necessary resources and capacity to participate?

Notes

Further resources:

- [Main Street Data Primer: A Resource for Policymakers, Main Street Stakeholders and Urban Researchers](#) (Canadian Urban Institute)
- [From Consultation to Co-Creation in the Open Smart City: Toolkit for Public Engagement](#) (Evergreen and Digital Justice Lab)
- [Design Thinking Modules](#) (Evergreen)

Sourcing and managing data

Identifying data needs

- What types of quantitative and qualitative data are required to understand your challenge and develop effective solutions to it?
- What kind of analytical techniques and methods will you use?
- How will you communicate findings to stakeholders?

Collecting new data

- Does the project require new data collection?
- Is it feasible to collect this data? Does it require special technology?

Accessing existing data

- Does the project require accessing data held by another department or a third-party source?
- What terms, conditions or costs are associated with using this data?
- Do you anticipate other barriers to accessing this data?

Data management

- Do you have a plan in place to manage data throughout the project lifecycle?
- What data quality standards are important for your project?
- How will access be controlled?
- Who will be the designated data steward for each dataset?

Notes

Further resources:

- [Main Street Data Primer: A Resource for Policymakers, Main Street Stakeholders and Urban Researchers](#) (Canadian Urban Institute)
- [Moving from Idea to Practice: Three Resources for Harnessing the Power of Data Sharing Agreements](#) (Open Data Policy Lab)
- [Introduction to Data Sharing and Integration](#) (AISP)
- [Data Responsibility Journey](#) (The GovLab)

Assessing implementation capacity

Staff capacity

- Do you have staff with the necessary skills, knowledge, and time to implement and support this project?
- Is there an opportunity to add staff capacity for this project (hiring, training, additional budget, etc.)?
- Are there opportunities to bring in temporary outside support?

Technology

- Does your organization have the software and/or hardware needed for the project?
 - Are there proprietary products on the market that would meet project needs?
 - Are there open-source solutions that would meet project needs?
- Have you assessed the upfront and ongoing costs associated with these products?
- Have you assessed privacy and security risks associated with these products?

Funding

- Is there sufficient funding to launch the project?
- Is there an opportunity to pool departmental budgets?
- Are there external funding sources that could be leveraged?
- How will the project be sustained after one-time funding has been exhausted?

Notes

Further resources:

- [Municipal Digital Transformation Guidebook](#) (NDI)
- [Process Code for Software Procurement](#) (Foundation for Public Code)
- [Innovation Toolkit: A Community Resource for Data and Technology Projects](#) (Evergreen)