Barriers to Implementation of Open Data Strategies in Small, Medium, and Large Municipalities in British Columbia

By

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A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of

MASTER OF PUBLIC ADMINISTRATION

in the School of Public Administration

Supervisory Committee

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Abstract

Introduction

This thesis aims to provide a current understanding of the open data movement at the municipal government level in British Columbia. The focus of the analysis is to identify barriers municipal public servants have encountered and may encounter in adopting, implementing, and expanding open data programs. As defined by the Government of Canada, open data is "structured data that is machine-readable, freely shared, used and built on without restrictions" (Treasury Board of Canada Secretariat, 2019). In terms of the rationale for open data, Jaegar & Bertot (2010) note that open data initiatives act as a means of increasing transparency, accountability, and civic participation by governments seeking greater openness.

Prior to the open data movement, some Canadian government data and information could only be accessed through a Freedom of Information request (FOI) or if not a sensitive document, through a library or public service centre. Often, FOI requests could take weeks to be filled and could be costly depending on the government policy being accessed. The documents available at libraries and public service centres were often ad hoc and had limited availability. The transition to an open regime in the early 2000s reflected a shift from an inherently confrontational method (citizen requesting information from the government) to governments proactively publishing data to encourage government and public collaboration and cooperation (Davies et al., p.1, (2019).

As a result of the progressive open data movement in the early 2000s, data about policy-making, software code (open sources), documents, minutes, and financial data have been made publicly available resulting in a large repository of government data that can be found on numerous open data portals and government websites around the world (Charalabidis et al, 2018, p.6). Davies et al. (2019) noted that as open data grew organically, it spread across some networks, communities, and governments as approaches to open data became more diverse, fluid, and cross-sectoral (p.1).

While open data has been continuously growing, evolving, and gaining momentum since the 2000s, it has not experienced linear progression at all levels of government. Davies et al. (2019) noted that the adoption of open data as part of the global development toolbox has opened it to substantial scrutiny that has tended to result in a re-evaluation of the effectiveness of open data rather than celebrating its progress. Additionally, many important datasets from local governments are still absent, resulting in many municipal public servants relying on outdated data and antiquated data systems for planning and decision-making (Maaroof, 2015).

Consequently, the purpose of this research is twofold. The first objective of the research was to better understand the current state of open data in British Columbia (BC) municipalities and secondly, to identify the barriers municipal public servants face to adopting, implementing, and expanding open data programs. Based on the research and the literature review, this thesis presents recommendations for smart practices for adopting, implementing, and expanding open data policies and practices in BC municipalities.

Methodology and Methods

The research for this thesis was conducted as a comparative case study to examine open data initiatives in both municipalities with an open data program and those without in BC. Surveys and interviews with senior public servants working in BC municipal governments provided the foundation for data collection and analysis.

A current state analysis of open data in municipalities in BC was completed, with 100 municipalities randomly selected to receive the survey. Of the 100 public servants in municipalities across BC that were contacted, 23 people completed the survey. Of the 23 people that completed the survey, 16 opted in for the interview for further discussion and 10 people completed the interview composed of 6-8 semi-structured questions. Both the survey and the interviews were conducted within a time-frame of two months during the COVID-19 pandemic. As a result of the pandemic, all findings were accumulated utilizing remote-communication methods (i.e., Zoom video conferencing for the interviews, survey-monkey for the surveys and e-mail for distributing information to participants).

Key Findings

The literature review revealed seven potential barriers to the adoption, implementation, and expansion of open data. The barriers are as follows, in no particular order:

- Public servant education and skillsets are low in the area open data and knowledge about open data
- Public servants appear to fear the perceived risks of open data
- Political figures appear to fear the perceived risks of open data
- Internal resource constraints in the municipality limit opportunities to implement open data
- Citizens do not have advanced enough digital literacy to engage with the published datasets
- Absence of effective data infrastructure within the municipality
- Lack of executive/management buy-in within the municipality

Utilizing this understanding of barriers as a starting point, the survey and interviews further explored these barriers as well as identify further themes related to open date in municipalities in

general. Through the primary research, while related to some of the literature review themes above, two new themes were discovered in the survey and interviews as participants frequently identified them as barriers to the adoption, implementation, and expansion open data.

- **Open data is not prioritized -** Open data is not being prioritized in BC municipalities by staff or elected officials.

- **The absence of a staff champion is detrimental to the success of open data -** Many municipalities face budget constraints and numerous competing priorities that make allocating funding for open data challenging. The findings indicate that even in municipalities with established open data programs, it is unlikely to find a staff champion. Instead, it is commonly one staff member working on open data off the side of their desk without giving it their full attention. The lack of willingness to devote a staff member to focus on open data may result from numerous factors, including resource capacity, the circumstances of the COVID-19 pandemic, a lack of education from both municipal staff and mayors and councilors of what open data is and how it can benefit the overall operations of the municipality.

Recommendations

The following recommendations are based on the findings of the literature review, surveys, interviews, and further criteria that was taken into consideration was ease of implementation, resource capacity, and political acceptance. The first recommendation is for municipalities to consider and the following recommendations are for the consideration of the BC provincial government or the federal government.

British Columbia Municipalities:

Recommendation 1 – Establish an Open Data Staff Champion within the municipality public service and at the Council level if not already in place.

Government of British Columbia and/or Government of Canada

Recommendation 2 – Establish a financial support initiative at either the provincial or federal level to aid municipalities with the initial start-up costs of implementing an open data framework and system.

Recommendation 3 – Create a partnership between the BC provincial government and the BC Economic Development Association to increase education resources on how open data benefits internal operations of municipalities.

Recommendation 4 – Leverage the provincial Office of the Chief Information Officer (OCIO) to create an ‘open data for local government’ working group.

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Dedication

It is my pleasure to express gratitude to my supervisor, Dr. Kim Speers. Her wisdom, clarity, and incredible sense of humour have been greatly appreciated throughout this process. Additionally, I am grateful for the work of Dr. Erik de Vries and the Committee for their respective contributions, feedback and time. I extend thanks to my loved ones, who continue to provide immense support and encouragement throughout my academic endeavours.

1.0 Introduction

The goal of this thesis is to identify the barriers to the adoption, implementation, and expansion of open data initiatives in British Columbia (BC) municipalities. As defined by the Government of Canada, open data is "structured data that is machine-readable, freely shared, used and built on without restrictions" (Treasury Board of Canada Secretariat, 2019).

Open data has become a widespread phenomenon around the world in the last decade changing how organizations, governments, and citizens access and use data. Open data is often found under the data revolution umbrella term, which includes other concepts such as "the rise of crowdsourcing, new Information and Communication Technology tools (ICTs) for data collection, and the explosion of availability of big data, together with the emergence of artificial intelligence and the Internet of Things" (United Nations, n.d.). In Canada, open data has gained momentum due to its perceived benefits for strengthening democracy, increasing service delivery efficiency, and enhancing the relationship between citizens and governments (Treasury Board of Canada, 2017). Jaegar & Bertot (2010) further note that open data initiatives act as a means of increasing transparency, accountability, and civic participation by governments seeking greater openness. The increased demand for data from governments in the past decade has resulted in current literature identifying significant transitions in the modern world toward a knowledge economy that has made "data" become the new "oil" (The Economist, 2017).

As discussed by Open Knowledge International (2017), open data programs at municipal, provincial, territorial, and federal orders of government also tend to be part of the larger umbrella movement of open government, which calls for a range of emerging goals focused on transparency, accountability, public participation, improved public service delivery, technological innovation, and economic growth. In the past, governments have often been characterized as being closed, risk averse, and not as citizen centric as they could or should be (Open Data Toolkit, 2017). Given such negative perceptions, Konga (2011) argued that within the past decade, citizen expectations of expanded scope and ease of access to government data and information have made governments at all levels reassess their data management procedures and adopt principles of openness. Ariss et. al., (2015) discussed that at the international level, the United Nations (UN) identified open data as holding immense value to achieve and measure progress in meeting its Sustainable Development Goals. The importance of open data was further supported by the World Bank, with four broad benefits identified as follows:

- [Open data] helps foster economic growth and job creation.
- Improves efficiency and effectiveness of public services.
- Increases government transparency, accountability, and citizen participation.

- Facilitates better information sharing within government (Ariss et. al., 2015).

Landry et al. (2017) argued that municipal public servants have an important role to play in supporting and expanding shared data infrastructure, both locally and globally, to build an open culture and to use open data to improve urban resiliency and sustainability. Given this context, this research seeks to examine the barriers to open data participation in municipal governments to facilitate the expansion of principles of open data and to ideally foster a culture of sustainable openness in British Columbia.

The research framework for this thesis begins with a current state analysis that includes such topics as the status of open data in municipalities in BC, available open data resources for BC municipal staff, and feedback from senior public servants on their first-hand experiences with open data in their municipalities. The feedback from public servants was gathered through a survey and interviews that provided insight into the perspectives of working in an open data environment as well as what are the barriers to the adoption, implementation, and expansion of their open data programs. The thesis ends with recommendations to different orders of government to address the barriers to open data.

There is no informal client for this thesis.

1.1 Defining the Problem

The problem addressed in this thesis are the ongoing barriers to adopting, implementing, and expanding open data in BC municipalities. Even though open data, having been in existence since the mid 1990s and gaining momentum in the early 2000s, is not a new concept for Canada's local, provincial, and federal governments, it has not been adopted universally into policy by all orders of government to the same extent.

Although open data acts as a channel for data-driven decision-making and the benefits of an open data program are mutually beneficial for governments and citizens, the high production of information and availability of resources are acting as significant roadblocks in preventing local governments from publicly sharing their data. Roy (2014) further situates the importance of local open data, stating “it is locally where Canadian public sector open data efforts have been pioneered, a reflection of the bottom-up nature of many aspects of government innovation and reform in the digital era” (p.415). For example, the type of data shared by local governments includes business licences, snow clearing routes, garbage pick-up schedules, current road closures, building permits, property assessments, infrastructure projects status, and COVID-19 active cases (Open Data Edmonton, 2019).

DEFINING THE PROBLEM AT THE MUNICIPAL LEVEL

There is a pressing need to address open data at the local level of government in British Canada. For instance, Hawken et al. (2020) stated that municipalities are increasingly being recognized as a centre of information exchange at the local level, as they are the most intimate setting where citizens and the economy intersect. Municipalities may also benefit substantially from the effective collection and management of their data, as increased efficiency makes municipal governments better stewards of service delivery and improves the quality of life in the city, making the community more appealing to residents and businesses, therefore increasing tax revenue (PR Newswire, 2020). Advocates of open data claim significant "growth in knowledge and innovation when scientists, entrepreneurs, and others share data; the term also suggests an obligation on the part of government to make freely available data that public sector funds have generated" (Harrison et al., 2012, p. 901).

While there have been many positive aspects about open data that have been argued in the literature and by practitioners, there are numerous concerns related to open data. For example, Van Schalkwyk et al. (2017) identified the risk of open data exacerbating the digital divide as "the understanding, and the capacity to extract value from open data is not equally distributed, and those who may need data the most often don't realize the value data may have to improve their decision making" (p.3). Yannoukakou and Araka (2014) also noted concern over intellectual accessibility and reinforcement of digital inequalities because of open data providing a wealth of knowledge but only to those with access to computers and the required skill set to engage with the data (p. 338).

Concerns regarding the disclosure of private information is an additional concern related to open data. Alam et al. (2021) discussed the effect of open COVID-19 data as a threat to citizen anonymity as the data has been increasingly shared worldwide, resulting in fear of identification or reidentification (p.1). Meijer et al. (2014) also noted that conflict could arise when datasets are published that may seem anonymous at first, but when paired with other public data the risk that one can deduce privacy-sensitive information remains (p. 36). Meijer et al. (2014) also discussed the possibility of the raw data being taken out of context and misinterpreted and misused as it is out of the hands of governmental control (p.36). Roy (2014) noted that removing exclusive government control over messaging and interpretation is an area of pushback from public servants against open data. Roy (2014) expanded to state that the ethos of openness invariably results in pushback from both the "traditions of proprietary protection and its organizational cousin that is particularly prevalent in the public sector—namely hierarchical and informational control" (p.416).

The concern in British Columbia is that little research exists on a broad scale on the adoption, implementation, and expansion of open data. In this sense, the extent of the barriers to open data in municipalities is somewhat unknown and this thesis is designed to assist in filling this research gap.

Defining the Problem at the Provincial Level

At the provincial level, BC became the first province in Canada in 2011 to publish its data under an open licence as a result of the Open Information and Open Data Policy (Data BC, 2019). The province recognized early on the innovative opportunities of open data for connecting and engaging the public to government and the ability to better solve problems for citizens (Data BC, 2019). In BC, open data is not mandated but participation is encouraged for ministries, agencies, and municipalities (Government of British Columbia, 2021a). The provincial open data licence also allows municipalities to use this feature, which removes the need for municipalities to create their own as it goes into detail regarding the parameters of the appropriate use of the published information and outlines relevant copyright details. The provincial open data licence is the primary supporting function the provincial government provides for municipalities at this time.

The Open Data Toolkit (2017) discusses the positive effects of optimizing open data in BC for economic development in municipalities through the reduced costs to find and use government data, ability for start-ups able to leverage the data, increased opportunities for community engagement and collaboration to address societal needs and job creation. The BC Economic Development Association (BCEDA) advocates for using a data management program called BC Business Counts, powered by Executive Pulse since 2010. This database solution program is aligned with some open data principles in that it aims to help eliminate internal data silos, ignite efficiency, aid collaboration, and empower organizations (local governments) to redefine their growth potential (British Columbia Economic Development Association, 2021).

The success of programs such as BC Business Counts depends on the availability of municipal data to be uploaded and engaged with in the software. Publishing data to be consumed for the benefit of economic development demonstrates the value of "publish with a purpose," which is one of the significant proactive data practices encouraged by the International Open Data Charter. For significant governmental reform to occur in this area, it is important to define the barriers municipalities encounter when considering and implementing open data so that supporting organizations (such as other levels of government or nonprofit organizations) can optimize their support systems and streamline progress on open data.

Defining the Problem at the Federal Level

Canada is recognized as an international leader in open government at the federal level, having served as the lead co-chair of the Open Government Partnership (OGP) and subsequently hosted the International Open Government Summit in Ottawa in 2019. In recent years, the OGP created a Subnational Government Pilot Program (later rebranded as the OGP Local Program) to prioritize the participation of a diverse range of entities, such as municipalities, local governments, regions, provinces, etc. (Open Government Partnership, 2021). As a result of open data gaining intergovernmental popularity, research into the barriers to implementing open data that municipalities face is increasingly important. As identified by the OGP, "they

(municipalities) are also sometimes inadequately resourced and thereby have a greater need for support" (Open Government Partnership, 2021).

In response to the OGP's movement in 2016 toward the OGP Local Program, in 2017, the Government of Canada worked in partnership with a nonprofit organization, Open North, to create a Municipal Do-It-Yourself Open Data Toolkit pilot project containing public servant training materials, best practices, tools and resources to help municipalities prepare for and implement an open data project (Treasury Board of Canada, 2017). Open North is an organization that drives research, capacity-building, and network collaboration across and within sectors to advance the responsible and effective use of data and technology (Open North, 2020). The pilot project toolkit is intended to be of service to all municipalities, regardless of past or current progress on open data. To address any potential concerns or risks of opening, the toolkit provides some brief conversational talking points for public servants to utilize among other resources (Treasury Board of Canada, 2017). The federal resources, such as the DIY Toolkit and other supporting documents, were created to enable assist municipalities to utilize their data to the greatest extent by providing guiding strategic documents and preliminary background information (Treasury Board of Canada, 2017), yet open data is not being implemented similarly across municipalities.

Upon review of the Treasury Board of Canada (2020b) website, there are only 12 BC municipalities out of 162 categorized as "open municipalities": City of Nanaimo, City of Prince George, City of Chilliwack, City of Kelowna, Regional District of Central Okanagan, Township of Langley, City of Vancouver, Regional District of North Okanagan, City of Surrey, District of North Vancouver, City of Victoria, and District of Saanich.

SUMMARY

Implementing an open data program requires a substantial investment by a municipal, provincial, territorial, or federal government and requires the dedication of all stakeholders involved, including collaboration with political actors, other public servants, civil society organizations, and the private sector. As a result of the numerous stakeholders involved, it presents opportunities for barriers to occur which may limit the progress of the program. While open data is an increasingly common concept and practice at the other orders of government, it has not necessarily gained the same momentum at the municipal level in Canada.

1.2 Project Goals, Scope, and Research Questions

GOALS

As noted previously, the goal for the thesis is to identify barriers to the adoption, implementation, and expansion of open data programs in BC municipalities and to then develop smart practices to overcome such challenges. Underlying this approach is the concept discussed by Davies et al., (2019) that open data is not a one-size-fits-all solution, but instead plays out in

different ways in different settings. Ergo, the need to be flexible and to recognize the different capacities each municipality has (p.12), needs to be taken into consideration when proposing smart practices to assist municipal public servants to successfully implement an open data program.

RESEARCH QUESTIONS

The main research question this thesis sought to answer is "what are the barriers to the adoption, implementation, and expansion of open data program in municipalities in British Columbia?" Secondary questions to support the answering of the main research question are:

1. When are the barriers to open data occurring? (e.g., initial start-up, basic open data publishing, increased functional open data portal, organization wide open data operations, integration with broader open data ecosystem)
2. Where are the challenges arising to implementing and expanding an open data program? (e.g., policy (amongst public servants), political (Mayor and Councillors), technical side or otherwise?)
3. What is the value of open data programs and systems in a municipal government?
4. What level of support from other levels of government is needed to support open data in municipalities?
5. What level of support from civil society organizations such as Open North and similar organizations are needed to support open data in municipalities?

For the purpose of this report, open data is interpreted in relation to the Government of Canada's definition as "structured data that is machine-readable, freely shared, used and built on without restrictions" (Treasury Board of Canada Secretariat, 2019). At the municipal level, open data is often present in the form of an open data policy guiding the distribution of data through an online data portal, spatial mapping platform or data catalogue. The published data can involve numerous datasets from a variety of government departments. Zuiderwijk et. al., (2018) noted that municipalities have social and economically valuable datasets concerning events, health services, monuments, addresses, public space, sports facilities, garbage collection, subsidies, shopping areas, education and so on at their disposal that can be utilized to stimulate innovation (p.2).

SCOPE

As BC is home to a range of municipalities, such as cities, towns, districts, and villages, to gain an understanding of open data across the province, municipalities of all population sizes and geographic location across the province were included in the sampling. To avoid a regional concentration (i.e., Northern BC, Mainland BC, Vancouver Island), municipalities in all regions of BC were contacted to participate.

The research for this thesis was not limited to municipalities that have not implemented open data programs. The survey was sent to municipalities that have active open data programs (e.g., clear strategies and policies) and municipalities that have not yet demonstrated action toward open data.

By focusing strictly on municipalities in BC, the research will provide relevant findings on open data and open government for the Government of British Columbia to consider as well as local governments who are considering establishing, expanding, or improving their current open data program.

1.3 Importance of Research

In the research process for this thesis, the analysis evaluated how and why the participating municipalities have adopted strategies and identified the systemic limitations of developing or further advancing open data programs. In other words, the findings identify what the barriers are to adopting, implementing, and expanding open data programs in municipalities. Identifying the barriers is intended to help further discover the critical success factors for a municipality to implement an open data program.

As found in the forthcoming literature review, increasing transparency and accountability has positive effects on citizen relationships with their local government. Open data allows citizens to have increased engagement and interaction with their governments by increasing accessibility to data and governmental information. It is hoped that by developing a system of smart practices for municipalities to adopt and implement open data, it will strengthen municipalities' relationship with its citizens.

Additionally, for organizations such Open North, the Community Solutions Network, Open Data for Ontario Municipalities, Code for Canada, and the Canadian Open Data Society that work across Canada to improve governmental capacity in adopting open data principles, this research is designed to aid their work to help identify current barriers to achieving open data. As identified by Landry and Sangiambut (2017), many civic problems facing governments are multi-jurisdictional in nature and it is difficult to collaborate and solve problems without an open approach that works both horizontally and vertically.

1.4 Organization of Report

The thesis begins with a detailed background overview of the historical and current open data programs, initiatives, and successes at local, provincial, federal, international, and nonprofit sectors. Positioning the importance of open data as an intergovernmental issue found throughout governments of all levels further reinforces the necessity of this research.

The subsequent literature review identifies some of the important academics within the field of study. It reveals the gap in the knowledge illuminating the opportunity for research into the barriers to the adoption, implementation, and expansion of open data, which this report proceeds to identify. The research depends on the findings of both grey literature and academic studies, which has allowed for a well-rounded understanding of the multi-faceted nature of open data.

The findings section presents the results from both the survey and interviews. The results are presented through both print and media formatting to allow for the greatest transparency of results. The findings form the basis of the eventual recommendations made from this research for establishing a more effective approach to open data initiatives in BC municipalities.

2.0 Background

This chapter provides historical context for the open data movement at the local, provincial, national, and international orders of government and provides a brief overview of current resources for municipalities seeking to implement open data initiatives. This information is necessary to better understand the scope and effects of the open data movement in recent years.

2.1 The Evolution of Open Data

Historically, much data collected by governments was kept for internal use and only shared with citizens in curated forms; however, as citizens' expectations of government have evolved and transparency and accountability have become forefront concerns, governments have been forced to adjust accordingly (Jelenic, 2019). Since the open data movement began gaining momentum in the early 2000s, the purpose behind the movement has shifted. Originally, open data was promoted as being a tool for general government reform, whereas now it is being used as the primary driver and asset for meeting specific goals (Davies, Walker, Rubinstein & Perini, 2019).

Partially as a result of evolving public perception of the role of governments, open data can be seen as the tool that facilitates mobility, collaboration, and participation (Roy, 2014, p.415). The ethos of a more collaborative form of government is affiliated with the concept of “Gov 2.0”, which requires public servants to embrace significant structural and cultural shifts in governance (Roy, 2014, p.415). Open data strategies can be found in all levels of government as strategic policies, guiding frameworks, roadmaps, or open data policies. As open data has spread globally via the Internet in the last decade, the way in which open data ideas have manifested across different sectors, communities, countries, and stakeholder groups has increasingly varied (Davies et al., 2019).

2.2 International Open Data

On the international stage, there are numerous civil society organizations and governing bodies working to disseminate open data principles around the world. For example, the international Open Data Barometer produced by the World Wide Web Foundation with the support of the Omidyar Network, was established in 2012 and provides a global measure of how governments publish and use open data for accountability, innovation, and social impact (World Wide Web Foundation, 2016). The interactive dataset covers 30 international governments and "analyzes global trends and provides comparative data on governments and regions using an in-depth methodology that combines contextual data, technical assessments and secondary indicators" (World Wide Web Foundation, 2016). In past editions of the barometer, it observed over 100 governments; however, in recent years pivoted to focus on international leaders who have adopted the Open Data Charter or those who have signed up to the G20 Anti-Corruption Open Data Principles to assess the progression of open data policies and practices (World Wide Web Foundation, 2016).

The Open Data Charter was launched at the 2015 United Nations Assembly after a global consultation led by key representatives from governments including the UK, Canada, and Mexico, and civil society organisations such as the Web Foundation, Open Knowledge International and the Initiative for Latin American Open Data (Open Data Charter, 2019) More than 100 governments have implemented open data, guided under the international Open Data Charter (Charter). The Charter outlines six principles developed in 2015 by governments, civil society, and experts worldwide to represent a globally agreed set of aspirational norms for the foundation of access to data and for the release and use of data (Open Data Charter, 2021). The six principles include open by default, timely and comprehensive, accessible and usable, comparable and interoperable, improved governance and citizen engagement, and inclusive development and innovation.

The Charter recognizes the digital transformation of the world to foster more effective governance, and identifies open data at the centre of this global shift as a crucial initiative (Open Data Charter, 2021). The Charter seeks to provide civil society, the private and public sectors with the leadership, management, oversight, performance incentives, and internal communication policies necessary to enable the transition to a culture of openness (Open Data Charter, 2021). Support programs for governments to get started with open data involved the creation of Open Up Field Guides, intended to explain in practical terms what types of datasets can be used to address specific problems and how that data should be published in order to do so (Open Data Charter, 2018).

A significant shift in data practices occurred in 2018 with the announcement of the Open Data Charter pivoting focus from “open by default” to “publish with a purpose.” Publish with a purpose aligns with the findings of Berrone et al. (2016) who identified that for data to be utilized to the highest capacity, it needs to be intentionally published and aligned with the interests of all stakeholders to bridge the gap between short-term city priorities and the longer-term development of citizens' quality of life. Chignard (2013) further argues that the concept of opening government data reflects a reversal of logic and an important cultural shift toward letting go control and making by default, public data and information published online. This transition reflects a change in the interpretation of open data from being focused on publishing as much information as possible (open by default), to publishing data to solve specific policy problems (publish with a purpose) (Davies, et. al., 2019, p.254).

In 2018, the United Nations (UN) created a subgroup under the Friends of the Chair group on the Fundamental Principles of Official Statistics (FOC-FPOS) composed of country representatives, international agencies and organizations and other partners to focus on open data principles, guidance and support for the implementation of open data in countries (United Nations, 2021). Additionally, the UN has identified that open data principles contribute to the ongoing dialogue of the successful implementation of the 2030 Sustainable Development Goals.

The Organization for Economic Co-operation and Development hosted meetings, developed reports, and created policy and working papers on open data. Additionally, the organization created a tool titled "OURdata Index: Open-Useful-Reusable Government Data 2019" designed to assess federal governments' efforts to implement open data in three critical areas – openness, usefulness, and reusability of government data (Organization for Economic Co-operation and Development, 2019). The organization's goals concerning open data are to assess the impacts of open data on concrete benefits of economic, social and policy areas due to open data. Overall, there are significant supports and resources at the international level to justify creating an open data program at any level of government.

2.3 Federal Open Data

As discussed by Roy (2014), for the Government of Canada, "open data has been explicitly tied to a more ambitious Open Government agenda that seems in keeping with widening calls both within and outside of government for an expansion of systemic transparency and a cultivation of meaningful forms of public engagement" (p.429). Open data falls under the umbrella of Open Government in the Government of Canada, a policy movement gaining international momentum.

Fundamental principles of Open Data such as the accessibility of citizen access to personal information in Canada can be drawn back to the Privacy Act of 1983 and the Access to Information Act in 1985. A citizen's personal information is protected under the Privacy Act and provides the necessary information for the government to govern effectively and further provides individuals with a right to access their personal information as well (Department of Justice, 2020). The Access to Information Act (1985) is intended to "enhance the accountability and transparency of federal institutions in order to promote an open and democratic society and to enable public debate on the conduct of those institutions". The Access to Information Act gives every Canadian citizen, permanent resident, individual or corporation in Canada the right to request access to records that are under the control of federal government institutions, regardless of their format (Government of Canada, 2020).

Traditionally, government data and information were only accessible to citizens through a formal Freedom of Information (FOI) request (as identified in the Privacy Act of 1983), libraries, or government offices. An FOI request is public information that disclosed at the discretion of the government 'based upon request' when citizens prompt the government to provide access, whereas the proactive provision of data to the public is based on the 'open by default' principle in which requires open data (Charalabidis et. al, 2018, p12). Open by default is defined by the Government of Canada as "a broad principle that means publicly releasing government data and information that is of value to Canadians, with information being withheld only for necessary privacy, confidentiality and security reasons" (Government of Canada, 2019).

As the world has changed both socially and technologically since these Acts came into force, citizens expectations of how their personal information is used, shared, and stored has changed as well (Department of Justice, 2020). van Schalkwyk (2017) noted the importance of positioning open data as a tool to improve people's lives by generating insights from data and should not be focused solely on adhering to a set of baseline standards or principles to check off a list (p. 4). The Department of Justice (2020) also noted that citizens expect their private personal information to remain protected but concurrently expect government services to anticipate user needs, proactively respond to those needs, and offer enhanced and trustworthy services and user experiences.

In response to evolving citizens needs, in March 2011, the Government of Canada launched the first version of its open data portal (Treasury Board of Canada Secretariat, 2021). Further, in response to the establishment of the International Open Government Partnership (OGP) in 2011, Canada further enhanced its commitment to the principles of open government of open data by signing on to the OGP in April 2012 and releasing its first two-year National Action Plan on Open Government in that same year (Treasury Board of Canada Secretariat, 2017). The first National Action Plan focused on three streams: open info, open data, and open dialogue (Treasury Board of Canada Secretariat, 2012).

Canada remains a current member of the international Open Government Partnership (OGP), which since its founding in 2011 has grown to compose of 79 countries, 64 local governments, and thousands of civil society organizations representing more than two billion people (Open Government Partnership, 2020). As a leading member of the OGP, Canada has released four National Action Plans on Open Government and served as co-chair of the OGP's Open Data Working Group (Open Data Toolkit, 2017). The four National Action Plans seek to guide the government in successfully implementing open government and open data initiatives by providing strict oversight, mandating milestone check-ins, and closely observing progress to ensure governments are keeping to their commitments (Open Government Partnership, 2019).

In the most recent 2018-2020 National Action Plan, Commitment 10 focuses on the onboarding of two municipalities into open data and open government initiatives stating, "to strengthen collaboration with other governments in Canada through the Canada Open Government Working Group and expand the working group to include representatives of national municipal organizations" (Treasury Board of Canada Secretariat, 2018). Provincial governments were previously the only non-national representatives in the Canada Open Government Working Group. Recent consideration of the role municipalities play was acknowledged by the OGP, as a result of the formation of a Subnational Government Pilot Program in 2016 (later rebranded as the OGP Local Program), to prioritize the participation of a diverse range of entities, such as municipalities, local governments, regions, and provinces. (Open Government Partnership, 2021).

In 2017, the Canadian Treasury Board of Canada Secretariat (the federal leader for Open Government), in partnership with Open North, published a Municipal Do-It-Yourself Open Data Toolkit pilot project intended to serve as a comprehensive resource and project plan for municipalities that have not yet initiated open data in their organization (Open Data Toolkit, 2017). The toolkit seeks to address common barriers to implementing open data by providing presentations and resources to help municipal public servants throughout the planning and initial implementation process. The toolkit was created in partnership with municipalities and Open North and is tailored to support municipal public servants.

The Treasury Board of Canada (2017) defined the value proposition of open data to be inclusive of reducing costs for government operations, enhanced service delivery, increased opportunities for community engagement and collaboration to address the societal need, economic development opportunities leading to job creation, innovation through new products and services, improve departmental access to data by breaking down departmental data silos, enhances decision making support, enhanced transparency and increased trust in public institutions. As the federal government leaders, the Treasury Board Secretariat has a team within the Office of the Chief Information Officer with attention focused entirely on the success of open government within the federal government. The staff members serve as a wealth of knowledge on open government and open data initiatives in Canada.

2.4 Provincial Open Data

Of the ten provinces and three territories across Canada, 12 have been identified as "open provinces" by the Canadian federal government including: Alberta, British Columbia, Manitoba, New Brunswick, Newfoundland and Labrador, Northwest Territories, Nova Scotia, Ontario, Prince Edward Island, Quebec, Saskatchewan, and Yukon. Due to the limited scope of this thesis, British Columbia, Alberta, Ontario, and Quebec's initiatives on open data are discussed.

At the provincial level in 2011, BC became the first province in Canada to publish its data under an open licence as a result of the Open Information and Open Data Policy (Data BC, 2019). The province recognized early on the innovative opportunities of open data for connecting and engaging the public to government and the ability to better solve problems for citizens (Data BC, 2019). The Open Information and Data Policy facilitates the creation of a participatory environment in which citizens can be more engaged with their government, communities and public policy issues by increasing access to government information and permitting the use, adaptation and distribution of data (Government of British Columbia, 2011).

Currently, Data BC is responsible for encouraging and facilitating the BC Government data management model, provides value-added services, e.g., Open Data Policy and the BC Spatial Data Infrastructure, acts a key agent for sharing data and advising government data-

related initiatives (Data BC, 2019). The BC government produces and maintains thousands of datasets that represent a broad range of information about natural resources, the economy, justice, education and social programs (Government of British Columbia, 2021b). The provincial open data licence also allows municipalities (with respective name changes) to use this feature, which removes the need for municipalities to create their own. This is the primary supporting function the provincial government provides for municipalities at this time.

Alberta was not far behind BC and launched its open data portal version 1.0 in 2013 with 280 datasets, rising to 15,200 open datasets and government publications in 2018 (Government of Alberta, 2021). In 2017, the Government of Alberta won the Canadian Open Data Summit Award for Open Data Innovation for the Open Laws initiative that makes Alberta Legislation accessible (Government of Alberta, 2021). There is no evidence of the provincial government providing support for Alberta municipalities to implement open data at this time.

The Government of Ontario published a Digital and Data Directive in 2021 as part of its broader goal of becoming "the most digitally advanced province in Canada, and the most digitally advanced jurisdiction in the world" (Government of Ontario, 2021). Additionally, the Government of Ontario adopted the International Open Data Charter in 2017 to enhance its Open Data Directive (created in 2016). A key element is a dedication to better coordination with other governments and setting common data standards across jurisdictions (Government of Ontario, 2021).

In Quebec, the provincial government has made substantial strides toward encouraging its cities to publish datasets. Its Municipal Open Data Policy is a partnership between the Government of Quebec and several cities to create a collaborative open data portal featuring 1185 datasets to disseminate quality standardized data (Government of Quebec, 2021). Users can filter in the portal to search datasets published by select cities. Additionally, the City of Montreal and the Government of Quebec have co-organized the upcoming 6th edition of the Canadian Open Data Summit to be held in September 2021 (Open Data Summit, 2021). The Summit will tackle two major themes; Engagement and Digital Literacy, and Responsible Data Governance (Open Data Summit, 2021).

2.5 Local Open Data

The International Open Data Charter identifies the proximity and engagement with citizens at the local level as an asset to progressing the open data movement (Open Data Charter, 2015). Numerous municipalities in Canada have created open data programs that use their data in meaningful ways.

Current municipal leaders in open data are the award-winning City of Edmonton and the City of Toronto. Toronto recently published a standard-setting Open Data Masterplan for 2018-2022, stating that "when government data is made open to the public, new ideas and perspectives unlock exponential potential for it to be re-used, analyzed, and correlated to help improve the City's delivery of public services, engage with citizens in government decision making, and innovate our approaches to civic problem solving" (City of Toronto, 2018). For the City of Edmonton (2017), their open data strategy integrates the principles of the International Open Data Charter, outlines an action plan to realize the value of open data and provides metrics to evaluate its performance.

The City of Vancouver is another leader in municipal open data. CBC News (2009) described the origins of the open data program in 2009 as lead by (now former) City Councillor Andrea Reimer, who stated that open data "would allow the city to improve transparency, cut costs and enable people to use the data to create new useful products, including commercial ones." Open data was later a priority of the City of Vancouver Digital Strategy (2013), with commitments to expand and enhance the open data program. The City of Vancouver provided technical advice in the formation of the DIY Open Data Toolkit through the DIY Open Data Municipal Advisory Committee (Treasury Board of Canada, 2017).

Despite the successful implementation of open data in the large city of Vancouver, Gill and Corbett (2017) found through an environmental scan that smaller BC municipalities have not experienced similar success. They further argued that municipalities of all sizes face various barriers, including digital literacy and resource constraints, but larger municipalities such as Toronto and Edmonton appear to overcome these challenges and implement more robust initiatives at a higher rate. According to the Government of Canada, only 12 municipalities in British Columbia are deemed to be open with the majority with populations between 74,000-675,000 with only one municipality under 30,000 people (Treasury Board of Canada, 2021).

2.6 Civil Society

Nonprofit organizations across Canada work to support governments to implement open data and encourage program standardization. Davies and Walker (2019) noted the important role civil society organizations have played in advancing the open data movement, with many of the most prominent milestones involving civil society actors in key roles in convening stakeholders, framing agendas, and driving open data uptake across sectors and policy domains (p.356).

There are numerous nonprofit organizations that provide opportunities for collaborating with municipal governments throughout all stages of the open data process. In particular, some organizations offer services and resources to guide municipalities throughout the entirety of the process such as Open North, the Community Solutions Network, Open Data for Ontario

Municipalities, Code for Canada, the Canadian Open Data Society, Local Government Management Association of BC, and the Union of BC Municipalities provide support and resources on open data.

Open North was established in 2011 and is focused on driving "research, capacity-building and network collaboration across and within sectors to advance the responsible and effective use of data and technology" (Open North, 2020). The organization has a wide range of topics in which they offer research and advisory services including Data Governance and Management, Data-Driven Public Engagement, Digital Inclusion and Data Literacy, and Open Government and Open Data (Open North, 2020). The organization partnered with the Canadian federal government in 2017 to create the Municipal Do-It-Yourself Open Data Toolkit pilot project containing training materials, best practices, tools, and resources to help municipalities prepare for and implement an open data project (Treasury Board of Canada, 2017). The organization is frequently involved in national and international research and advocacy initiatives on the topic of open data.

The Community Solutions Network is a community-centric platform created by Evergreen Brickworks and supported by Open North. The initiative works to provide support, experience and guidance to municipal and community leaders to build internal capacity and navigate topics such as technology, data management, security, privacy, procurement, public engagement, and outcomes-based project planning (Evergreen, 2021). Their support ranges from technical advisory support to free online courses, webinars and workshops designed to suit the municipality's needs. This resource works effectively throughout the planning, implementation, and development stages of open data maturity in a municipality.

The Open Data for Ontario Municipalities (as a sub-organization of the World Council on City Data) works to facilitate roundtable discussions for open data program development and standardization, to acknowledge the power of open data to build strong and accountable local governments through evidence-based decision making and enhancing transparency (World Council on City Data, 2018).

Organizations such as Code for Canada work closely with government to connect public servants with the tools, training and talent they need to build digital services such as open data programs that are simple and easy to use, with a focus on creating better outcomes for residents (Code for Canada, 2017). The diverse skill set of this organization helps municipalities overcome the need for strong internal technology literacy and skillsets and help set up the digital infrastructure for an open data program.

The Canadian Open Data Society is a grassroots community-led organization established in 2013 in BC. The organization focuses on hosting events around Canada, highlighting successful open

data initiatives at all government levels. At the events, "advocates from all sectors share best practices and local experiences, learn from top international experts, and grow the community strategically and collaboratively" (Canadian Open Data Society, 2019). Additionally, the organization provides awareness through events, advocacy for open data releases access and use, and assembles open data supporters and practitioners (Canadian Open Data Society n.d.).

The Local Government Management Association of BC provides numerous resources, training, guides, and programs to support municipal public servants in BC. While the organization does not offer any resources relating to open data, it does provide a series of resource documents related to best practices in Records Management and the Freedom of Information and Protection of Privacy (Local Government Management Association of British Columbia, 2019). Records management is a preliminary step and component in implementing an open data program for municipalities. As stated by Chorley (2017), to open government data without first effectively managing records decreases the accuracy and reliability of the data (p. 150).

The Union of BC Municipalities is incorporated under a provincial statute and works as a united and common voice for local governments in BC through policy-making and implementation (Union of BC Municipalities, 2012). In 2013, the organization facilitated a multi-speaker workshop titled "Open Government, Open Data, Open Future". The event was open to individuals working in local government in BC, including elected officials, staff, and people who work for local government-oriented companies and not-for-profits (Union of BC Municipalities, 2013). The organization does not appear to provide any resources relating to open data for BC municipalities at this time.

2.7 Summary

In this background section, it is apparent that all levels of government and civil society contribute to the function of open data and methods for implementation and accountability. For instance, at the international level interactive dashboards present opportunities for national comparisons and sharing of action plans. The Government of Canada has closely followed international trends and remains a strong member of the Open Government Partnership in present day. Simultaneously, the BC provincial government has been recognized for its leadership in the open data movement and provides an adoptable open data licence for BC municipalities. Whereas, at the municipal level open data has a diverse range of progress, with notable award-winning programs in larger cities such as Toronto and Edmonton. Finally, civil society organizations have been successful in providing advocacy and support to governments beginning their open data journey. While all levels have varied progress in open data, there is evidence of the pursuit of open data principles at all levels of government in Canada.

3.0 Literature Review

3.1 Introduction

This review explores primarily scholarly literature on open data by discussing the various elements that contribute to an open data program at the municipal level. As noted by the Treasury Board of Canada, key components of an open data program include data governance, open data portal, community engagement, data standards, and operations (Treasury Board of Canada, 2017). Research on open data at the municipal level is important for creating a better understanding of how local governments face barriers to accessing, exchanging, and using their data.

While there has been substantial research across the literature and governments into the benefits of open data, there has not been as much research on the barriers to open data. As open data gains in popularity, public servants in all levels of government require awareness of the barriers to program implementation to provide the most effective service delivery. Identifying the barriers municipal public servants and politicians face in the adoption, implementation, and expansion of open data program can allow for a system of smart practices to be developed.

Through a search of the internal University of Victoria library databases, key phrases of "open data in municipalities," "barriers to open data," and "open government data" were most effective to finding relevant research. The University of Victoria provides access to numerous academic databases with the most useful being JSTOR, ERIC (EBSCOhost), Academic Search Complete and Nexis UNI Plus. The searches were completed between August, 2020 and March 2021.

The following areas are discussed in the literature review:

- Defining open data
- Importance of open data
- Literature on open data in municipalities
- Barriers to open data in municipalities

3.2 Defining Open Data in the Literature

The term "data" derives from Latin meaning "something given" or "having been given" and is associated with observations, experiments and continues to carry the implications and resonance of science for activity in the social sciences, including qualitative research (Torrance, 2019, p.734). In the context of open data, national and international organizations such as the United Nations (UN), Open Data Charter, and the Government of Canada share similarities in their definitions of open data, focusing on the technical requirements. For example, the Government of Canada defines open data as "structured data that is machine-readable, freely shared, used and built on without restrictions" (Treasury Board of Canada Secretariat, 2019). This technical

focused definition is contrasted by the Organization for Economic Co-operation and Development that focuses more so on the ideology of open data, defining it as “a philosophy and increasingly a set of policies that promotes transparency, accountability and value creation by making government data available to all” (Organization for Economic Co-operation and Development, 2019).

Young (2020) highlighted the importance of differentiating “data” from “information” as “information consists of data that have been given structure and meaning, whereas creating information from data involves a suite of choices including which questions to answer, which data are appropriate and what the results of the data processing mean” (Young, 2020, p.306). While the difference between data and information is subtle, differentiating the two alleviates misunderstanding of the relationship between the two terms. Barry & Bannister (2014) also distinguished between data and information, stating that “data, being the building blocks upon which information is built, is a key resource in any state; a resource to be used to enhance and improve the state and the lives of its citizens” (p.130).

Open data has evolved in recent years as technology has increasingly found its place within governments. When open data was first developing as an idea over a decade ago, it was a point of consensus for action among pro-democracy practitioners, internet entrepreneurs, open-source advocates, civic technology developers, and open knowledge campaigners (Davies et al., 2019). Advocates built their position around open data's ability to "act as a platform to critique the way governments, and other institutions were hoarding valuable data paid for by taxpayers, data that if made accessible, could be reused in a myriad of different ways to bring social and economic benefits and democratic change" (Davies et al., 2019). With open data's rise from an idea to a movement, there have been numerous case studies completed on the program's effectiveness at all levels of government.

Within the literature, there are some critiques of open data’s ability to fulfil the idealistic citizen-government harmony. Nam (2014) completed a study composed of interviews with public servants and academics in Korea in response to the Korean government’s Government 3.0 Drive. Respondents raised concerns over the risks of individuals misusing the data to come to false conclusions, utilizing government data to commit fraud and increasing transparency, leading to a potential decrease in citizen trust in the government.

3.3 Importance of Open Data and Current Trends

It is generally acknowledged that open data can benefit internal operations within governments as it enables sharing data with anyone who wishes to reuse it, therefore, breaking down silos within government departments making it easier to share data internally (Open Data Toolkit, 2017). Using this understanding as a basis for analysis allows for a greater understanding of the conditions that need to be met for utilizing data to the greatest extent. For internal data sharing to

be possible, all public servants must recognize the program's benefit and use it in their day-to-day operations. The nature of the data as machine-readable in flexible formats allows everyone (internal and external to government departments) to access and use it in the manner that best suits their needs, which can result in time and cost-savings, therefore decreasing staff workload and staff efficiency (Stewart, 2018). Welle Donker et al. (2016) described open data as abiding by the principle of "collect once, reuse many times" as governments can utilize open data to become more efficient and more effective in decision making (p.1). As Landry et al. (2017) pointed out, access to timely, open, and accessible data and networks as part of an open culture is advantageous for numerous components of municipal governance, urban planning, and managing service delivery. As open data grows in popularity domestically and internationally, it presents a tremendous opportunity for governments to become more responsive, collaborative organizations.

van Schalkwyk (2017) identified an increasing demand worldwide for transparency, evidence-based decision-making, and open data due to the recent Trump Administration in the United States and the subsequent emergence of nationalist behaviour and decrease in faith in democratic institutions (p.2). Yet, van Schalkwyk (2017) states that open data cannot be implemented solely with the objective of transparency, but rather to avoid being overlooked or ignored needs to demonstrate direct value through economic growth, improving public service delivery and innovation (p.2).

For a consistent approach to open data, addressing the challenges municipalities face is imperative for aiding institutions (such as other levels of governments or nonprofit organizations) to alter service and resource delivery. Frequently identified across the literature is the notion that for governments of all levels, open data provides important insights on how best to move forward and build on progress made so far (Davies et al., 2019). Analysis of historical data allows for progression and planning for the future to be made more effectively. The need for ongoing accumulation of historical data reinforces the consensus that open data can be a long-term investment in society (Hawken et al., 2020) by increasing transparency and accountability, providing a tool for active public engagement, and promoting citizen involvement in decision making (Berrone et al., 2016). These principles proved evident at the municipal level of government. Open local government data can help tackle pressing urban resilience issues such as climate change, migration patterns, employment trends, natural disasters, changing demographics, industrial developments, and disease (Landry et al. 2017).

3.4 Literature on Open Data in Municipalities

While national and international communities have made substantial progress in globalizing dimensions of open data, Roy (2014) argues that it is locally where "the most traction can be gained in concretely measuring the impacts of openness initiatives—and as importantly where

the community itself can become engaged in doing so" (p. 422). When looking at open data in municipalities across Canada, cities such as Edmonton, Toronto and Vancouver have implemented standard-setting open data programs. By contrast, a review of smaller municipalities found that "open data initiatives have not been prioritized to the same extent and often lack robustness" (Zuiderwijk et al., 2018, p.14). Varying levels of maturity in open data programs can be the result of numerous factors.

A factor effecting the success of the program can be population size. Johnson (2016) evaluated how municipal government evaluates the success of their open data programs with attention to how the size of the municipality affected the results of the program. Johnson (2016) completed a series of qualitative, semi-structured interviews with eight Canadian municipalities at varied stages of open data provision maturity and population size were analyzed for their research. It is important to note that the author did not address other barriers beyond population size that were keeping the municipalities from progressing and focused primarily on the internal evaluation methods for current success.

Further research into the role population size plays in the success of open data was investigated by Gill and Corbett (2017). To develop a deeper understanding of how open data exists in municipal governments, Gill and Corbett (2017) presented an analysis of open data portals in municipalities in British Columbia with a focus on testing the relationship between population size and efficacy of open data portals. Their research looked at the usability aspects of the portal's design and the accessibility characteristics of the published data. They found that to provide effective open data, the platform itself needs to be accessible to citizens with various technical skill sets. The lack of consideration regarding the usability of the portals in current evaluation tools presents a roadblock to improving the open data program. These findings build on the consensus across the literature that the value from open data comes not from its provision but from its use and connection between provisioning government and end-user in a meaningful way (Hawken, Han & Pettit, 2020; Janssen et al., 2012; Sieber & Johnson, 2015; Zuiderwijk et al., 2018).

Additionally, further research identified that for data to be utilized to the highest capacity, it needs to be intentionally published and aligned with the interests of all stakeholders to bridge the gap between short-term city priorities and the longer-term development of citizens' quality of life (Berrone et al., 2016). To properly manage the data and demonstrate its value is an asset to any organization or government. Data infrastructure includes datasets, the technology, training, and processes that make them useable; policies and regulation, such as those for data sharing and protection, and the organizations and people that collect, maintain, and use data (Landry et al., 2017). Landry et al. identified that robust data infrastructure is imperative for establishing an innovative and useful open data program in local governments. The need for linking, integrating, and deploying datasets through effective data infrastructure was discussed by Janssen et al.

(2014), further demonstrating the need for innovative data collection and distribution methods that maximize the potential of the data and ensure the highest return on investment. Progress in data publication has raised important questions about who will use that data, how they will use it, the value the data holds, and what results can be achieved (Davies et al., 2019).

A study completed by Grimmelikhuijsen (2009) found that when government transparency is high, it is likely to increase citizen trust in the agency (p.183). On the other hand, de Fine Licht (2011) argues that transparency cannot be assumed to equal trust and public acceptance as often increased transparency in the short term can lead to a decrease in trust as the media can scrutinize to a greater extent. These contrasting perspectives raise questions regarding the legitimacy of the claims that open data increases transparency, therefore, directly influences citizen trust in government institutions.

3.5 Barriers to Open Data

There are, however, barriers and challenges to the adoption, implementation, and expansion of open data programs present across the literature. It is important to identify the existing barriers acknowledged in the literature to compare and contrast the subsequent survey and interview results.

First, logistical challenges facing public servants to implement the program were commonly mentioned in the literature. Theories of how to achieve a successful program were identified by Zuiderwijk et al. (2018), who found that the "success and maturity of an open data program can be attributed to a top-down versus bottom-up approach", referring to if the concept is brought forward by the working level staff (bottom-up) or from the executives or management (top-down) (p.3). As demonstrated in the study, these findings emphasize a connection between senior staff support and the program's success. Hossain et al. (2016) came to similar conclusions and attributed barriers due to a lack of awareness and knowledge from managers and risk-averse leadership (p.30).

Similarly, Crusoe and Melin (2018) discussed the role that public servants capacity may play as a barrier to open data. Their findings acknowledge that a lack of "Skills for Publishing" and "Skills for Release" (from public servants) may result in inadequate infrastructure performance, lacking metadata descriptions, or inaccessible data as well as a threat to external safety, useless, or reveals private information about citizens (p.178).

Additionally, numerous authors found other barriers emerging within the structure of public service. Young (2020) findings suggest that for open data to be successful within a municipality, there needs to be substantive implementation by municipal departments. This may come in the form of hiring appropriate staff and allocating enough resources to the initiative. However, if

there are resource limitations in the form of a lack of funds to meet these requirements, Young's findings would conclude that the open data program would not be successful. Otherwise, Young (2020) found that the open data will be tokenistic by acting strategically within departmental constraints to fulfil policy requirements rather than transform governmental service delivery. Likewise, Chorley (2017) noted that establishing strong records managements systems within the departments are imperative for open data success, which requires departmental buy-in to implement the organizational system. Chorley continued to state that records management is a barrier that precedes technical barriers (such as determining what data to publish and managing the data itself) and that fulfilling open data requirements cannot be considered a possibility until records management systems are in place (p. 157).

Technical barriers were discussed by Albano and Reinhard (2014), who noted "technical problems in information processing, information collected in different ways and for different purposes, work overload to make the information available, heterogeneity of users and their inability to work with the information, among others" (p. 183). Heterogeneity of users and concern over who can access the data was discussed further by Gurstein (2011) who stated that other than the range of potential users able to translate access to open data into meaningful applications and uses, the available outcomes from open data are available only to those who are already well provided with other resources. Their argument identifies that open data can contribute to the digital divide occurring within communities if consideration is not given to the varied access to digital resources. Gurstein highlights the importance of access to digital literacy for data democratization and ensuring community members are not further marginalized. Ultimately, open data is most beneficial to a community if used by the whole community and aligned to society's interests (Roy, 2014, p. 417).

Building off the role community places in open data, given the identified importance of open data from the government's perspective, it holds value as an accountability and participatory mechanism from the community perspective. Baack (2015, p.4) found that sharing raw data removes the opportunity for the government to influence what is being published through a summary or a press release. Instead, individuals can utilize raw data to interpret and break down the government's monopoly of interpretation, allowing analysis free of preconceived interpretations. Young (2020) argues that removing public servants as the gatekeepers to the data erodes administrative discretion for issue framing, therefore fundamentally altering the nature of government-public interaction (Young, 2020). However, removing the government as gatekeepers to the data can be seen as a barrier to participating out of public servant fear. Crusoe and Melin (2018) noted "Consequence Barriers", in reference to if the data was misused (for example, abused data, utilized in fraudulent behaviour or other inappropriate circumstances), it could raise a question of liability (p.177). In a chapter on the "Dark side of Open Data", Charalabidis et al. (2018) argued that open data may not be occurring in all levels of government due to the public administration’s fear of the risks of open data. The study further points out that

open data may be a tool for politicians to bolster their perceived transparency, while "the public servants implementing the program are wasting resources on publishing data that was not used or relevant" (Charalabidis et al. 2018, p.7).

3.6 Conceptual Framework

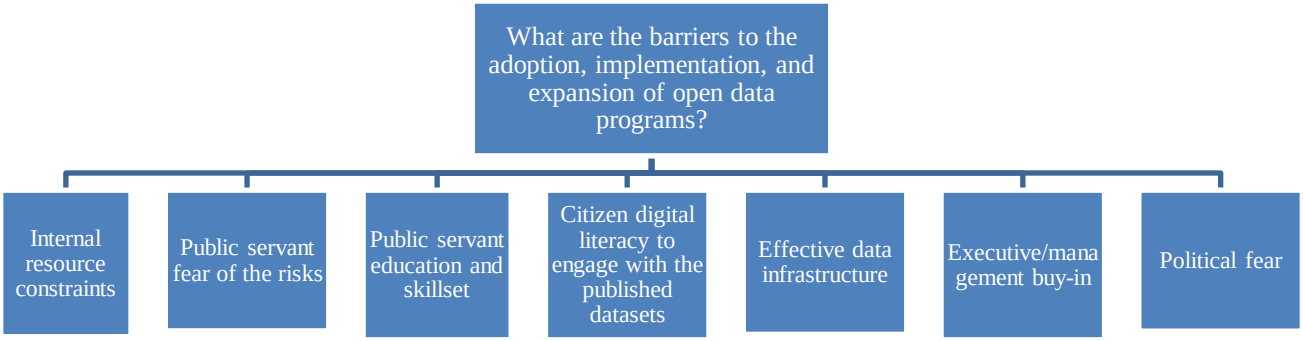
Throughout the existing literature, it is evident that open data has been viewed as primarily a beneficial program for governments at all levels to engage with and implement; however, also apparent is the fact that the main drivers of change can be public servants, yet they are seemingly a part of a barrier to moving from the current state of openness to the future state. It is important to note that public servants are only a portion of the agency, and a program of this magnitude would require political buy-in, motivation and capacity as well. For governments to increase transparency through open data requires a substantial culture shift. Opening up government data to potential scrutiny and review by the public challenges traditional theories of governance (Lane, 2000, p.8). In modern society, a decentralization of institutional mechanisms is occurring, resulting in increased citizen involvement and data-driven decision-making (Lane, 2000, p.8).

A potential theory to explain the absence of robust open data programs in BC could be the limitations by public servants and politicians. The current policies, guides, and strategies from the BC provincial government to educate municipal public servants appear insufficient in addressing the barriers to implementation occurring in reality. If the province wishes to disseminate principles of open data amongst municipalities, the current approach to distributing information needs to be adjusted accordingly to ensure incoming political figures as well as public servants are aware of the opportunities and challenges of open data.

Figure one below identifies some barriers in adopting, implementing, and expanding open data programs in all levels of government that were discovered in the literature. The barriers are as follows and are in no particular order:

- Public servant education and skillset
- Public servant fear of the risks
- Political fear of the risks
- Internal resource constraints
- Citizen digital literacy to engage with the published datasets
- Effective data infrastructure
- Executive/management buy-in

Figure 1: Conceptual Framework



4.0 Methodology and Methods

This chapter describes the methodological research design, the way data was collected, and how the data was analyzed.

The research was conducted as a comparative case study through surveys and interviews with senior public servants working in municipal government in British Columbia.

This research has been approved by the Human Research Ethics Board (HREB) with certificate number #20-0559. The HREB ensures that University of Victoria research involving human participants or human biological materials meets the ethical standards required by Canadian universities and national regulatory bodies.

4.1 Methodology

The research was conducted predominantly as a comparative, qualitative case study with British Columbia being the case and the comparative component are the municipalities within British Columbia. Goodrick (2019) defines comparative case studies as a type of case study with a key differentiating feature being their focus on generating explanatory claims. Additionally, Flyvbjerg (2013) noted that "qualitative research does not usually employ statistical procedures or other means of quantification, focusing instead on understanding the nature of the research problem rather than on the quantity of observed characteristics" (p. 170).

As discussed by Guest et al. (2013), qualitative research methods are often employed to answer the whys, and how's of human behaviour, opinion, and experience— information that is difficult to obtain through more quantitatively-oriented methods of data collection" (p.2) As the data collected were public servants' experiences, it is necessary to use a methodology that allows for a subjective account inclusive of varied perspectives and lived experiences.

The comparative analysis component of a comparative case study allowed for a review of contrasts, similarities, or patterns across participating municipalities in British Columbia.

4.2 Methods

SURVEY

Municipalities with evidence of implementing open data programs (published open data policies, guides, roadmaps, portals etc.) as well as municipalities that do not have any evidence of open data on their website were contacted to participate in the study. All participants were selected at random. The initial 100 people contacted were Chief Administrative Officers, Information

Technology Managers, City Planners, and Corporate Services Officers. Those who received the survey information were encouraged to forward the information to the most appropriate staff member within the municipality to complete the survey as they saw fit. Municipalities with evidence of implementing open data programs (published open data policies, guides, roadmaps, portals, etc.) and municipalities that do not have any evidence of open data on their website were contacted.

In the introductory email (See Appendix A) sent to 100 of the 162 BC municipalities chosen at random, open data was explained, the research questions were identified, and the researcher was introduced. The recipients were then able to self-select to participate in the survey (See Appendix B for copy of survey). Of the 100 public servants in municipalities across BC that were contacted, 23 people completed the survey. Of the 23 people that completed the survey, 16 opted in for the interview for further discussion and 10 people completed the interview (See Appendix C for copy of the interview questions). Completion and return of the survey by the participant implied consent. An official consent form (See Appendix D) was sent to participants who opted-in to the more in-depth follow-up interview. The consent form was sent and returned through email to participants who opted into the survey to ensure clear lines of communication and clear identification of how their participation and responses would be utilized to benefit the study.

Each interview took place through Zoom and the survey was distributed through a link to a SurveyMonkey survey that was sent through email. The mean time for an interview was 30 minutes, with a range between 15 minutes and 45 minutes in total.

All recruitment was made through the use of publicly available contact information. As senior public servant contact information is public information, contact was made through sourcing email addresses through respective municipal websites and/or Civic Info BC. All contact was made through a University of Victoria supplied email address. Utilizing a University email address increased the legitimacy of the recruitment and documented a clear communication chain.

The data collected from the survey responses was used for comparative analysis to discover any common themes or patterns in the barriers. The population size of 100 public servants contacted resulted in an appropriate response level for the scope of the research.

INTERVIEWS

Interviews were recorded for further analysis and notes were taken throughout the session. Due to the state of the COVID-19 pandemic, the interviews were conducted remotely using the video conferencing tool Zoom as it allowed for easy recording and playback as well as a safe interview platform for both the participants and researchers health.

The individuals who chose to participate in the interview were categorized based on the size of the municipality they worked for. For the purpose of this study, small municipalities have populations from 0-50,000 residents, medium municipalities have 50,000 to 100,000 residents and large municipalities have 100,000 plus residents. The data collected was then used for comparative analysis to discover any common themes or patterns in the barriers identified.

Interviews with ten public servants were conducted through semi-structured interviews composed of 6-8 predetermined questions (See Appendix C for interview questions). This interview style allowed for a guided discussion while leaving space for the participant to provide in-depth responses that align with their experience. Senior-level staff were preferred to interview as they tend to have a more robust understanding of their respective program. Ideally, a senior staff member from both policy development and information technology departments were interviewed to provide a more well-rounded perspective of the reality of the open data program; however, in acknowledging resource constraints in municipalities and the reality that senior public servants have limited time to allocate to projects external to their current priority list, this was not required. In circumstances where there was not an open data program in place, it was preferred to speak with a senior public servant from the Information Technology department as their role typically involves data management in some capacity.

Interview questions were crafted so that there is a degree of flexibility in the response. For the study to be the most effective, semi-structured, open-ended questions were imperative to provide a well-rounded perspective. Currently, there is a lack of qualitative data in this topic area. This is important as there have been other studies conducted in this topic area that focused on quantitative data of a more technical nature; therefore, this research will complement past research nicely.

METHOD ETHICAL CONSIDERATIONS:

There was no risk or compensation associated with participating in the study. As the findings are published with anonymity and categorization based on broad generalizations related to the size of the municipality, there were no risks or consequences. The participants were able to withdraw their participation at any time throughout the process. Therefore, there was no risk or harm associated with this research. No participants withdrew from the research. The data accumulated will be deleted within 30 days post-completion of the research.

The time devoted to the research is the primary inconvenience for participants. As the feedback was collected during participants workday, there was the possibility of the survey or interview being a distraction from their tasks at hand; however, the inconvenience was minimal.

To ensure confidentiality of the participants, they are not explicitly be identified by name, position title, or municipality in the research. However, to contact the correct participants, the principal researcher and the faculty member are aware of the participant's name, job title and employer. The survey results and interviews were anonymous to allow public servants to speak freely and candidly without fear of repercussion. Anonymity was imperative to receive as honest of responses as possible.

4.3 Data Analysis

SURVEY ANALYSIS

Data was collected and accumulated from the survey results through Survey Monkey. The results were multiple choice or open ended. The data gathered was downloaded from Survey Monkey in Excel spreadsheets for review and analysis of results. Open ended questions were organized thematically through a coded system of key words. Utilizing a similar process as the open ended questions in the survey and interviews allowed for ease of comparison and analysis of both sets of results.

INTERVIEW ANALYSIS

Data collected was accumulated through semi-structured interviews. The data gathered through thematic analysis for this research was stored in an Excel chart to maintain an organized and coherent inventory. As discussed by Terry et. al, (2017) thematic analysis is a widely used tool for analysing qualitative data and identifying themes. The data collection allows for an analytic induction in the observation of each municipality sequentially. After the preliminary analysis, themes were created and coded through the development of a system of keywords. The thematic organization allows for a clear vision of commonalities amongst interviewees. The data was organized based on each interviewee's respective municipality as well as by the question that was asked. Clear organization in Excel allowed for adequate filtering, analysis, and interpretation of data. To preserve privacy and maintain confidentiality, municipalities or the participants were not singled out or cited when referring to the survey and interview response data; instead, generalizations about each group were made.

4.4 Project Limitations

As human participants were used for the study, there is the opportunity for interviewees to provide misleading information intended to make their municipality appear more progressive than in reality. This may be due to perceived peer pressure unknowingly applied by the researcher combined with a participant's ego or perception about the "right" or "wrong" way to answer a question. In some cases, public servants may hesitate to speak negatively about their municipality and their inability to implement a specific initiative. This may alter how they approach answering the survey and interview questions. Additionally, as some municipalities

began their open data strategies many years ago, there was some difficulty finding the individual responsible for the program's initial implementation.

An additional limitation was contacting municipal level public servants in BC as there is a lack of consistency in publicly available contact information for senior staff. While some municipalities had detailed contact lists with email addresses and phone numbers, many did not. As a result, the introduction email referencing the survey was directed to the department's general email address, with the intention of it being forwarded to the appropriate person. Due to this additional step, there was an additional barrier out of the researcher's control. It is perceived that many of the potential participants did not receive notice of the survey and did not get a chance to participate due to this step and lack of information available to contact staff directly.

5.0 Findings - Surveys

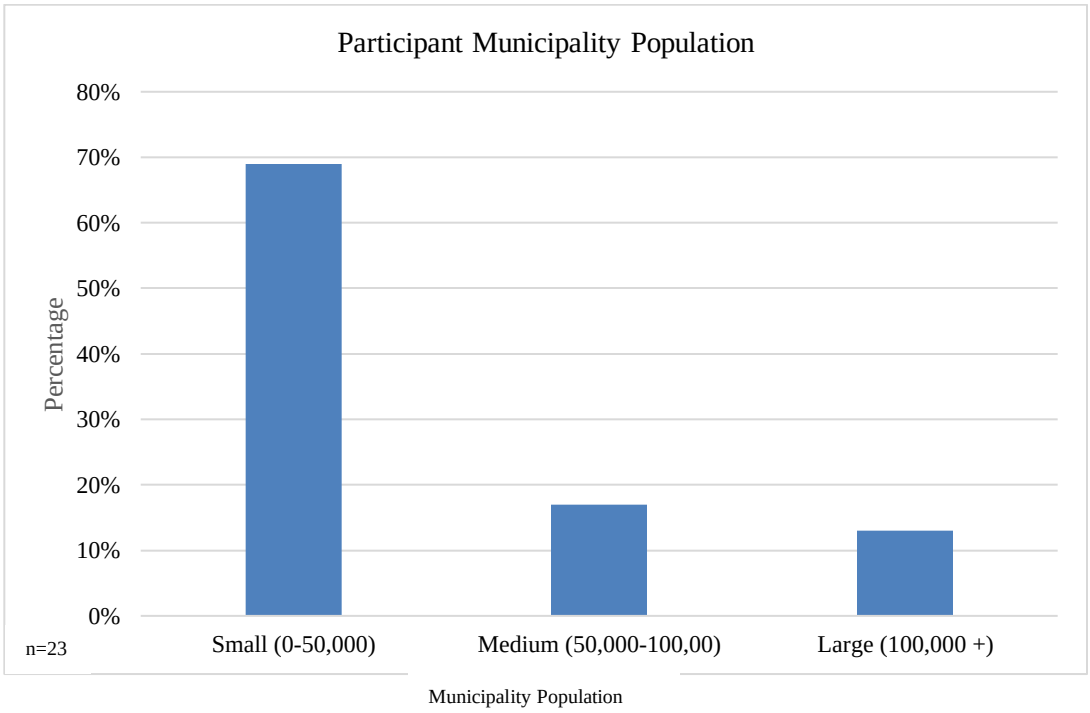
This chapter focuses on the survey findings completed by 23 senior public servants working in municipalities in BC. The survey's goal was to help to identify the current state of open data in their respective municipality and to identify the barriers in establishing or expanding an open data program.

In the survey, open-ended questions were asked to complement the multiple-choice options to allow a free flow of discussion, perspectives, and ideas. As a result of the "comments" section, participants provided unique insights that had not previously been considered or seen in the literature review.

5.1 Survey Results

Results were gathered through an initial survey composed of seven questions, with an optional more in-depth interview. Of the 100 public servants in municipalities across BC that were contacted, 23 people completed the survey. Of the 23 people that completed the survey, 16 opted in for the interview for further discussion and 10 people completed the interview.

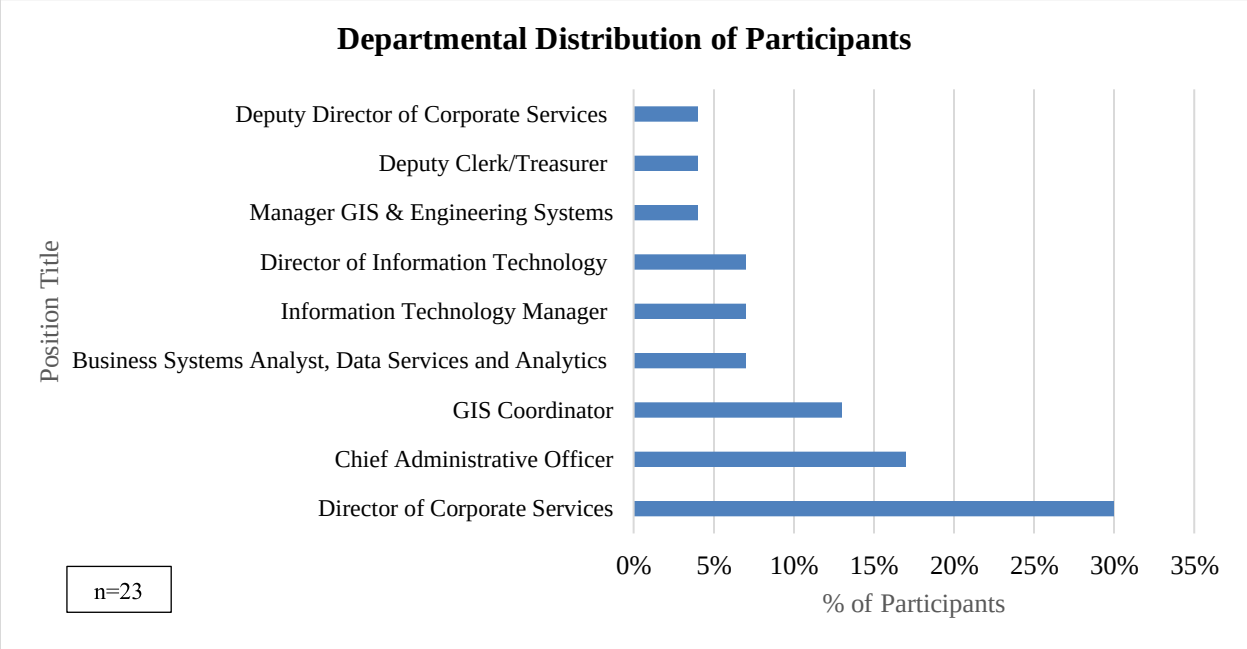
Figure 1: Survey Question #1a



Primary questions of the survey required reporting participants contact information, municipality, position within a department, and municipality population. As seen in Figure 1, participating municipalities were predominately from small municipalities. For the purpose of this study, small municipalities have populations from 0-50,000 residents, medium

municipalities have 50,000 to 100,000 residents and large municipalities have 100,000 plus residents. Participating municipalities ranged in population size from 195 to 250,000, with the majority under 100,000. Population size was necessary to consider to ensure that the results were not skewed toward larger municipalities that have had greater success in implementing open data than smaller ones.

Figure 2: Survey Question #1b

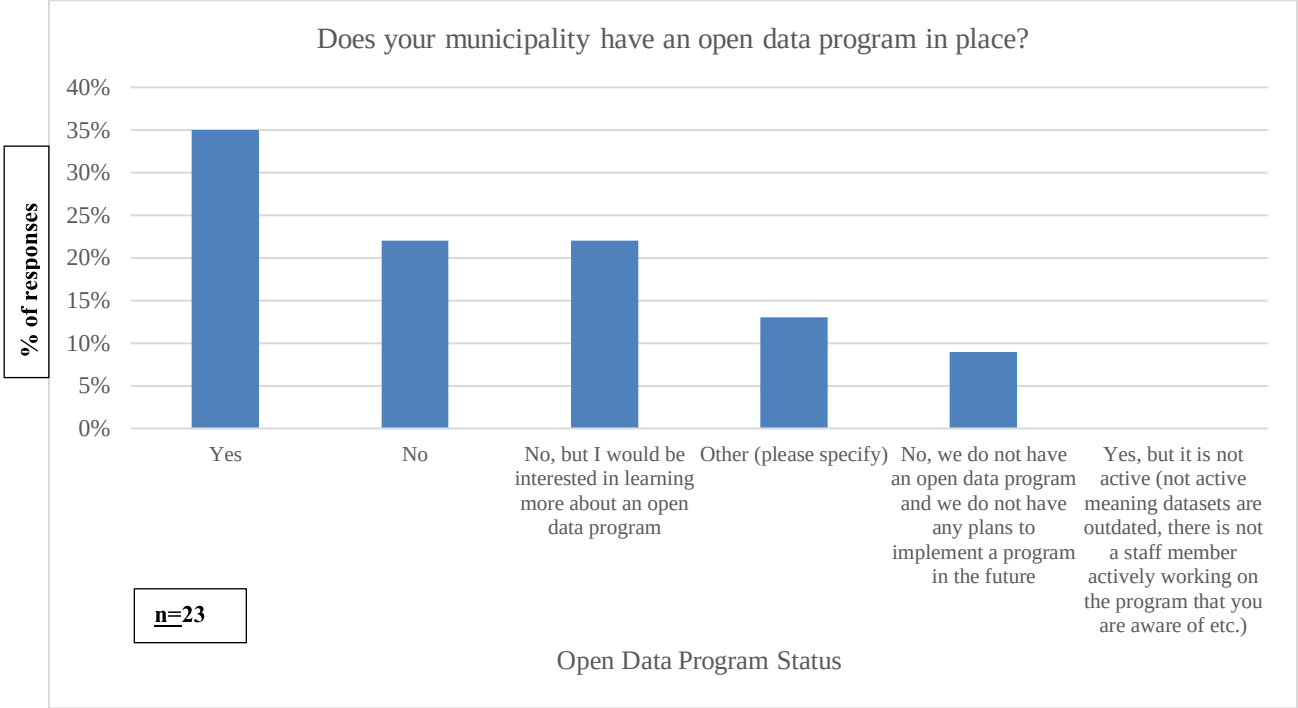


As part of the introductory questions, participants were required to submit their position title and department. This was posed as an open-ended question. The findings demonstrate the following in order from most to least:

- Director of Corporate Services (7)
- Chief Administrative Officer (4)
- GIS Coordinator (3)
- Business Systems Analyst, Data Services and Analytics (2)
- Information Technology Manager (2)
- Director of Information Technology (2)
- Manager GIS & Engineering Systems (1)
- Deputy Clerk/Treasurer (1)
- Deputy Director of Corporate Services (1)

The survey then began determining the scope of a participant's knowledge of open data and whether there was already an open data program in their municipality. Participants were able to select only one option that best suited their current state of open data.

Figure 3: Survey Question #2

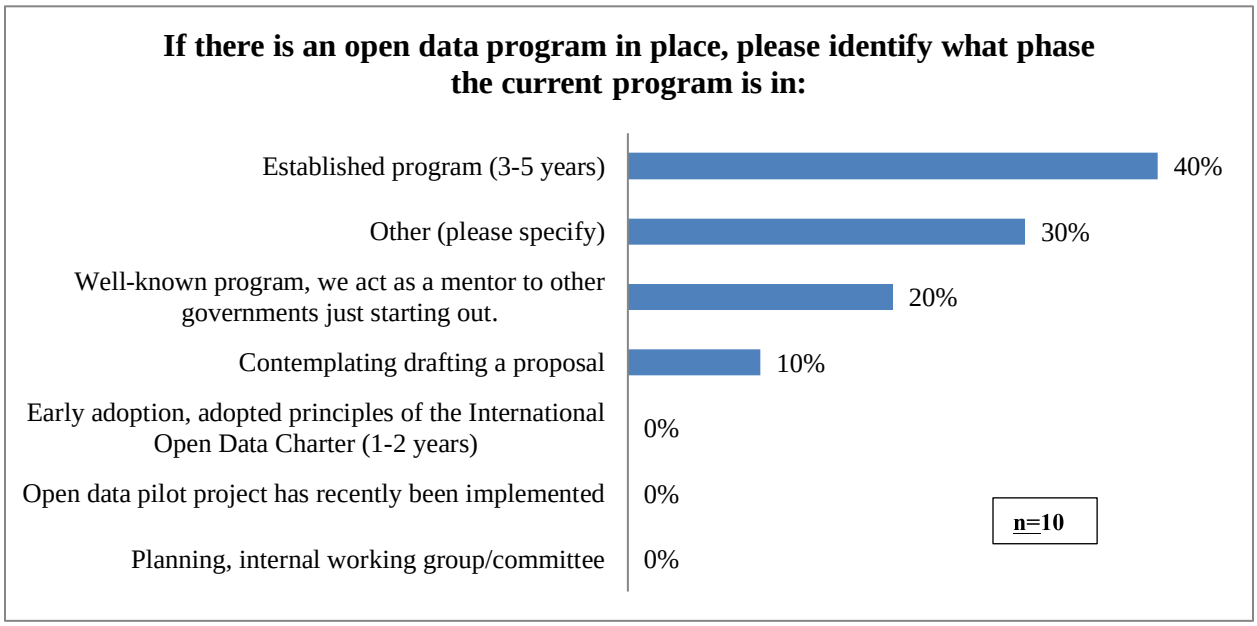


The results presented in Figure 3 revealed that most municipalities did not have a program in place at the time of the survey. For those municipalities with an open data program in place, 60% classify it as a well-established or well-known program. This distribution allows for a greater understanding of both the barriers to the adoption, implementation, and expansion of open data. Participants were able to provide an example further expanding on their experience with open data in their municipality. The three written comments were as follows:

- "We have an open source QGIS database for our asset management. I am not sure if this counts but believe it does. However, we do not use raw data, only the mapping for sharing the information. FOIPPA and record management legislation makes it challenging."
- "No - but we have just received approval to move ahead with a capital project to implement Open Data."
- "No idea what an open data program is or would be used for."

Those with an open data program in place were then asked to distinguish at what phase their program is in. Results for survey question three are presented below.

Figure 4: Survey Question #3

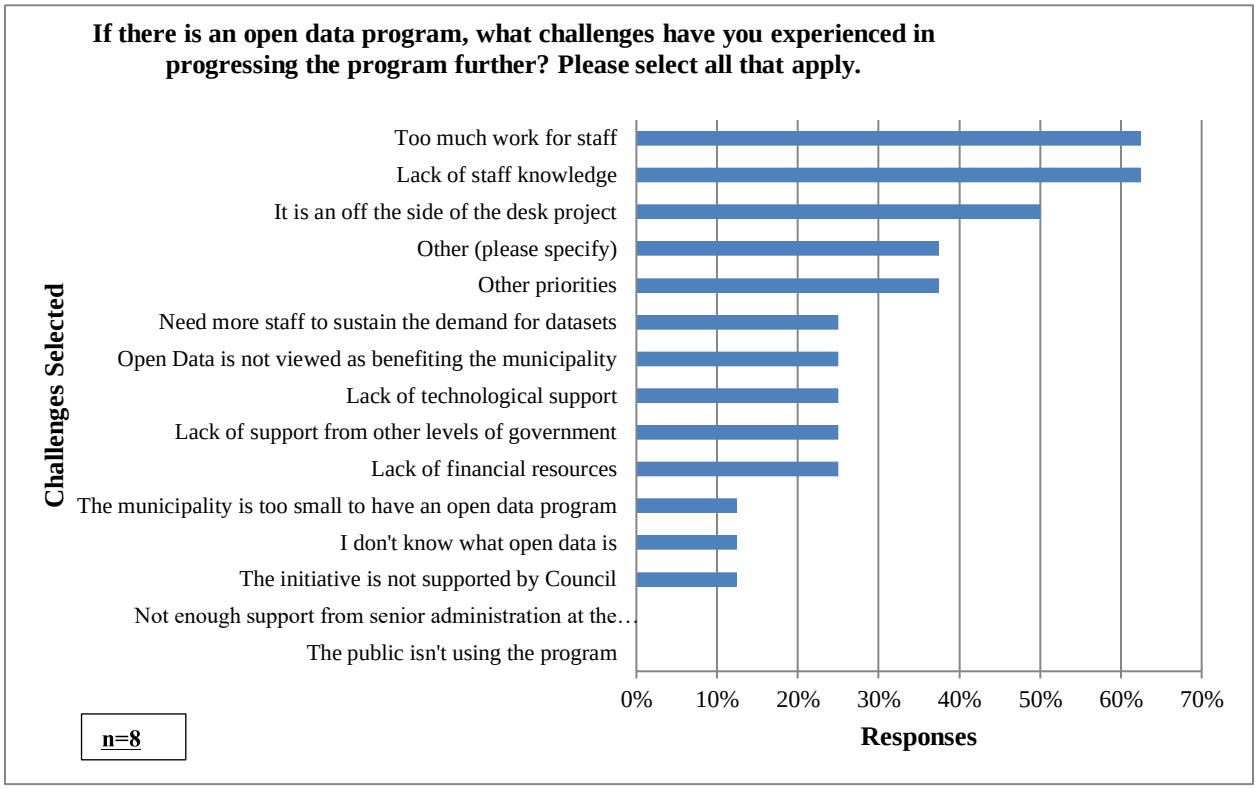


Of the ten that responded, there were three additional comments in the 'other' category as follows:

- "Our QGIS is in its 3rd year of development as we are still a working group"
- "GIS Data is available."
- "We launched a program about 7 years ago, but it was not fully implemented. We are currently re-launching this program."

Building on the phase of the program, those with an open data program in place were then asked to identify the barriers to expanding. Participants were able to check all options that apply for their circumstance as well as comment if there was an additional barrier they believed should be included. Three additional comments were made.

Figure 5: Survey Question #4



Of the eight responses to question four, the responses were as follows in order from most frequently selected to least frequently.

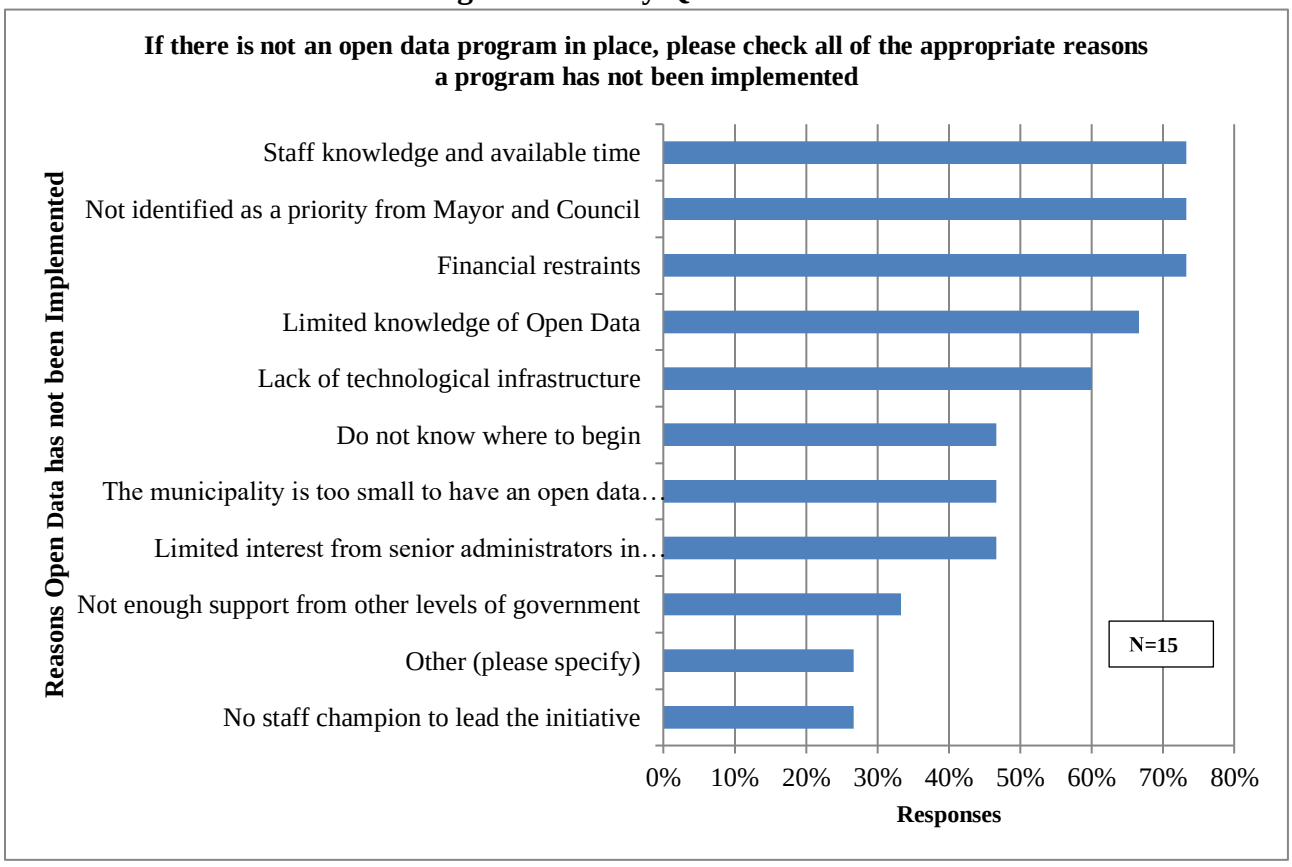
- No devoted staff member to lead the initiative (75%)
- Lack of staff knowledge (63%)
- Too much work for staff (63%)
- It is an off the side of the desk project (50%)
- Other priorities (38%)
- Lack of financial resources (25%)
- Lack of support from other levels of government (25%)
- Lack of technological support (25%)
- Open Data is not viewed as benefiting the municipality (25%)
- Need more staff to sustain the demand for datasets (25%)
- The initiative is not supported by Council (13%)
- I don't know what open data is (13%)
- The municipality is too small to have an open data program (13%)
- The public is not using the program (0%)
- Not enough support from senior administration at the municipality (0%)

The comment section allowed participants to expand on their answer or provide an additional barrier. Three additional responses were volunteered as follows:

- "Just getting more exposure to the public and other coworkers."
- "Lacking strong directive to expand program."
- "City's Open Data is primarily GIS based and there is no plan to add other data elements at this time."

Question five was directed for those without an open data program to identify the barriers to implementing a program. Participants were able to check all options that apply for their circumstance to allow them to present numerous barriers that they experience.

Figure 6: Survey Question #5



The reasons for a program not being implemented were (response to 'other' category):

- Staff knowledge and available time (73%)
- Not identified as a priority from Mayor and Council (73%)
- Financial restraints (73%)
- Limited knowledge of open data (67%)
- Lack of technological infrastructure (60%)

- Limited interest from senior administrators in municipality (47%)
- The municipality is too small to have an open data program (47%)
- Do not know where to begin (47%)
- Not enough support from other levels of government (33%)
- No staff champion to lead the initiative (27%)
- Other (please specify) (27%)

Survey questions six and seven provided the opportunity for exclusively open-ended answers. No prompts were given beyond the initial question.

Question six asked "If there is an open data program at your municipality, what works well?" It was responded to by nine participants and skipped by 14. Out of the nine responses, five touched on the important role GIS software played in the success of their open data program.

- "There is information to share that does not reveal personal information and is great for presenting annual or long-term budgeting priorities as to infrastructure needing to be replaced, most notably water lines and road maintenance/replacement."
- "GIS Data Downloads."
- "Continuous addition of data, maps, and infographics."
- "The software we use is quite powerful. The District is learning how to take advantage of this."
- "Engineering firms are able to download data layers without contacting GIS"
- "Strong demand for some datasets, well-tuned process, framework is in place, and has been running for years."
- "Our Esri Open Data platform is built into our Cloud GIS platform so it was fairly easy to deploy once we had to proper approvals."
- "Using ArcGIS Online as our open data program. Starting with GIS data, using Open Data to start the conversation about data governance."
- "Most inquiries made by the public is GIS based and this working well"

The final question of the survey, question 7 asked: "What supports, and who from, would you need to implement/improve open data in your municipality?" This question was answered by all 23 participants.

- "Consistent IT support and user-friendly data entry that cannot be tampered with when shared and that does not generate information that would be "revealing" a particular property or owner or any other FOIPPA concern."
- "Would need senior management support."
- "Information to enable me to better assess the status of open data initiatives in our municipality, and to enable me to provide a rationale for either improving or implementing an open data program."
- "Mayor and Council; Directors; Finance."
- "Financial and ongoing technical support would be required."

- “Greater training - perhaps better info on what qualified and what our stakeholder (resident) expectations are.”
- “City website designers to make it more easily found on City website.”
- “As a smaller municipality, it would be helpful if there was support, guides, standards, possibly webinars, workshops etc. available through professional associations, the province and/or larger municipalities.”
- “Council, CAO, resources, finances - support from provincial government. Right now, with COVID there just isn't the funding.”
- “No idea what an open data program is or would be used for.”
- “If we had political will and financial resources we could move forward but I am not sure we are large enough to warrant it. We share information freely (within the constraints of FIOPPA) and proactively post many documents on our website.”
- “Mayor/Council, Senior Staff.”
- “Don't know.”
- “We need a dedicated resource for Records Management. This initiative is often put on the side and there is no consistent management of the records.”
- “We are looking at doing a revamp if we can find the time”
- “It would need to be a priority for the organization. Currently this is down the priority list”
- “I am not responsible for the program any longer in my current role, however, I was responsible for establishing and operating for the first few years. To improve it now, it needs strong leadership and direction.”
- “Greater buy-in from other departments or a council-driven initiative would really help take our Open Data program to the next level.”
- “We really need more data governance. Currently the quality of the data, the metadata, and finding out who is responsible for the data is a challenge. We are currently looking at getting a consultant to help us start the process.”
- “If open data was identified as a priority for the City, it would need to be resourced appropriately through the City's budget.”
- “Direction from other departments and Council.”
- “It would be helpful to have detailed guidance from the Ministry of Municipal Affairs.”

    “An incentive (grants) from the Province, and a resource/guide plus training opportunities about implementing Open Data programs, likely hosted by LGMA. Small municipalities in particular lack the staff resources, IT infrastructure, and political incentive from the public or Council to initiate this type of project.”

5.2 Summary

The survey results provided responses from 23 public servants from across BC. The majority of participating municipalities had under 100,000 residents and were predominately from municipalities without an open data program. Across both municipalities with and without an open data program stated that public servants were a barrier to implementing the program in some capacity. The majority of the questions allowed participants to select as many options as possible

that applied to their circumstances, with the additional option to comment if they did not see their situation represented. The final two questions of the survey provided the opportunity for the participants to explain what works well currently and go in-depth as to the type of supports they would need to implement open data. The results presented similar barriers present in small, medium, and large municipalities, demonstrating that municipalities of all sizes are experiencing a similar phenomenon and similar barriers.

6.0 Findings - Interview Results

Interviews were conducted with ten public servants that completed the initial online survey and self-selected to participate in further discussion. Participants were asked eight questions and informed to answer to the best of their understanding. The participants were asked a set of questions that differed slightly depending on whether or not they had an open data program currently in place. This slight differential was intentional to determine the barriers to creating a program compared to establishing a program.

The intention of the surveys was to provide participants with a platform to further expand on their experience or supplement their previous answers. While the initial survey welcomed additional comments, the interviews encouraged further, more in-depth reflection of the reality of open data in their municipality.

To maintain confidentiality and anonymity, municipalities will be referenced based on their population size. For the purpose of this study, small municipalities have populations from 0-50,000 residents, medium municipalities have 50,000 to 100,000 residents and large municipalities have 100,000 plus residents.

6.1 Existence of Open Data Program

Interview Question #1: Does your municipality have an open data program (for example an open data portal, policy, strategy and/or framework)? If yes, can you please provide an overview? If your municipality does not have an open data program, please describe your understanding of open data.

The majority of responses came from municipalities with an open data program, with only four municipalities out of ten participating without having an open data program. Within the responses, there was a general misunderstanding of open data, including from municipalities with an active open data program. One participant stated they had asked other senior level colleagues about their knowledge of open data and done a Google search before the interview in attempts to figure out what open data was and how they could approach the interview to best represent their municipality. Another medium sized municipality, without an open data program, stated that they are unsure what information exists in their municipality to provide to open data. Two medium sized municipalities with open data programs highlighted the basis of their program as driven by spatial GIS mapping.

One participant from a large municipality without an open data program mentioned the necessity overarching open data policy or strategy guiding the initiative. This sentiment was further reinforced by another large municipality with an open data program. No other municipalities mentioned an open data policy or strategy.

6.2 Open Data and Teams

Interview Question #2: Describe the composition of the team working on open data (i.e., number of staff, roles, and responsibilities)

Of the six participants with open data programs, only three have dedicated staff members actively working on open data. One large municipality with a dedicated staff member further expanded on their response saying, "we have one staff member who is responsible for the open data program, and it's only a small portion of their job responsibility." All three municipalities identified that the staff members are working in the GIS team, which is under management of either the Engineering Department or Information Technology.

6.3 Motivation for Open Data

Interview Question #3: What was the motivation to implement an open data program? If unfamiliar, what is the current motivation to sustain the program?

The responses to this question varied substantially. Four of the six respondents attributed the beginning stages of open data to the need to better respond to Freedom of Information requests (FOI's) and increase citizen access to municipal information to create a more informed community. One respondent from a large sized municipality stated that "it really relieves staff from having to answer to data requests so that's a huge win for us."

The COVID-19 pandemic was cited by one small municipality as a motivation to sustain the program; "especially now in times of COVID having certain records available to the public electronically is a lot better than people coming in and asking for these records and even if they did come in and ask for these records on paper, we probably would have a hard time finding them."

One large and one small municipality both identified the need for sustaining open data for the ease of operations for development, engineering, and regional real estate endeavours, stating "open data benefits new developments by making information that a site selector would want to know available, you can build drawings and designs and do accurate estimates of what things are going to cost to develop a certain parcel of land."

A unique response mentioned the municipality's desire for transparency. This large municipality identified this as their top reason for sustaining the program, identifying that the current mayor and council are passionate about making data-informed decisions that are transparent to the public.

6.4 Benefits of Open Data

Interview Question #4: Do you view open data as beneficial to your work? Or would it be beneficial to your work if there was a program?

Four of the six respondents with open data programs identified open data as being highly beneficial to their work. Two participants, one large municipality and one medium, identified it as not being beneficial to their day-to-day operations with both identifying that despite having open data in their municipality, internally staff are not using it to share information.

One large municipality identified open data as being super beneficial to their day-to-day work, as the public has taken the information and utilized it in "ways we could have never imagined or had the capacity to do."

Of the municipalities without open data programs that answered this question, two out of four identified it as likely to be beneficial to their work, with the other two saying they were unsure as to how open data would supplement their current work.

6.5 Data Usage

Interview Question #5: In your perspective, do you believe your municipality is utilizing its data to the highest potential? Why or why not.

This question was designed to encourage more in-depth responses from all participants regardless of their respective progress in open data; however, overall, there were limited responses beyond a simple "no". All ten participants responded similarly in that they were currently not utilizing their municipal data to its greatest extent and that there is room for improvement.

6.6 Status of Exterior Support

Interview Question #6: Do you receive any form of support from data focused organizations such as Data BC, Treasury Board of Canada Secretariat, Open North?

Nine out of ten participants stated they have never received support from any of the aforementioned organizations. One large municipality identified receiving support from the federal government in response to the federal Smart Cities initiative. The municipality received support through some webinar training sessions; however, it has not since received any follow-up support.

6.7 Exterior Support Methods

Interview Question #7: What supports, and who from, would you need to implement/improve open data in your city?

Of the ten responses, nine identified the need for more in-depth guidance from either the Local Government Management Association of BC (LGMA) or the provincial government. Necessary guidance was described in terms of identifying the process of where to start, approximate budget needed to begin/sustain, how to start, how to sustain a program, establishing a framework, creating a strategy, and demonstrating why it's useful. A participant from a large municipality with an open data program stated that "it would be useful to have a provincial directive on a baseline level of openness required to help all municipalities conform to the same standards." This was further supported by a medium sized municipality without an open data program stating that "organizations such as the LGMA should create courses for Corporate Officers, IT folks and incoming city councilors to put everyone on the same page as to why open data matters and why it should be implemented." A large municipality with an open data program explained their desire for support, "LGMA tells us how our records should be structured, what documents go where, but I find that it is quite high level, it doesn't seem to go down far enough for me and also while all municipalities are very similar, they are also extremely different."

Support in terms of funding was identified by two small and one medium municipalities without open data programs, requesting a grant opportunity to support the development and implementation of a program in their municipality. "We would need funding to hire a consultant to come in and implement the program. Encouraging the provinces to support small municipalities would be extremely worthwhile", said one of the municipalities, followed by the other municipality stating, "it's hard to know what is needed to be budgeted for if you don't know what you need to do the program, we need an assessment of the costs and external funding to support the costs." The medium sized municipality further demonstrated the need for external funding, "I can't see open data and us funding open data taking priority over say a new park or a new community amenity or something like that, something that is more tangible."

One respondent from a medium sized municipality with an open data program expressed contentment with the current circumstances of their program, "we already have full support internally so I can't think of what else we would need." This municipality was the only one to not express interest in any form of external support mechanisms.

6.8 Implementation/Improvement Challenges

Interview Question #8: In your personal experience, what has been your biggest challenge so far in working to implement/improve an open data program?
This question was answered by all ten participants and received the most in-depth responses in the survey. The following categories were identified through a thematic analysis of the findings from each interview to summarize all participant responses. The themes are presented in ascending order based on how frequently each was mentioned. The themes identified were as follows:

1. Lack of staff expertise (80%)
2. Competing priorities (70%)
3. Budget constraints (60%)
4. Records management (60%)
5. Staff champion (60%)
6. Public awareness (30%)
7. Public servant and political fear (10%)

"Lack of staff expertise"

Eight of ten participants identified the absence of staff expertise as a barrier to implement/expand open data in their municipality. Staff expertise can come in the form of someone proficient in utilizing the software, aware of what datasets are useful to publish, breaking down departmental data silos, understanding the value of open data, and provide training exercises. Expertise may come from a variety of departments; however, it was predominately described as needing to come from the GIS or Information Technology departments. One participant from a medium sized municipality without open data described their experience in depth; "not many bureaucrats have training in codifying data, meaningfully running surveys, either qualitative or quantitative, and then codifying the data, and then making meaningful correlations with what's happening."

"Competing priorities"

Seven out of ten respondents explicitly described open data as not being a priority as a barrier to implementation/sustaining a program. A large municipality with an open data program identified that "there are always competing priorities, and open data is not at the top of the list." The other respondents replied more simply, stating that overall that there is a long list of priorities that municipal staff have to tend to, and open data is not yet on the list as a pressing concern.

“Budget constraints”

Budget constraints was discussed by six of ten respondents. Budget constraints frequently was mentioned concurrently with the lack of priority given to open data. If an initiative is not identified as priority, then budget is not allocated accordingly. A small municipality without an open data program expanded on their response, saying “I think for us being such a small municipality it's absolutely resources, so its staff and money and time to be able to not only sort of look at how best and effectively to implement open data like what kind of information we want to provide and how is it going to be updated.” Budget constraints were only briefly discussed with the majority of respondents saying simply they do not have the financial situation to accommodate this initiative. One respondent in a medium municipality with an open data program expanded and said the municipality had allocated funds for open data expansion, but the staff do not know where to begin to do so.

“**Records management”**

Many participants mentioned the need for their internal records management system to be updated before open data would be possible. Six of the ten respondents described their records management system as being antiquated, inconsistent, or in need of review. As a result of the current records management system in place, a medium municipality without an open data program stated that when considering open data, “my concern as a senior manager is that I don't know what data is out there in our organization.” This sentiment was further recognized in a large municipality with an open data program “people (public servants in the municipality) are all using the software in a different way, the metadata is being tagged differently, and this is where the search issues are coming up because someone may tag a certain document in a particular way that's important to their department but a lot of documents crossover to different departments.” A large municipality with an open data program described their records management program as inconsistent, “we don't have a set process for people (municipal public servants) who want to put their data on open data to let me know that this is the data that I want, this is metadata this is how it needs to look, these are the columns that are supposed to be in there, the detail oriented stuff we don't really have a good process for that and so it makes it very time consuming to add anything to open data because everyone does it differently.” This comment touches on a further challenge in municipalities with data ownership as a result of poor records management as “the people that use the data often are not the people entering the data that's actually a huge problem for us that the people entering it don't want to spend the time but then people using it have incomplete data.” Effective records management systems are recognized by participants necessary for an open data program.

“Staff champion”

The staff member to lead open data could come from a variety of departments, however if there is not funding for the position, staff education, or prioritized, then, as identified by the respondents finding a staff champion is challenging. Six out of ten respondents identified the absence of a staff champion to lead the initiative as being a barrier to implementation. A small municipality with an open data program stated that “I think everybody here recognizes that it’s important and they all agree we need this, but everybody says well but I'm not the person in charge of that, it’s always just been a side project.” The participant proceeded to say they are “aware they need to hire a staff member to lead their open data program, but it is not a priority.”

A large municipality with an open data program stated that “in the absence of a strong champion internally, you need external pressure and a strong demand from the public, the drive has to come from somewhere.”

“Public awareness”

Three out of ten respondents identified public awareness as a barrier to implementing open data. One medium municipality with an open data program elaborated, stating “one of our hurdles is not so much getting the open data site established it's getting people to use it and know it’s there.” Whereas a small municipality without an open data program identified concerns about public awareness stating, “I don’t know how much the general population would find it useful”. The third respondent, a large municipality with an open data program has experienced the public not expressing concern or demand for the open data, “the engineering community, such as engineering firms or land developers are the only ones using the data. There is no demand from the public.”

“Public servant and political fear”

One medium sized municipality without open data expressed a barrier to be fear within the municipality. “There's a fear amongst local governments that not doing something like this right is going to just generate a lot more questions from the public than answers.” The participant proceeded to describe the need for a narrative to be published alongside the raw data to help viewers understand the information and avoid “the data painting the municipality in a negative light”. The fear described may come internally from municipal public servants, as well as from Mayor and Council.

6.9 Summary of Key Findings

Through the findings from the initial survey and the subsequent interviews, participants have contributed to uncovering multiple potential answers to the primary research question, "what are the barriers to the adoption, implementation, and expansion of open data programs in BC municipalities?"

The most important findings identify that one of the top barriers to the adoption, implementation, and expansion of open data programs is internal to the municipality due to the absence of devoted staff members to lead the initiative, commonly known as a "staff champion". The staff champion would have the bandwidth to address the municipalities concerns over staff knowledge/expertise, available time, and the need for leadership as the individual(s) would prioritize open data and have the necessary skill set to do so.

Overall, it is apparent that municipalities face an array of barriers that have not previously been taken into consideration by other levels of government and civil society organizations working to encourage open data in municipalities. These findings will help adapt current and future resources designed to support municipal open data programs to take into consideration the barriers municipal public servants face. Municipality population size does not appear to play a role in the prevalence of barriers as all municipalities described similar barriers.

7.0 Discussion and Analysis

In this Chapter, the results and themes revealed through the findings of the literature review, survey and interviews are analyzed and examined in an integrated manner. The following analysis is based on the literature review, ten semi-structured interviews with senior municipal staff from various departments, and survey results from 23 senior municipal staff.

Through both the findings from the initial survey and the subsequent interviews, participants have contributed to uncovering multiple potential answers for the overarching research question, "what are the barriers to the adoption, implementation, and expansion of open data programs in BC municipalities?"

7.1 Answering the Research Questions

1. *When are the barriers to open data occurring? (E.g., initial start-up, basic open data publishing, increased functional open data portal, organization wide open data operations, integration with broader open data ecosystem)*

The findings of the research present that the main barriers to implementing open data are occurring throughout the process of establishing and maintaining an open data program. Initial barriers to implement the program are the result of financial constraints, staff expertise, and records management systems. Established programs face similar barriers regardless of their progress toward open data. Other barriers that appear for established programs are more outward facing, such as public awareness and citizen digital literacy.

2. *Where are the challenges arising to implementing and expanding an open data program? (E.g., Policy (amongst public servants), political (Mayor and Councillors), technical side, or otherwise?)*

It is implicit here that the challenges to implementing open data come from a combination of internal barriers (from public servants, mayor, and councillors) and external sources (funding support from other levels of government). For public servants, there is a barrier in internal leadership. As identified in the research findings, a staff champion is needed at all stages of implementing an open data program. To encourage the acquisition of a program leader, it requires senior public servants (heads of departments, Chief Administrative Officers, or similar) to allocate funds and set the list of priorities to include an open data champion. The BC provincial government could advocate for this position to be established and details regarding the expectations and necessary skillset. Through the provincial government's involvement, there would be consistency across the province as to the roles and responsibilities of the position, which would help market and promote the position to applicants. Additionally, if there is consistency in the position across the province, it would allow individuals working to smoothly transition to other municipalities to fill a position as needed. With consistency in the role would

address the current dilemma of misinterpretations of open data and a lack of cohesion in open data's delivery.

3. *What is the value of open data programs and systems?*

The findings of the research failed to provide a thorough response to this research question. Predominately, the questions were focused on the barriers to implementation and only briefly addressed the opportunities made possible through open data. However, question six of the survey prompted participants to describe what works well with their current open data program. The results predominately focused on utilizing spatial GIS information for assisting engineers at the municipality and external engineering firms when considering infrastructure projects. Additionally, participants were asked if they perceived open data as beneficial to their work in the interview. The majority answered that they do view it as beneficial but failed to provide additional comments. The lack of information on this question presents the opportunity for further research into the lived experiences of municipal public servants concerning open data and whether they perceive the program as beneficial and in what ways. While there is a significant portion of the literature that describes open data as valuable in theory for a multitude of reasons, interviews discussing the reality would provide a useful comparison to the theory.

4. *What level of support from other levels of government is needed?*

As noted by the research, support from other levels of government (provincial or federal) is needed to help municipalities with the initial start-up financial costs. Many small municipalities are facing resource constraints when considering digitizing their files and pivoting operations online. Financial support could come in the form of a grant application or a subsidized rate for access to the appropriate software needed for open data portals.

Additionally, other levels of government could provide support in terms of advanced data governance. A participant in the survey stated, "We really need more data governance, currently, the quality of the data, the metadata, and finding out who is responsible for the data is a challenge." The BC provincial government could play a role in establishing and disseminating appropriate data governance documents for municipalities to reference. Data governance and overall guidance documents would help municipalities establish a baseline of appropriate data publication and allow for greater awareness from the public on what information to expect to be able to access from municipalities.

5. *What level of support from civil society organizations such as Open North and similar organizations are needed?*

Civil society organizations could better support municipalities by providing training, webinars, workshops etc. to help increase awareness of open data, education on the possibilities of the

program, and resources to guide public servants in the right direction. This is similar in the role that other levels of government could provide. Civil society organizations have partnered with government organizations historically. This partnership is likely to prove beneficial to municipal public servants if it is further expanded and subsidized to allow greater reach and more in-depth consultation with municipalities.

7.2 Major Themes

The following themes were identified in both the findings and in the literature review:

- Lack of staff expertise (referred to as public servant education and skillset in the literature review)
- Budget constraints (referred to as internal resource constraints in the literature review)
- Records management (referred to as effective data infrastructure in the literature review)
- Public awareness (referred to as citizen digital literacy to engage with the published datasets in the literature review)

Two new themes were discovered in the findings as they were frequently identified by participants as barriers to the adoption, implementation, and expansion of open data.

- Open data is not being prioritized internally
- The absence of a staff champion is detrimental to the success of open data

The following three themes will be disused in greater detail as they were most frequently cited by participants.

1. Open data is not a priority in BC municipalities
2. A staff champion is needed to implement and sustain a program
3. Updated records management systems

1. Open Data is not a priority in BC municipalities

In the survey, 73% of participants without an open data program responded that open data is not a priority. Whereas, for participants representing municipalities with an open data program, only 38% said that open data not being a priority was a barrier. In the interviews, 70% of participants identified that competing priorities were barriers to the adoption, implementation, and expansion of open data. In BC municipalities, when completing long-term planning documents, such as Strategic Plans, Official Community Plans, and so on, initiatives that are seen as most highly benefiting the municipality will, in turn, receive a budget allocation. Suppose a program is not widely known, and there are no staff champions to present and educate municipal officials on the program. In that case, the chances of it gaining traction and being implemented are unlikely.

As previously discussed, open data is not a new concept and is prevalent across numerous levels of government throughout Canada and internationally. This raises the question, is open data not as well known in BC municipalities because it has not proven to be as beneficial and, in turn, not received funding? Or is it a matter of open data still in its infancy and requires a long-term cultural change within the public service to be implemented universally?

Of the interviews completed with senior public servants, one participant from a large municipality with an open data program mentioned the possibility that open data received a lot of attention at first but no longer has a role to play in municipal governments. The participant's municipality was previously a role model for open data in Canada and has since retreated from the spotlight as new priorities and staff changes took precedent, resulting in the program falling stagnant. If open data is as crucial to democracy and effective service provision as seen in the literature, why was the program discontinued?

2. Staff Champion

The concept of a staff champion was found throughout the survey and interview results. The absence of a staff champion to lead the initiative was identified as a barrier in both the survey and interview findings. In the survey, for municipalities with open data programs, 75% identified the absence of a devoted staff member to lead the initiative as a barrier to advancing an open data program. During the interviews, participants referred to the dedicated staff member as a “staff champion”, with 60% of participants identifying the lack of a staff champion as a barrier.

A staff champion is a devoted employee focused on leading open data. However, hiring an employee with open data as their primary focus is not always a straightforward endeavor. Many municipalities face budget constraints and a multitude of competing priorities that make allocating funding for open data challenging to accomplish. The lack of a devoted staff member reflects on other barriers to the adoption, implementation, and expansion of open data. To employ a staff member requires a significant allocation of financial resources and other staff time in training. 25% of respondents signaled that lack of financial resources is a significant barrier to implementing the program, further demonstrating that hiring a staff member would not be feasible financially for many municipalities. The findings indicate that it is unlikely to find a staff champion even in municipalities with established open data programs. Instead, one staff member is commonly working on open data off the side of their desk without giving it their full attention.

The lack of willingness to devote a staff member to open data may result from numerous factors, including a lack of education from municipal staff and mayors and councilors of what open data is and how it can benefit the overall operations of the municipality.

3. **Records Management Systems**

Open data requires technological infrastructure that progresses further than spatial GIS mapping. Getting to the level of publishing datasets from various departments requires the initial digitization of files. As discovered in the findings, small municipalities are bogged down with the need to begin digitizing files and revitalizing their records management system to decrease dependency on paper filling. That process requires intensive staff time, a complete restructuring and reprocessing for all staff members of where files can be stored, all while new files are being created every day. As a result, the concept of then making the datasets public-facing is too far ahead of where they currently are in their data management progress. Establishing an effective records management system presents a barrier to implementing open data from the beginning.

7.3 Research Findings and the Initial Hypothesis

A key component of the research was to include various sizes of municipalities to determine if size plays a role in the success or failure of an open data program. Participants in the study represented a wide variety of small, medium, and large municipalities. This range in population size allowed for an interesting perspective and contributed to new findings within the literature. The findings demonstrated that participating municipalities of all sizes experience similar barriers to the adoption, implementation, and expansion of open data. For example, municipalities with small, medium, and large populations all expressed open data has not been prioritized internally; they face staffing and resource constraints and do not have a staff champion to lead the initiative. While previous literature identified that larger municipalities are more likely to succeed with open data programs, the barriers appear to still exist within municipalities of all sizes. Further research into the role the size of the municipality plays in overcoming the barriers would be of interest. These findings form the basis to examine, refine and extend open data support systems to BC municipalities to promote a higher rate of success in creating long-lasting open data programs.

7.4 Unexpected Findings

Throughout the literature review, it was evident that numerous levels of governments in Canada refer to the Government of Canada's definition of open data to guide operations. It was implicit when beginning the research that that definition would be of consensus within BC municipalities. However, the research revealed that not all open data programs have been created and maintained equally. As a result, city data is not being utilized to its highest potential. This may result from misinterpretation of open data, how it can be implemented, and how it can benefit both internal users (within the municipality) and external users (the general public). In BC, numerous municipalities have immature open data programs and many are presenting outdated datasets. Open Data programs that have not been maintained and provide predominately outdated

information decrease the program's value and legitimacy. This phenomenon has been observed through a review of open data portals in BC, observing the dates associated with the last update of datasets.

Different interpretations of open data were identified in the survey results. As identified in the survey's first question, all participants were not basing their understanding of open data on the same definition. This may be attributed to a lack of education for public servants on open data and a lack of awareness and understanding of how open data operates. It was apparent that many participants were under the impression that open data in municipalities refers to all information collected to be made public, which is not the case. Collected information is subject to privacy legislation and other restrictions at the discretion of the municipality.

Five of the ten participants in the interviews mentioned transparency and accountability as foundational components of open data, yet not all mentioned transparency or accountability as beneficial aspects of open data for their work. This presents an opportunity for future research on the relevance and effectiveness of transparency and accountability in municipal public servants' day-to-day operations.

Numerous participants in the interview raised concern over whether or not citizens are looking for their governments to be more open. One participant from a medium-sized municipality with an open data program discussed that they consistently experience the same few people attending Council Meetings and requesting information. These findings expose an opportunity for further research into the barriers citizens face in engaging with open data at the municipal level. Governments implementing open data have to consider their community's perceived digital literacy to ensure the program's success and decrease the opportunity for backlash if the community has limited technological skillsets and cannot engage with the published data. The potential for backlash from the community may result in political backlash, further decreasing the political drive to sustain a program. This presents a unique perspective, and a potential barrier to implementing open data out of political fear and an opportunity for further research into the role citizen digital literacy plays in the success of an open data program.

7.5 Positioning the Findings Relative to Existing Literature

The literature review revealed numerous potential barriers occurring at all levels of government to implementing open data programs. The findings of this research supported many of the themes that were discovered in the literature. However, some themes in the literature review did not arise within this research. In the literature review, discussion around political and public servant fear of open data was discussed; however, it was not of prevalent concern for participants in these findings. This may result from participant human bias out of concern about being perceived as afraid of transparency, which could negatively reflect the municipality. Or political fear may

be of concern but was not of high enough concern for it to be identified in the interview.

Within the literature, Young (2020) discussed that open data requires substantive implementation by departments. This concept was further demonstrated in the research findings where numerous municipalities identified their most significant barrier to be the absence of a staff champion. Additionally, as discussed by a large municipality with an open data program, their program successfully served as a role model for other municipalities for many years. However, a staff change and the removal of open data on the departmental priority list resulted in open data projects becoming tokenistic and an off the side of desk project. While the program is still existing in the municipality, it has become stagnant.

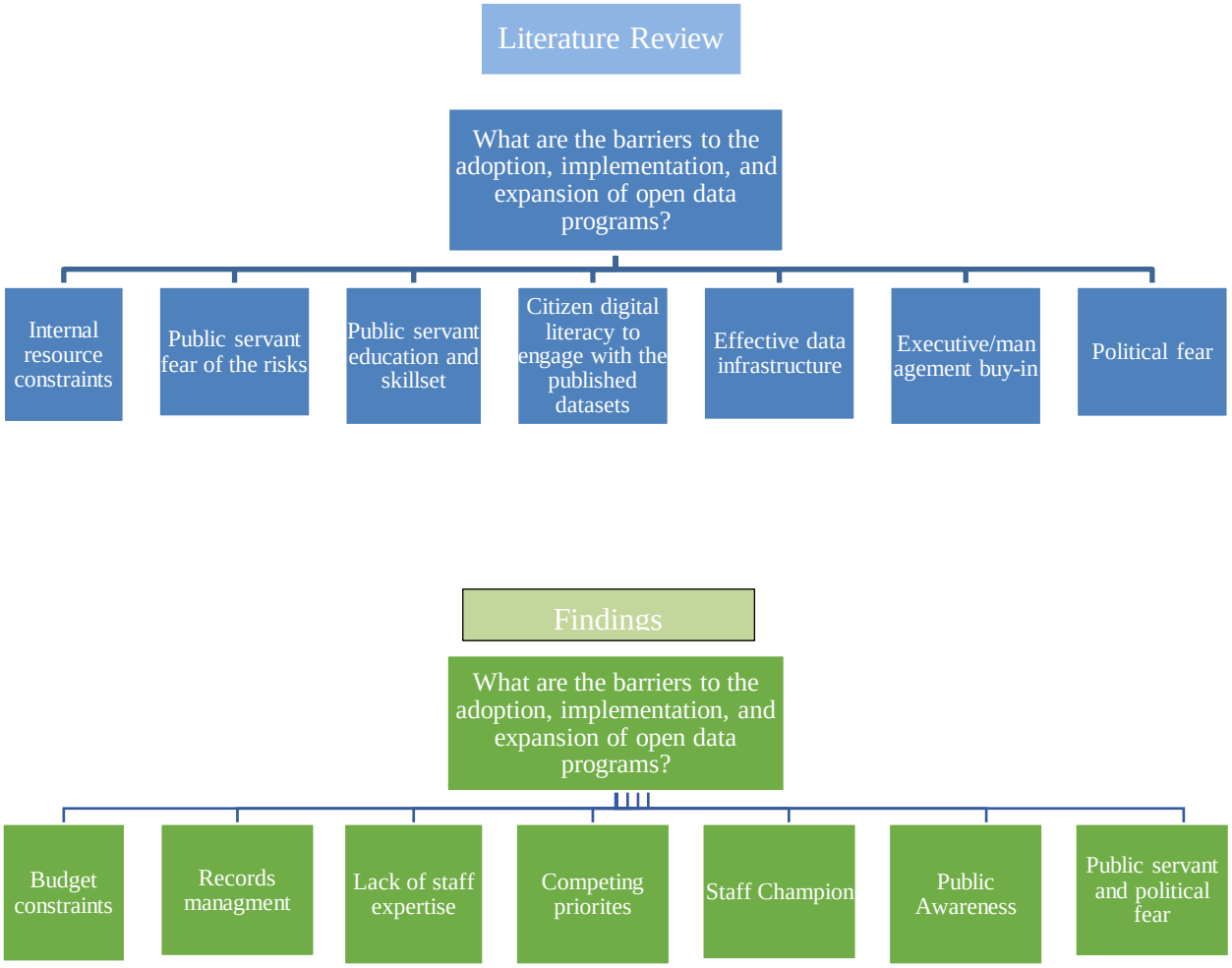
It is interesting to contrast the notion discussed by Charalabidis et al. (2018) that open data can be utilized as a political tool for politicians who capitalize on municipalities publishing multiple datasets regardless of their relevance, to appear more transparent. In the research findings, many participants noted the importance of having more significant guidance on which datasets are essential to publish or not. The establishment of more in-depth resources for data management/governance would result in consistent, relevant baseline published datasets across the province. Therefore, decreasing resource depletion from political requests for irrelevant datasets for political purposes.

Young (2020) and Baack (2015) discussed the concept of reshaping government-public interaction. They presented a benefit of open data as removing the government as data gatekeepers, allowing residents to come to their own conclusions when engaging with raw data. Within the findings of this study, only one municipality expressed concern over the erosion of administrative discretion for issue framing by suggesting that data should be published with a narrative to avoid more questions from the public. The majority of participants did not express concern regarding increase public scrutiny of municipal affairs. As a result of the findings, it is apparent that participating municipalities are less concerned with greater public scrutiny and are more concerned with building the internal capacity to accommodate the staff expertise required for an open data program.

7.6 Revisiting the Conceptual Framework

As a result of the new findings, the conceptual framework has been adjusted accordingly below.

Figure 7: Conceptual Framework from Literature Review and Findings



7.7 Limitations of Analysis and Further Research

Areas for further research were discovered within the findings, such as whether open data can assist municipalities in breaking down data silos internally through advanced information sharing amongst departments. While this is a feature of open data programs, it is not always utilized internally. Open data is often promoted as an externally facing initiative (for the public to use). Further research into the efficiency of open data for municipal public servants would also be of interest. As open data decreases public dependency on municipal staff for information, it is perceived as expediting FOI requests and freeing staff time. However, does the time taken to clean, prepare and publish datasets outweigh the time taken for FOI's? Additionally, would open data help to address challenges with departmental data siloes through streamlined internal

information sharing? Further research may reveal the possibility of decreased data siloes as an opportunity and motivation for uptake of open data programs.

The limitations of the study include a low survey response rate and convenience sampling. These limitations have the capacity to affect the results as there may be other perspectives from underrepresented municipalities such as municipalities with over 100,000 residents. Smaller municipalities (with populations under 50,000) were highly represented with 69% of respondents from small municipalities. To combat these limitations, further research including more municipalities across the province would be beneficial.

8.0 Recommendations and Conclusion

8.1 Introduction

This thesis aimed to provide a better understanding of the barriers municipal public servants face when implementing open data programs in BC to create a series of smart practices. Through both the findings from the initial survey and subsequent interviews, participants contributed to uncovering multiple potential answers for the research question, "what are the barriers to the adoption, implementation, and expansion of open data programs in BC municipalities?".

The literature review revealed numerous barriers existing for public servants across varied levels of government both in Canada and around the world. The survey and optional interview were sent to municipal public servants across BC to gauge their lived experience or lack thereof with open data. While many of the barriers identified in the literature were apparent in the findings, two discoveries were identified that contribute to the field of study. The results of the research present that the main barriers in the adoption, implementation and expansion of open data are occurring throughout the process of establishing and maintaining an open data program and are not isolated to only one stage and tended to be oriented around public servants as barriers in some capacity. Through the findings, it became apparent that the absence of a staff champion is detrimental to the success of an open data program at every stage of implementation. A staff champion addresses other barriers present in the literature review and findings such as lack of staff knowledge, limited staff capacity, limited knowledge of open data, competing priorities and open data as an off the side of the desk project. A staff champion would be prepared to lead the initiative as it would be their primary deliverable of the position. As it would be the primary deliverable, a staff member would not need to split their attention to other more pressing matters, resulting in the success of open data as a consistent priority. Additionally, the champion would have the appropriate resources and skillset to effectively implement the program, breaking down the barrier of limited staff knowledge. Ongoing education for the staff champion through collaboration and networking with other successful open governments and civil society organizations would help keep the staff champion up-to-date on new smart practices and opportunities.

The research has exposed opportunities for further research into other components of open data in municipalities. The scan within BC found that there have been some important assessments of components of open data in municipalities, but there has been a gap in the research focusing on identifying the experience of public servants when working to implement or improve an open data program. Through discussion in the interviews, it became apparent that the first-hand experience of municipal public servants had not previously been considered in the debate on open data. Further research into the lived experiences of municipal public servants and the process they must endure creating this type of program needs to be considered before the Government of Canada commits municipalities to principles of the Open Government Partnership (OGP) Local Program. The survey results revealed that most of the participating municipalities did not have a program in place at the time of the survey, and 67% identified limited knowledge of open data as a contributing barrier. Should the OGP Local program be encouraged in BC municipalities, public servant education needs to be addressed.

Additionally, through the findings, it became apparent that for this type of program to be successful, a portion of responsibility lies on the end-user (in this case, the municipality's residents) to have the ability to use and access necessary technological tools to engage with the program. As discussed by Jaeger and Bertot (2010), the evolution of the internet has not been distributed equally to everyone, resulting in significant gaps in society in terms of access to the internet, access to broadband speed, and skill with technology. Jaeger and Bertot (2010) proceeded to state that as a result of the unequal distribution of accessibility to technology, open data must be created with the user in mind and not only be available to all but designed to be usable by all; otherwise, individuals with limited technological resources or skillsets may be further removed from the participating in their local government. This is supported by the findings of Zuiderwijk et al. (2019) in that often when implementing open data programs, the background of the data user has not been taken into consideration, which can result in potential benefits of the published data not being attained (p.665). The findings of this research reinforce the necessity of stimulating interest and providing access to digital literacy within communities to ensure that governments are not implementing progressive programs (such as open data) that surpass their community's digital literacy. For local governments, encouraging data literacy and engagement with the open data program further reinforces the usefulness of the program and is likely to result in residents utilizing the datasets. Prioritizing publishing relevant, useful, and usable datasets is a key component of the Publish with a Purpose ideology present in data discussions today (Open Data Summit, 2021). Further research into the barrier' citizens face in engaging with open data at the municipal level and how governments can address these challenges to make e-government more participatory to all citizens would supplement this research's findings. Additionally, research into the state of digital literacy in small, medium, and large communities would provide the opportunity for further analysis into the success or failure of open data as a result of limited or robust digital literacy.

8.2 Recommendations

The following recommendations are based on the findings of the surveys and interviews completed for this research and build from the literature review. Recommendation one is for municipalities to consider, and the following recommendations are for the consideration of the BC provincial government.

Recommendation 1 –Establish an Open Data Staff Champion within the municipality public service and at the Council level if not already in place.

An internal staff champion will have the necessary skillset to facilitate and lead open data in the municipality. Having a dedicated staff member responsible for the long-term implementation and sustenance of open data is a critical success factor. Dedicating a public servant to this initiative acts as a domino effect in addressing other barriers municipalities face and helps keep open data on the list of priorities. For example, the City of Toronto has a Chief Technology Officer who leads open data for the municipality and the City of Edmonton has a Chief Information Officer with similar responsibilities. Additionally, by having a champion at the council level, would help keep the members of council engaged with open data through quarterly reporting on open data progress and serve as an outward facing advocate for open data to constituents.

Recommendation 2 – Establish a financial support initiative at either the provincial or federal level to aid municipalities with the initial start-up costs of implementing an open data framework and system.

Many small and medium-sized municipalities are facing resource constraints when considering digitizing their files and pivoting operations online. Financial support could come in the form of a grant application or a subsidized rate for access to the appropriate software needed for open data portals. Additionally, the financial assistance could help current municipalities obtain the required education and training to pivot their role to include leading open data. A grant may be in partnership with civil society organizations such as Open North to provide guidance and support for both the creation of the grant and to the receiving municipality to implement the program. Additionally, covering the financial costs initially would allow the municipality to publish the most pressing datasets that citizens are interested. The most pressing datasets may be different for each community and may be composed of business licences, snow ploughing routes, garbage pick-up routes and so on, depending on the needs of the community.

Recommendation 3 – Create a partnership between the BC provincial government and the BC Economic Development Association to increase education resources on how open data

benefits internal operations of municipalities.

This would come in the form of workshops and webinars with a more business and efficient service delivery delineation. As the BCEDA has a network of economic development officers and managers throughout the province, they would be the logical organization to disseminate the information of this nature. Additionally, as the BCEDA has created their own data-focused program BC Business Counts, they have already begun work in this area and open data would complement their current efforts. Engaging with BCEDA would also bolster the legitimacy of the open data movement as they are a reputable organization focused on economic drivers in the province.

Recommendation 4 – Leverage the provincial Office of the Chief Information Officer (OCIO) to create an 'open data for local government' working group.

Similar to the working group at the federal level, Canada Open Government Working Group (COGWG), an Open Data Local working group, could provide a platform for multi-jurisdictional information sharing and collaboration. The working group would also allow for discussion on data governance for municipalities. As seen in Quebec's Municipal Open Data Policy, collaboration between the provincial government and municipalities allows for increased data standardization. Data governance and increased access to resources would help municipal public servants establish a baseline of appropriate data publication and greater consistency in open data initiatives across the province. Consistency in open data programs would allow open data champions to transfer their skillset across municipalities, increasing the marketability and desirability of the open data champion role.

8.3 Final Thoughts

Open data has been gaining momentum in recent years across the world as citizens expectations of their governments evolve. As technological revolutions prevail, service delivery must change concurrently to ensure governments provide the best possible service to their residents. Open data provides an opportunity for BC municipalities to further engage with their citizens while contributing to the values of transparent and accountable democratic institutions. Through this research, it is clear that there are numerous barriers to overcome for BC municipalities of all population sizes when implementing open data. The benefits of open data may not be apparent for all public servants and political figures, especially in the face of the stated barriers. As a result, as Canada continues to lead in open data and open government at the federal level, appropriate attention and support must be given to municipalities to ensure that the benefits of open data are maximized and open data knowledge is disseminated to all appropriate stakeholders including politicians and public servants. The proposed recommendations provide reasonable solutions for addressing these issues and require a collaborative and

intergovernmental approach to ensure municipal public servants have the skills and resources necessary for success.

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Appendix A: Introductory Email

Good morning,

I am a Master of Public Administration candidate at the University of Victoria. I am working on completing my Master's thesis on the barriers to implementing open data programs in BC municipalities to determine a system of smart practices for open data programs. I am working with Dr. Kimberly Speers, who is my supervisor, at the School of Public Administration and she can be reached at 250-721-8057 or kspeers@uvic.ca .

As a senior municipal public servant, you are in an ideal position to provide valuable first-hand information on open data in your municipality from your perspective. My goal is to complete a comprehensive review of the status of open data programs in municipalities so that organizations such as Data BC, Open North, and other government agencies can better understand the challenges municipal governments face when implementing this type of initiative.

I would appreciate the opportunity to learn about your experience with open data in your municipality. Whether open data has never been mentioned in your municipality, a program was started but not maintained, or you have a thriving program; all experiences have significant contributions to my research.

All survey responses will be kept confidential throughout the project process and your municipality or any other identifying factors will not be identified. Your specific municipality may be mentioned in the final report but only if that information is available in the public domain (e.g., documents on a public website). No link will be made to any public documents and your survey response.

Your participation in this study is voluntary. Your willingness to return the completed questionnaire indicates your consent to participate in this study. Should you wish to withdraw your participation during the survey or after you have completed it, please promptly advise me and your answers will be disposed of immediately.

In the survey, there is an option to agree to a follow-up Zoom interview for a more in-depth conversation than what is in the survey. The interview is expected to take 20 minutes of your time and will be scheduled at your convenience. Should you wish to be interviewed, a letter of consent will be sent to you to identify the interview protocol and to gain your formal consent.

Once the Master's report has been defended and any revisions are made, the report will then be available to the public via the University of Victoria or by contacting the author or supervisor of the report.

While it is optional to participate in the survey, your participation would be greatly valued and highly appreciated! If any of your colleagues would be better suited to participate in this study, please feel free to distribute my contact information.

Your participation will ideally contribute to a more streamlined and practical approach to open data programs as well as help me complete my thesis! The survey can be accessed by clicking here.

Please let me know if you have any questions or concerns.

Thank you for your time and knowledge, I greatly appreciate it!

--

Shannon Toogood
Graduate Student
School of Public Administration
University of Victoria

Dr. Kim Speers
School of Public Administration
University of Victoria
phone: 250.721.8057

Appendix B: Survey Questions

Question 1: Contact Information

- Name
- Position title & Department
- Municipality
- Municipality Population
- How many years have you been in your current position?

Question 2: Does your municipality have an open data program in place?

- Yes
- Yes, but it is not active (not active meaning datasets are outdated, there is not a staff member actively working on the
- program that you are aware of etc.)
- No
- No, but I would be interested in learning more about an open data program
- No, we do not have an open data program and we do not have any plans to implement a program in the future
- Other (please specify)

Question 3: If there is an open data program in place, please identify what phase the current program is in.

- Contemplating drafting a proposal
- Planning, internal working group/committee
- Open data pilot project has recently been implemented
- Early adoption, adopted principles of the International Open Data Charter (1-2 years)
- Established program (3-5 years)
- Well-known program, we act as a mentor to other governments just starting out.
- Other (please specify)

Question 4: If there is an open data program, what challenges have you experienced in progressing the program further? Please select all that apply.

- Lack of financial resources
- The public isn't using the program
- Lack of staff knowledge
- Too much work for staff
- It is an off the side of the desk project
- No devoted staff member to lead the initiative
- Lack of support from other levels of government
- Not enough support from senior administration at the municipality
- The initiative is not supported by Council
- Other priorities
- I don't know what open data is
- Lack of technological support

- Open Data is not viewed as benefiting the municipality
- Need more staff to sustain the demand for datasets
- The municipality is too small to have an open data program

Question 5: If there is not an open data program in place, please check all of the appropriate reasons a program has not been implemented.

- Limited interest from senior administrators in municipality
- Lack of technological infrastructure
- Limited knowledge of Open Data
- Financial restraints
- Not identified as a priority from Mayor and Council
- Staff knowledge and available time
- No staff champion to lead the initiative
- The municipality is too small to have an open data program
- Do not know where to begin
- Not enough support from other levels of government
- Other (please specify)

Question 6: If there is an open data program at your municipality, what works well?
Open ended responses

Question 7: What supports, and who from, would you need to implement/improve open data in your municipality?
Open ended responses

Question 8: Would you be willing to discuss your experience further in a more in depth 20-minute Zoom interview?

- Yes
- No

Appendix C: Interview Questions

1. Does your municipality have an open data program? (for example, an open data portal, policy, strategy and/or framework) If yes, can you please provide an overview. If your municipality does not have an open data program, please describe your understanding of open data.

2. Describe the composition of the team working on open data (i.e., number of staff, roles, and responsibilities)

3. What was the motivation to implement an open data program? If unfamiliar, what is the current motivation to sustain the program?

4. Do you view open data as beneficial to your work?

5. In your perspective, do you believe your municipality is utilizing its data to the highest potential? Why or why not.

6. Do you receive any form of support from data focused organizations such as Data BC, Treasury Board of Canada Secretariat, Open North?

7. What supports, and who from, would you need to implement/improve open data in your city?

8. In your personal experience, what has been your biggest challenge so far in working to implement/improve an open data program?

Appendix D: Consent Form

Barriers to Implementation of Open Data Strategies in Small, Medium, and Large Municipalities in British Columbia

You are invited to participate in a study entitled Barriers to Implementation of Open Data Strategies in Small, Medium, and Large Municipalities in British Columbia conducted by Shannon Toogood and Dr. Kimberly Speers.

Shannon Toogood is a Graduate Student in the School of Public Administration at the University of Victoria, and you may contact her if you have further questions by email at stoogood@uvic.ca

As a graduate student, I am required to conduct research as part of the requirements for a Master's in Public Administration. It is being conducted under the supervision of Dr. Kimberly Speers. You may contact my supervisor at kspeers@uvic.ca.

Purpose and Objectives
The purpose of this research project is to analyze barriers to implementing open data strategies in a sample of small, medium, and large municipalities in BC to determine a system of smart practices for effective open data programs.

Importance of this Research
This research seeks to determine why some municipalities struggle to maximize the potential of open data, why some programs were started then removed as a priority and why some municipalities have not demonstrated participation at all. As open data gains in popularity nationally and internationally, academic research needs to contribute to the open data journey to help build policy standardization, efficiency, and effectiveness. Municipalities have the most one-on-one interaction with residents and appear as the logical locations for increased engagement, accountability and transparency between government and residents to foster a stronger democracy in BC.

Participants Selection
You are being asked to participate in this study because you are a senior municipal public servant in BC from within either the departments of Information Technology (including GIS), Legislative Services, City Planning, Chief Administrative Officer, Economic Development, or a similar department.

What is involved
Should you choose to participate in this research, your participation will include one preliminary survey with the option to participate in one follow-up interview on Zoom for an estimated 20-minute discussion. Written notes that are taken during the interview will be sent to you through e-mail for confirmation of accuracy. The interview will be recorded for later analysis. All notes and video recordings will be stored on my password-protected computer and deleted upon completion of the research.

Inconvenience
Participation in this study may cause some inconvenience to you including time during your workday. To best accommodate you, meeting times will be flexible and can be conducted at your convenience.

Risks
There are no known or anticipated risks to you by participating in this research.

Benefits
The results of this study will not only provide supplementary data for the international Open Data movement but will also be extremely beneficial in helping other local governments, non-profit organizations, and other government agencies to better adapt their approach to open data in municipalities due to the greater understanding of the reality of municipal processes.

Voluntary Participation
Your participation in this research must be completely voluntary. If you do decide to participate, you may withdraw at any time without any consequences or any explanation. If you do withdraw from the study your data will not be used and any notes, videos, or correspondence will be promptly deleted.

Anonymity
In terms of protecting your anonymity your name and job title will not be published. General departments interviewed will be named (i.e., Planning, Economic development, GIS) but not in relation to exact municipalities. Naming the variety of departments is important to demonstrate that the information collected was from public servants who work in open data or a closely related field that manages or would manage open data in the municipality. The size of the municipalities will be disclosed as part of the data collection. Municipalities will be clustered based on population size and generalizations will be made that do not single out one municipality.

Confidentiality
Your confidentiality and the confidentiality of the data will be protected by ensuring storage of all research-related documents are stored on a password locked file on my computer. Files will only be shared through email with the supervising professor as needed.

The researcher will write responses to the pre-determined questions during the interview. The notes taken by the researcher will be sent for approval to the participant to ensure accuracy. Upon approval by the participant, the notes will be stored in a secure Word document for future

analysis by the researcher. Upon completion of the research, the file will be promptly deleted. The responses will not be shared and remain entirely confidential.

All communication will be conducted through email and video conferencing through Zoom.

As the preliminary survey will be conducted utilizing SurveyMonkey, please be advised that this research study includes data storage in U.S.A. As such, there is a possibility that information about you that is gathered for this research study may be accessed without your knowledge or consent by the U.S. government, in compliance with the U.S. Freedom Act.

Dissemination of Results
It is anticipated that the results of this study will be shared directly to participants and through thesis dissertation and publication.

Disposal of Data
Data from this study will be disposed of promptly as soon as the research is completed. The data will be erased from all digital storage devices.

Contact:
You may verify the ethical approval of this study, or raise any concerns you might have, by contacting the Human Research Ethics Office at the University of Victoria (250-472-4545 or ethics@uvic.ca).

Your signature below indicates that you understand the above conditions of participation in this study, that you have had the opportunity to have your questions answered by the researchers, and that you consent to participate in this research project.
ß

_____	_____	_____
Name of Participant	*Signature*	*Date*

Visually Recorded Data
Participant to provide initials, *only if you consent*:

- Videos may be taken of me for: Analysis _____

PLEASE SELECT STATEMENT only if you consent:

I consent to be credited in the results of the study: _____ (Participant to provide initials)

I consent to have my municipality explicitly acknowledged as participating in the study: _____ (Participant to provide initials)

Future Use of Data

I consent to the use of my data in future research: _____ (Participant to provide initials)

I **do not** consent to the use of my data in future research: _____ (Participant to provide initials)

I consent to be contacted in the event my data is requested for future research: _____ (Participant to provide initials)

A copy of this consent will be left with you, and a copy will be taken by the researcher.