Local Government Digitalization:
Best Practices from Canadian Municipalities
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Anthony N. Fernando, MPA

We live in a world where our most valuable resource is data. In recent years, many municipalities have undertaken a technology review to take stock of their existing information technology (IT) infrastructure and legacy software applications to understand where to make investments. With the cost of data storage decreasing and the introduction of fifth generation wireless technology (5G), digital payments, identification, streaming, and record keeping will be mainstream for nearly every organization. Municipalities must be ready to adapt to changing public expectations and make decisions based on best practices. This paper is a guide to officials considering digital service options. It is based on interviews with more than 30 municipal officials and a focus on the important considerations for implementation. After a thorough analysis of the data gathered, it is clear that every municipality is unique and therefore must cater to their community's particular needs when considering digital service tools. Working closely with its community stakeholders, software vendors, and other municipalities are the core recommendations to facilitate the digitalization of local government resources.

Keywords: digital service, digital tools, digitalization, technological tools, digital technology

Introduction

The Canadian public has grown accustomed to using high speed technology to access goods and services. With convenience at our fingertips, innovations by private sector organizations have created new public expectations for government service delivery. Service providers, including hospitals, grocery stores, and banks all have smartphone applications allowing us to order, adjust, or cancel services at the touch of a few buttons. As Canadians, we now expect to be able to use the same technological tools to access services from the municipal order of government.

Through digital service tools, we can now renew our licence, access personal records, and pay property taxes all from the comfort of our home. Similarly, business owners can find locations of office buildings to lease, apply for grants to offset the cost of hiring new staff, and access training modules all through online platforms. With the digitalization of local government resources, this has created an opportunity to identify the challenges faced and the lessons learned for other local governments considering similar tools, as outlined in the following paper.

Unexpected benefits of the COVID-19 pandemic

As it became clear that the COVID-19 pandemic was going to be a long-term challenge, there was even wider recognition that the transition to digital tools was necessary in order for small businesses to survive and for municipal governments to continue serving the population. COVID-19 served to boost digital service delivery advocates and pushed for the establishment of these tools more widely with many individuals already accustomed to digital options.

During this time, all three orders of government worked together to launch the Digital Mainstreet program, in partnership with several technology giants such as Google, Facebook, and Shopify. Through this program, small business owners across Canada were able to receive much needed support to launch e-commerce operations with "a digital assessment, online training and a one-time $2,500 grant to implement their digital transformation plan" ("Ontario Grants", n.d.). Municipalities were also able to access funds to hire Digital Service Squads to further support local business owners as they shifted operations online. Feedback received from municipal officials confirms that this initiative has been an overwhelming success, helping sustain and grow thousands of small businesses across Canada during these challenging times ("Ontario Grants", n.d.).

Challenges and threats to the adoption of digital tools

Capacity and financial resources

In the transition to the digitalization of resources, there are multiple challenges faced by local municipalities. One of these challenges lies in their staff capacity and financial resources. Often equipped with antiquated legacy software and digital systems that are cumbersome, difficult to maintain, and unadaptable as new requirements emerge, many municipalities have a need for updated technology resources. These tools, however, require time to source and implement. What's more, they are often linked to high fees that must be paid to software vendors.

Staff, particularly in smaller municipalities, sometimes lack the technical acumen to make informed purchases. There is also a lack of understanding on how to structure vendor agreements to ensure they protect all necessary data, position the municipality to shift to another vendor with ease, if required, and add to the scope of the software at a later point, without prohibitive additional costs. In the interviews conducted, several officials acknowledged that their lack of understanding in these areas may limit their openness to the digital tools they may propose to other staff and Council members. Inexperience can thus create anxiety and a reluctance to propose ideas.

In addition, for most Canadian municipalities where the tax base is growing at a rate lower than inflation, they are having to do more with less every year. Due to limited financial resources, staff must carefully evaluate digital tool options with cost-benefit and lifecycle estimating to determine if the fees paid will have the intended return.

Wide scope of service delivery

Another challenge municipal officials encounter relates to scope. There is a wide array of services that municipal corporations deliver to a broad group of stakeholders, making goal setting and the procurement of digital solutions a laborious task. Choosing which stakeholder groups should benefit from digital solutions and for which services sometimes leads municipal officials to choose a comprehensive software solution that attempts to serve all departments and fully integrate into all facets of municipal service delivery. Selecting a technology tool that seeks to be a "one size fits all" solution increases cost, delivery time, training requirements, and maintenance fees. This approach often results in a software tool that is overly complex for staff, residents, and stakeholders.

In the same light, the wide scope of municipal service delivery makes it so that different departments often have separate software tools in place, likely never designed to operate in conjunction. For example, the Transportation Services department may have a software tool to track applications and permits for road closures during events such as a film production. This software may be entirely different from the tool the Economic Development Office (EDO) uses to track studios seeking to book a location for shooting. If the film company submits an online application for a shoot location with a road closure, how does that data get shared with relevant departments? How do two separate software packages communicate so that staff in both departments can benefit from the digital data entered and work together to serve the client? These questions illustrate the challenge of workflows and software interoperability. When software tools are not integrated, this challenges the interactions business stakeholders have with the municipality and limits effective collaboration between departments.

A limiting procurement approach

Concerning the purchasing of new software technology, several officials noted their frustration with the current municipal procurement approach and how it limits idea generation. Typically, procurement staff work with various departments to draft a formal *Request for Proposal (RFP)* and invite appropriate vendors to submit applications. The RFP prescribes a digital solution but is limited to the knowledge and expertise of city staff. During the RFP process, staff are prevented from having informal discussions with potential vendors to maintain a fair process.

When municipal officials use a *Request for Information (RFI),* they typically get a marketing

presentation since vendors do not want to share their best ideas, fearing that it will be accessed by their competitors through the *Freedom of Information Request* process. Furthermore, they are not willing to invest much time and energy into an RFI given there is no guarantee they will be awarded a contract.

Moreover, Canadian municipalities are creatures of the provincial order of government and under strict legislation regarding the collection, storage, and dissemination of data. Some provinces have legislation requiring any third-party vendor that collects personal information to ensure that the data is always stored within Canada. Several officials stated that due to the emphasis on privacy and security, valuable resources are pulled away from building and maintaining new digital tools.

Corporate culture and community cohesion

According to several officials, one of the biggest obstacles to introducing a successful digital tool and its long-term success can be the corporate culture within an organization. Some municipalities do not fully nurture or resource a new tool and it fails since staff and clients are not aware of it. In other cases, a poor corporate culture between two or more departments or senior staff inhibits the necessary internal collaboration needed to successfully procure and launch a new digital service tool. The lesson here is that the best digital tools are still underpinned by collaborative staff and stakeholder interactions.

As more municipalities adopt digital tools, several officials further expressed their concern that over time, these tools may weaken the bonds within the community. One official referred to a conversation he had with a bank manager to illustrate his point. He noted that, "Online banking was great for the customer, but terrible for the bank. People stopped coming in and we didn't have the same opportunity to speak to them about new services"(C. Blum, personal communication, August 13, 2021). In much the same way, municipal officials are concerned about the diminished opportunity to engage with the public to inform them of new programs or to receive valuable feedback on how a new city initiative is going.

Ransomware attacks

As digital tools become more pervasive, the threat of a data breach or hacking incident will only increase. In Ontario alone, the communities of Stratford, Woodstock, Wasaga Beach, and Midland were all hit by ransomware attacks in the last few years. Wasaga Beach paid the online extortionists $35,000, while Midland did not disclose how much it paid (Vomiero, 2018).

In 2019, a group of criminals gained control of Stratford's computer servers, locking out municipal employees. Stratford Police Chief Greg Skinner commented that they were "holding hostage the data of the city, and they were demanding a ransom, or money, in return [for] the

release of that information in the form of Bitcoin" (as cited in Simpson, 2019).

In April 2021, the City of Saint John, New Brunswick was also hit by a cyber attack that held the city's network hostage (Ibrahim, 2021). The hackers asked for bitcoin worth $17-$20 million to release the network, but officials refused, choosing instead to rebuild from scratch and hire a private firm to investigate the incident, costing about $2.9 million. The city's insurance policy covered 85%, leaving the remainder borne by taxpayers (Ibrahim, 2021). These examples illustrate the growing risk for municipalities as more begin adopting digital tools.

Cyber attacks such as ransomware are ultimately an opportunistic business. Canadian municipalities are considered lucrative considering their possession of residents' and businesses' sensitive information, including taxation and election data, 911 and emergency dispatch, water sewer controls, and much more. Since most of these essential services cannot be paused, attackers know that municipal officials require a speedy resolution.

Equally frustrating for municipal officials is whether extortionists have actually stolen any data. In a ransomware attack on the Resort Municipality of Whistler in 2021, cyber criminals claimed to have accessed about 800 gigabytes of data, including a large amount of personal information (Dupuis, 2021). Experts claim that data is only stolen in 70% of ransomware attacks, but it is sometimes impossible to confirm what data the attackers have, "These are criminal organizations. They don't always tell the truth", noted Brett Callow (as cited in Dupuis, 2021), a threat analyst with cyber security company Emsisoft.

Best practices: Summary of recommendations

Assessing the needs of public and internal stakeholders

For community members, municipal websites can be difficult to navigate given the wide range of services available. It cannot be understated how important an easy to navigate website is for the public and external stakeholders as a service delivery, marketing, and investment attraction tool. Municipal officials should strive to make their websites user friendly, while still ensuring it is a repository of information.

In order to do so, a focused approach provides clarity on whom the municipality intends to serve with a new digital tool, its effectiveness, and its value for both the local government and associated stakeholders. Some officials expressed disappointment that the digital tools they developed were not as popular as expected. Whether it is a new online business registration form or a geographic information system (GIS) portal, municipal staff must be confident that individuals and businesses in their community will benefit from any digital tool they use.

At the same time, the implementation of new digital tools is often difficult for staff, signaling the

importance of specialized training in effectively implementing the new software. The training should be practical and consider the workflow process between clients and departments. If staff do not know how to use a new digital software tool, the system will fail, highlighting the need to have specialized change management consultants to smooth out the inevitable workflow implementation process.

Choosing vendors and software carefully

Given the wide scope of service delivery provided by municipalities, the option to add new components to an acquired digital tool should be explored in the initial procurement stage, since current requirements may not necessarily meet the needs of tomorrow. Key considerations when selecting a software vendor and digital service provider include the flexibility to adapt a digital tool if needed and the alternative options available should there be a desire to adopt a different software package. It is equally important to consider the possibility of data recovery from the vendor, as well as all hidden lifecycle costs associated with these transactions.

Another critical factor in the digitalization process is the interoperability of software, since it underpins the efficient workflows between departments. Municipal officials should strive for an "end-to-end" digital process as this creates the best opportunity to have efficient workflows between staff teams and the fastest possible service for stakeholders.

In addition to these considerations is the jurisdiction of data storage. Some provincial and municipal governments specifically require all data collected by third party vendors to be stored within Canada. This helps ensure that legal recourse to recover that data is more easily exercised. One of the biggest concerns of municipal officials is the privacy and security of data collected. During the procurement process, potential vendors should be required to demonstrate how they will store sensitive data and prevent potential cyber attacks.

Benchmarking and program evaluation

In order for staff to evaluate the success of a new technology tool, a program evaluation model should be implemented. During the procurement phase, setting clear and realistic goals will enable all departments to understand their involvement and the stakeholder benefits of a new tool. For example, if a municipality is launching a new smartphone application for residents, how many downloads do staff anticipate for the first year? What types of service interactions will be most popular and how will this change workflows between departments? Effective planning and benchmarking enables the successful launch of a digital tool.

To ensure early and strong adoption of a new digital tool, municipal staff should consult, test, and engage with all affected stakeholders throughout the process, including the public and

internal users. Every community being characterized by different demographics, budgets, departments, councils, and different stakeholder expectations, a digital solution that works well for one municipality may not be appropriate for another. Project managers must therefore understand how a particular tool will affect the workflows of various departments, along with the training requirements, anticipated maintenance, and support required. Ongoing consultation should also be seen as a mechanism to ensure digital tools continue to provide value to the stakeholders over time.

Partnership building and information sharing

Several officials voiced their frustration with the absence of collaboration networks surrounding digital tool usage. Suggestions were made about the Municipal Information Systems Association (MISA), Association of Municipalities of Ontario (AMO), and the provincial government all playing a greater role in setting up a document repository. These groups are equally capable of creating new platforms for document sharing and model buying agreements to allow local governments to work more efficiently, as well as purchase software tools at lower costs.

In some upper and lower tier municipalities which serve the same community, Memorandum of Understanding (MOU) agreements have been created to address the sharing of data. The rationale for these MOUs is to enable staff in both municipalities to share data easily and allow for optimal service delivery. In 2019, the upper tier municipality of Niagara Region entered into a data sharing agreement regarding planning and development applications with its 12 lower tier municipalities. This agreement was underpinned by a recognition that the local planning and development process involved both upper and lower-tier of government. Feedback from staff confirms that this agreement has led to efficiencies on all sides, expedited service to applicants, and a more business-friendly climate for investors.

Data sharing MOUs can be a valuable tool to facilitate service delivery, promoting collaborative decisions in the best interest of the community. Provincial governments and municipal associations are well placed to prepare template MOU agreements which can be a resource to local governments. These MOU agreements can also involve private sector partners. In July 2021, FreshBooks, which is an accounting software company, announced a data sharing partnership with the government of Ontario to provide insight into how small businesses fared during the COVID-19 pandemic.

Leveraging municipal open data programs

With regards to the public sharing of data sets, many municipalities have an open data policy in place, enabling third party organizations and the public to develop better serving application tools. In Toronto, for example, some public transit riders use smartphone applications such as the

TTC Bus Tracker to view accurate arrival times based on the GPS coordinates of the city's bus fleet. This free application leverages the city's open data feed. These businesses typically derive a profit by selling advertising space on their applications and since they are run by third parties, the municipality bears no legal responsibility for their operations. Open data programs should be viewed as an opportunity for local governments to improve the digital tools offered to a community with little to no cost.

Mitigating cyber security threats

With ransomware attacks on the rise, it is crucial to mitigate the risk of cyber security threats. In an effort to stay current with the evolving nature of cyber security, it is recommended that proactive measures be taken and municipalities undertake an annual audit of their online risks to identify potential gaps. Involving third party ethical hacking reduces these risks and ensures the municipality does not face any unnecessary legal liability should a breach occur. Special cyber security insurance policies can also further mitigate the financial risks associated with an attack.

Some officials believe the Canadian Centre for Cyber Security at the Communications Security Establishment, which is the federal agency responsible for protecting Canada's communications networks from attack, should play a greater role in establishing standards and sharing information. In response to a growing number of attacks, the Association of Municipalities of Ontario (AMO) developed *A Municipal Cyber Security Toolkit: Best Practices to Guide and Improve Cyber Security Readiness*, which was released in 2020.

A cyber security threat also requires municipalities to adequately train staff on how to spot malicious attacks and deceptive inquiries**.** Most municipal data breaches occur through email phishing scams, where an employee inadvertently clicks on an email link which downloads a remote access software to their computer, "It's about training employees to not click that button, no matter how much they may want to hit it" ("Combating Cyber-Attacks", n.d.). To create a culture of awareness among municipal staff, cyber security training should be a regular occurrence.

Municipal officials should equally consider developing internal communication protocols in the event security breaches occur. In 2019, two City of Toronto agencies were hit by ransomware attacks but the City's Chief Information Officer (CIO) at the time was not notified due to the absence of clear protocols (Rider, 2019). This meant that critical information failed to be shared across the entire corporation, signaling the need for stronger security measures to be put in place.

Data governance policies

As digital tools become more pervasive and a greater amount of data is collected, municipal officials should consider developing an appropriate data governance framework outlining which staff should have access to data and when. Data governance is central to the municipality's privacy policy and its cyber security mitigation since threats also come from within the organization. Only the appropriate personnel should have access to sensitive data and this should be carefully tracked to prevent abuse.

Depending on the size of the municipality, data governance frameworks are typically developed by IT department leaders. Some municipalities in North America now have a Chief Information Security Officer (CISO) to help the corporation implement programs to mitigate and prevent cyber security risks. In other cases, this work is integrated into the role of the Chief Information Officer (CIO) (Rider, 2019).

Risk management and business continuity plans

In developing digital tools, municipal staff should work collaboratively across departments to evaluate the risks and proactively seek to mitigate them, sometimes with the use of outside consultants. Staff should also consider the consequences when data is breached or stolen. How will staff communicate? How will the Council communicate? How will we communicate with the public and stakeholders?

Each municipality should develop a business continuity plan to allow operations to largely continue even if a cyber attack occurs. In the event of a disruption:

> A backup of municipal networks and systems is the best way to avoid data loss and can be invaluable if a catastrophic event such as a ransomware attack, fire, theft, natural disaster, server crash, or user error occurs. Municipalities can protect their networks from ransomware by keeping regular backups of their systems offsite. Regular backups are one of the easiest and least expensive cyber security precautions that a municipality can take to mitigate the risks of an incident involving data loss (Association of Municipalities Ontario [AMO], 2020).

Taking proactive measures such as these can significantly reduce the devastating impacts to municipal agencies should a cyber attack occur.

Insurance and legal considerations

Another consideration municipal officials should be aware of is the acquiring of insurance. A

report submitted to Council noted that the City of Saint John had cyber and property insurance through AIG Canada, which significantly reduced taxpayers' costs of having to rebuild its network (Ibrahim, 2021).

Richard Rogerson, Managing Partner of Packetlabs, which helps municipal governments identify threats and vulnerabilities, shared that:

> Although Canada's municipalities are known as very tempting targets for aggressive cyberattacks, we've spoken to many across the country that simply can't get the required funding for proper security testing [...] It's actually surprising that we don't see more attacks at the relatively unguarded municipal level of government and unfortunately, something like the Saint John's attack could be a criminal test case for more (as cited in Packetlabs, 2020).

Cyber insurance is intended to complement internal security frameworks, annual audits, and regular testing. These tools do not remove the threat of an attack, but can help cover the costs stemming from an attack, including fines, forensic investigation, legal fees, and other related expenses. Specialized insurance coverage also protects against the cost of restoring lost data and dealing with claims from individuals and groups who may have had their personal information compromised.

After a cyber attack, lawsuits can be brought forward by victims when the municipality does not have adequate security safeguards in place. For private sector companies in Canada that operate under the *Personal Information Protection and Electronic Documents Act*, this federal legislation requires companies to notify the public and their clients in the event of a data breach (Canadian Internet Registration Authority, n.d.). Experts believe that provincial governments should establish security standards to be followed, along with maintaining a public registry of incidents for better tracking and greater accountability.

In Ontario, under the *Municipal Freedom of Information and Protection of Privacy Act* s.3(1) of Regulation 823, municipalities must ensure that reasonable measures are defined, documented, and put into place, taking into account the nature of the records to be protected to prevent unauthorized access to records in their control or custody (AMO, 2020). These legislative requirements are similar to other provincial standards across Canada. As the AMO report (2020) states, "being proactive to cyber threats and continually implementing cyber security best practices, policies, procedures, and plans may help alleviate the risks of civil litigation".

Moving forward

Accessibility

In the transition to the digitalization of services, many municipal officials emphasized that not all

members of the public and stakeholders have access to digital tools due to an economic disparity, disability, or other accessibility issues. Therefore, it is recommended that municipal officials maintain the option for a paper-based method for all digital processes.

Electronic permitting experience

A sizable part of a municipality's business activities involves the planning and development of applications. Those for housing and commercial development, if approved, can bring important business activity, job creation, and an additional tax base revenue to the community. Business stakeholders have long advocated for a more expedient application process, pointing to electronic permitting (e-permitting) to accelerate the approval process.

The Association of Municipalities of Ontario (AMO) in partnership with the Municipal Property Assessment Corporation (MPAC) recently announced a partnership to identify a digital platform that municipalities can adopt for the building permit process. Both AMO and MPAC understand the need to modernize the municipal permit process to reduce administrative burdens and costs, "We're seeking a solution that can be scaled to help municipalities of any size manage the process from application to final inspection," said AMO President Graydon Smith (as cited in AMO, 2021). This collaboration is exciting for advocates of digital service tools and speaks to the leadership that municipal officials are expecting of organizations such as AMO and the provincial government.

Cloudpermit is an e-permitting software recently partnered with the Ontario Building Officials Association (2020) to encourage local governments across Ontario to adopt their cloud-based tool, which they claim reduces costs, improves customer experience, and increases efficiency. With an e-permitting system, municipalities create a portal allowing applicants to submit documents online. These online portals also help ensure applicants submit all necessary information by highlighting if a document is missing. Staff in municipalities currently using these platforms confirm that introducing this digital process has improved service for applicants and internal workflows.

Development Application Review Team (DART) site plan review

While e-permitting digital tools simplify the document submission process, there are other ways to support potential investors by giving them expedited feedback. The City of North Bay has a Development Application Review Team (DART) which reviews and provides feedback on development proposals prior to the applicant entering into a *Site Plan Control Agreement (SPCA)* or undertaking a *Planning Act* application. The DART is made up of representatives from internal city departments and many external agencies that would normally comment on

proposals as part of the approval process.

The *Development Handbook: A guide to land use and development in the City of North Bay* (City of North Bay, 2021) notes that the "goal of DART is to establish timelines for the efficient review of proposals, identify any major issues early on, and to cut through the red tape of the development approval process by having all City departments and other approval bodies at one table". Other municipalities have adopted a similar approach and feedback suggests that it is having a positive impact.

As more attention is being given to the housing affordability crisis in Canada, digitalizing the planning, development, and building application process along with DART committees can accelerate the process to bring much needed new housing supply to the market.

Ontario's digital and data strategy

In the spring of 2021, the Ontario government introduced the document entitled *Digital and Data Strategy: Building a Digital Ontario*. This strategy confirms the provincial government's recognition of the increasing demands for agile digital service delivery and that we are in a data-driven economy. Peter Bethlenfalvy, Ontario's minister of finance and the minister responsible for digital and data transformation said:

> People expect and deserve access to vital programs and services digitally, at their fingertips, with unprecedented speed and convenience. That's why our government has been rapidly expanding access to online options while preserving in-person services, investing in innovation and harnessing the power of technology (as cited in "Ontario Moves", 2021).

The Ontario government's comprehensive view of the new digital economy gives municipalities greater confidence as it confirms the need for governments to provide services digitally. Particularly interesting is what role the proposed Ontario Data Authority will have and how it will interact with municipalities ("Ontario Moves", 2021). Lisa Thompson, Ontario's minister of government and consumer services comments that, "Building a digital Ontario will strengthen practices across the public service and put Ontario ahead of the pack in our increasingly digital operating environment" (as cited in "Ontario Moves", 2021).

Broadband access via satellite

In Ontario, 12% of the population lives in rural, or remote areas that lack any internet connection or have poor connectivity ("Up to Speed", 2019). Limited broadband access may inhibit an individual's ability to access medical records or other online services. These gaps also affect business stakeholders eager to expand operations in these communities. To address high speed

connectivity gaps, the Ontario government recently invested $109 million in Telesat's next-generation Low Earth Orbit (LEO) Satellite Network ("Ontario Partners", 2021). The investment "secures dedicated high-speed satellite bandwidth for local internet service providers to purchase at reduced rates, enabling them to provide afford- able, high-speed connectivity services, including LTE and 5G, to various communities across the province" ("Ontario Partners", 2021).

This investment reflects the growing recognition among provincial and federal governments to address the broadband connectivity gaps in rural and remote communities. The Ontario government has pledged a total investment of $4 billion to help connect every region to high-speed internet by the end of 2025 ("Ontario Partners", 2021). It is the largest single investment in high-speed internet in any province by any government in Canadian history.

Conclusion

Municipal delivered services are most closely connected to the everyday lives of Canadians and the public now expects services to be accessible digitally. As local officials seek to determine which tools are best suited for their communities, it is clear that the best approach is to keep the introduction of digital tools simple, focused, and demand driven. Staff should also carefully evaluate vendors and software options to allow for maximum flexibility, adaptation, and cyber attack protection. Collaboration with other municipalities, sector associations, and the provincial government also offer unique opportunities to leverage past experiences and data, in addition to reducing costs. Ultimately, there is not one all-encompassing solution. Local officials should feel confident choosing the digital tools that are uniquely suited to the demands of their communities, all the while sharing information and building partnerships in order to move forward effectively with the digitalization of local government services.

Author biography

Anthony Fernando has gained experience as a political staffer, public servant, political candidate, public affairs consultant, and technology entrepreneur. He earned a Bachelor of Arts (Hons) from the University of Toronto, specializing in Political Science and a Masters of Public Administration from the University of Western Ontario.

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Appendix A

Popular Municipal Digital Tools

1. Community portals and smartphone applications
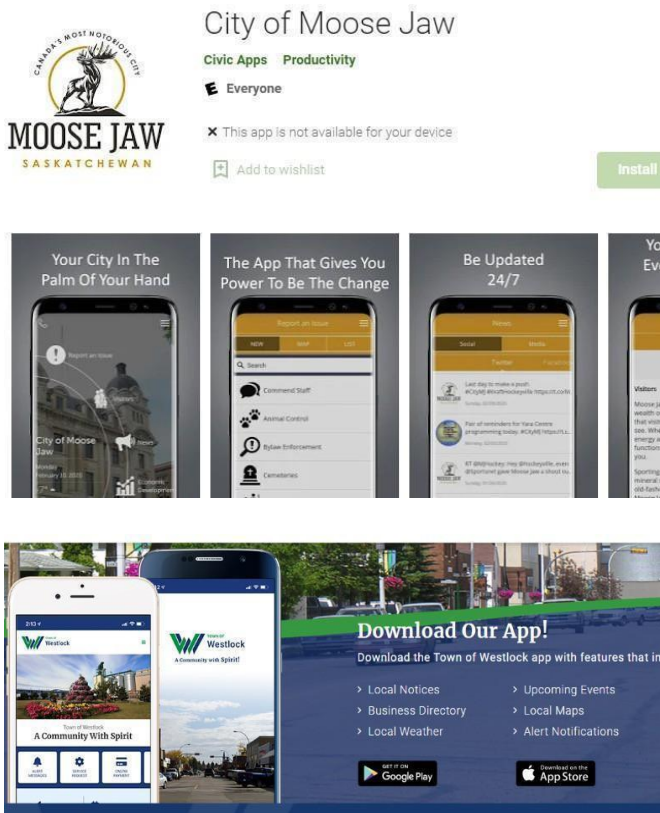
Some communities have smartphone applications and portals where residents can create a unique user account and log in securely to access information such as their property tax information, utility usage, pet licensing, local events, weather, and recreation registrations. Through these applications, residents can also sign up for unique alerts to inform them about local events, emergency alerts, road closures, and more.

These applications sometimes allow residents to identify service needs such as potholes to be repaired, which help direct city resources. Residents simply take a picture of an issue and submit it through the smartphone application with a comment and location reference. This feature gives city staff additional "eyes" on the community and can also be used to promote community safety.

2. Spatial Geographic Information System (GIS) tools
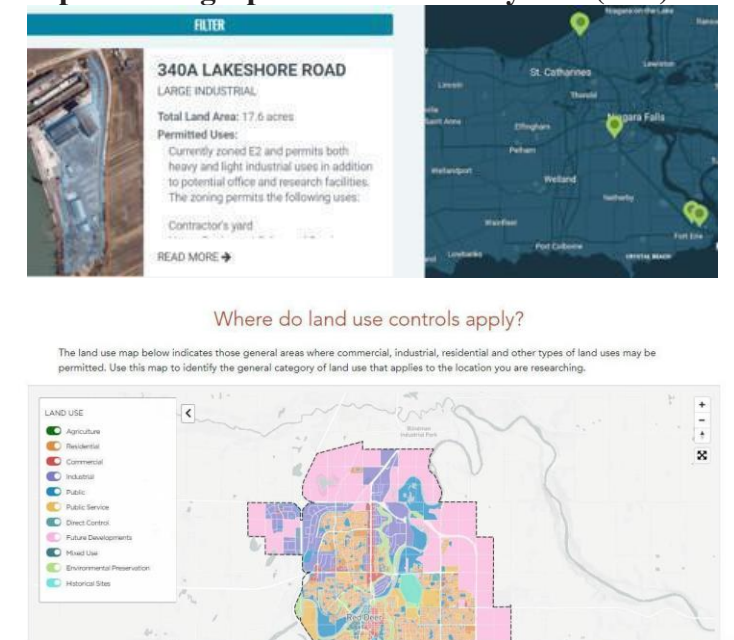
Municipalities use GIS tools to help investors, residents, and businesses see opportunities to purchase land, lease office space, as well as access development applications. In some cases, these tools reflect collaborations between neighbouring municipalities or the lower-tier communities under an upper-tier municipality. These tools are sometimes linked to active real estate listing data provided in partnership with a third-party.

3. Site location tools

Similar to the GIS tools, some municipalities also have map-based location tools which allow business stakeholders to identify locations for business activity. This example from Durham Region identifies possible movie shoot locations to help facilitate film permitting business activity.

4. Online Training Programs

In an effort to build the resiliency and capacity of the local business community, some EDOs are offering training modules, mentorship programs**, and** on-demand videos through their website.

5. Micro target websites
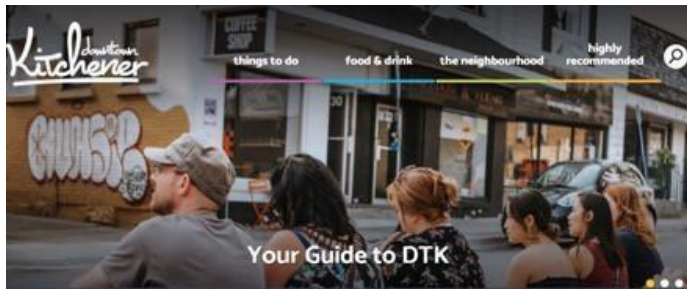
Micro websites are used by municipal staff to have a more focused marketing message to a particular target audience. These websites help create a healthy distinction from the more mundane municipal websites and can be linked to separate social media accounts for more targeted promotional engagement

6. Online forms (e-registrations)

EDO, licensing, and planning staff are using online forms to capture data for their Customer Relationship Management (CRM) software, along with application information for licensing permits, planning and development applications, and much more. These forms can be customized to prompt applicants in the event they missed a data submission field, helping ensure that only complete and accurate information is submitted.

7. E-permitting portals (document submission)

E-Permitting portals are similar to online forms, but are more comprehensive since they often require more information. Users can submit a simple permit request to build a backyard deck or a more complicated construction building application to build a ten storey mid-rise condominium.

8. Online business directory
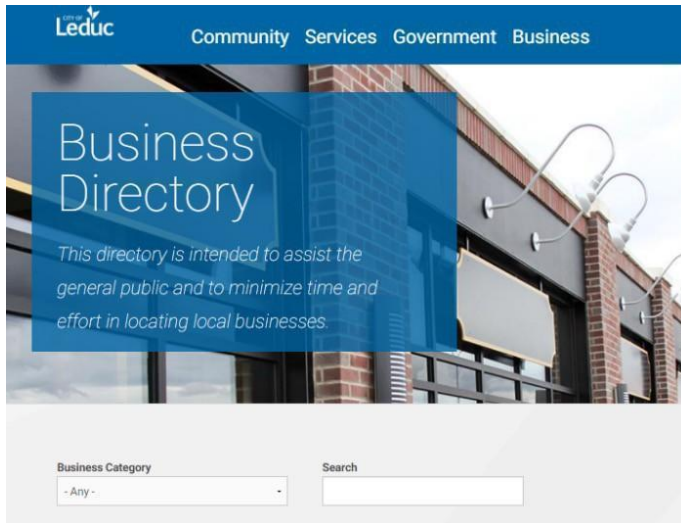
More and more municipalities are developing online directories of businesses in their communities. These directories are used by both residents and businesses to identify new restaurants to visit or vendors to supply services. When registering for a business licence, owners can "opt-in" to the directory. Using *North American Industry Classification System (NAICS)* code classification, staff can sort businesses to identify trends and growth areas, meaning the directory can also be a unique insight tool into the health of the local business community.

9. Online community engagement

Due to the pandemic, municipal staff had to shift public consultation online through platforms such as *Bang the Table*. The feedback received from municipal officials confirms that these tools have improved engagement and will likely be part of future consultations, giving residents both online and in-person opportunities to provide input.

10. Local business and statistical data
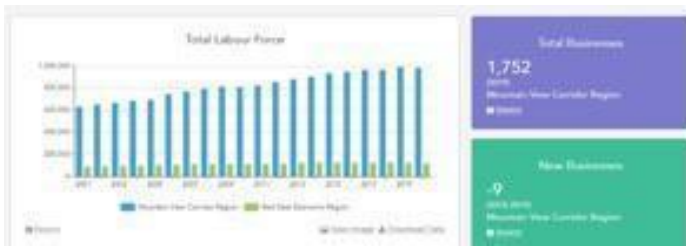
Many communities across Canada are using third-party vendors to populate their EDO websites with statistical and demographic data on their communities for investment attraction purposes. The data is presented nicely in charts, but is often limited to the most recent census information.

11. Multimedia videos
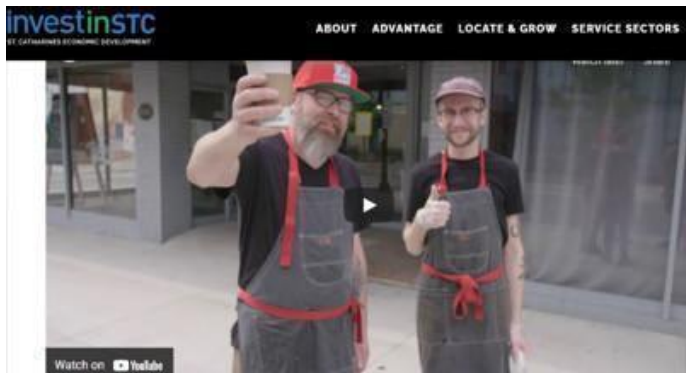
EDOs and communications staff continue to develop unique multimedia marketing videos, celebrating the advantages and cultural experiences their communities offer. These videos are easily shared on social media and can be powerful marketing and investment attraction tools.

Appendix B

Research Interviews Conducted via Zoom

A special thanks to the 30 municipal officials who generously met with me over Zoom to discuss how digital technology tools can be used to better serve the business community and build local prosperity.

1. Tara Levick, Economic Development Officer, City of Airdrie, July 28, 2021.
2. Eileen Kennedy, Economic Development Officer, Regional Municipality of Durham, July 29, 2021.
3. Aaron Byrne, Web Services and Business Operations Specialist, City of Ottawa, July 29, 2021.
4. Jennifer Patterson, Senior Business Development Consultant, City of Hamilton, July 29, 2021.
5. James Franks, Economic Development Officer, City of Temiskaming Shores, July 29, 2021.
6. Jim Dixon, Economic Development Manager, City of Moose Jaw, August 3, 2021.
7. Lindsay DeBou, Manager, Resort Municipality of Whistler, August 3, 2021.
8. Melody McKnight, Marketing and Research Specialist, City of Red Deer, August 3, 2021.
9. Melissa Barcellos, Manager, Economic Development, City of Prince George, August 3, 2021.
10. Bryan Blue, Economic Development Officer, Niagara Region, August 4, 2021.
11. Brennan Kenny, Manager of Economic Development, Town of Collingwood, August 4, 2021.
12. Michael Kemp, Economic Development Marketing Coordinator, Town of Bradford West Gwillimbury, August 4, 2021...
13. Shawn Welles, Director of Information Technology, City of Abbotsford, August 4, 2021.
14. Carley Graham, Economic Development Officer, City of Leduc, August 4, 2021.
15. Natalie Germann, Community Event Administrator, Town of Cochrane, August 4, 2021.
16. Beverley Hillier, Manager, Planning and Building Services, City of North Bay, August 5, 2021.
17. Sarah Franklin, Communications Officer, Perth County, August 5, 2021.
18. Michelle Levasseur, Economic Development Officer, Town of Calmar, August 5, 2021.
19. Danielle Pougher, Development Officer, Town of Westlock, August 6, 2021.
20. April Marshall, Economic Development Manager, Town of Hanover, August 6, 2021.
21. Rebecca Mustard, Manager Economic Development, City of Kawartha Lakes, August 6, 2021.
22. Lina Marinova, Manager, Strategic Business Services, Town of Oakville, August 9, 2021.
23. Jon Allan, Economic Development Officer, Town of Sundre, August 12, 2021.
24. Reade Beaudoin, Economic Development Officer, City of Fort Saskatchewan, August 12, 2021.
25. Katrina Ellis, Marketing and Social Media Specialist, Town of Georgina, August 12, 2021.
26. Forrest Pengra, Manager of Infrastructure and Technology, Town of Parry Sound, August 12, 2021.
27. Cory Bluhm, Executive Director, Economic Development, City of Kitchener, August 13, 2021.
28. Kristin Sainsbury, Senior Economic Development Officer, City of Waterloo, August 13, 2021.
29. Brian York, Director, Economic Development and Government Relations, City of St. Catharines, August 13, 2021.
30. Monica Shepley, Economic Development Officer, City of Sarnia, August 13, 2021.