THE ROLE OF CANADIAN MUNICIPAL OPEN DATA INITIATIVES: A MULTI-CITY EVALUATION

by

Liam James Currie

A thesis submitted to the Department of Geography

In conformity with the requirements for

the degree of Master of Arts

Queen’s University

Kingston, Ontario, Canada

(August, 2013)

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Abstract

In this thesis I undertake a study of Canadian municipal open data initiatives in order to assess the current state of the programs and to gauge the role(s) that these initiatives may play in regards to improving public engagement in local government issues. After an initial literature review, I adopt two separate approaches. The first approach involves the creation of an inventory and evaluation of the contents of all twenty three (23) Canadian municipal open data catalogues in existence during the summer of 2012. The second approach involves asking questions of key informants in the field through the execution of nineteen (19) semi-structured interviews with open data experts from both government and civic realms in ten (10) case study cities across the country.

The results of the research illustrate the major differences and similarities between the structure, output, and roles of open data initiatives in various Canadian cities. The data provided by these programs mostly consists of politically neutral geographic data, though there are a few exceptions. I find two major program structures in Canadian cities: (1) The first type of open data program is created and operates within a specific municipal department and the (2) second type of program operates across a number of departments. Each approach has its own benefits and challenges. The open data initiatives across Canadian cities also appear to have different approaches to public engagement. Several cities have developed strong collaborative relationships with local open data advocates which are explored in some detail. Larger themes about the current state of open data, its current and future role, and the challenges faced by operators and users, are also described in this thesis. I conclude with some recommendations for improving municipal open data initiatives in the future.
Acknowledgements

I would like to thank my supervisor Dr. Betsy Donald for all of her support. Whenever I would start to flounder and question what I was doing she was always able to pick out the good threads of my thinking and get me moving again. Secondly I would like to thank my “partner”, Michelle Runge, for following me around the country in my pursuit of fancy pieces of paper. She has put up with leaving friends and family, stressful moves, and my all too frequent absences. Hopefully I can make it all up to her in the future. Finally I would like to thank SSHRC for providing me with a Joseph-Armand Bombardier Canada Graduate Scholarship which was invaluable for my ability to complete my degree on time.

This research was supported by the Social Sciences and Humanities Research Council.
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Glossary of Terms

**API (Application Programming Interface)** – A set of protocols or tools that aid in building software applications. A common example is the Google Maps Javascript API, which allows developers to add Google Map functionality to their applications/websites.

**Apps (Applications)** – Interactive software applications. In the open data context these are usually built around freely available data and provide useful functions such as mobile transit planning apps. Appendix A provides several examples of apps built on municipal open data.

**Catalogue** – The repository through which data is distributed. These may exist on many different platforms.

**E-government** – A term used to describe the provision of government services in an online environment (e.g. city websites and online utility bill payments).

**Hackathon** – An event in which software developers, designers, and others gather to build applications and visualizations with data. In the case of open data this usually entails government data. These events are often hosted by non-government groups, but can be hosted by government or through collaboration between the two. Some hackathons are open-ended while others have very specific themes and goals (e.g. a ‘transit day’ hackathon would deal primarily with transit data).

**Metadata** – Data about data. There are two different uses of this term: “structural metadata” and “descriptive metadata”. Structural metadata refers to the technical specifications of data structures, while descriptive metadata refers to descriptions about the data in question such as how it was collected, what the variables mean, etc. In this study the term metadata almost always refers to descriptive metadata.

**Open Data** – Open and machine-readable data that is available under a non-restrictive license.

**Open Government** – A term often used to describe the principles of transparent, accountable, and participatory government. There are variations in meaning which are described in Chapter 2.

**Open-source Software** – Software written with a freely available and editable code. Prominent examples include the Linux and Android operating systems.

**Platform** – The web application through which an open data program is delivered online (includes the catalogue along with other features).

  - **Socrata** – A proprietary open data solution for governments built primarily for US customers. Provides an API and built-in data visualization features. It is used by Edmonton, AB.

  - **OGDI** – Microsoft’s Open Government Data Initiative DataLab is an open-source platform similar to Socrata with an API and built in visualizations. It is available via a license with Microsoft. It is used by two Canadian cities: Regina, SK and Medicine Hat, AB.
CKAN – A free to use, open-source platform maintained by the Open Knowledge Foundation. It is very customizable and provides an API for developers. It is used primarily in the UK, but Ottawa, ON has recently adapted this as their open data platform.
Chapter 1

Introduction

This thesis sets out to evaluate the open data initiatives that have been developing in Canadian cities over the past several years and draws on the debates about the potential role that open data plays in commitments toward open government. I frame the evaluation in terms of the effects of open data on government transparency and civic participation. The overarching question is whether open data at the municipal level is creating new opportunities for public participation through the opening up of government activities, or if it is just acting as another tool in a long list of traditional e-government programs.

Governments around the world have begun to implement open data policies that are designed to make government data available to the public in free and useful formats, the data are hosted online in a central repository that provides easy access to machine-readable data under a liberal license for re-use. The data are then used alone or combined with other data\(^1\) to create applications that serve functions ranging from helping people use public transportation, to tracking the campaign contributions and voting patterns of elected officials\(^2\).

While national governments like those of the UK and US have been systematically developing their own national open data programs, a large and growing number of municipal governments have also been creating their own programs. In Canada, the open government data movement has historically been led by municipal governments starting with the so called “G4 cities” of Vancouver, Toronto, Edmonton, and Ottawa. Some provincial governments as well as

\(^1\) This combing of data is often referred to as a data “mashup”.

\(^2\) For a few examples of applications that rely on open government data, see appendix A.
the federal government have begun open data initiatives following the first cities’ lead. The impetus and strategies followed by these cities, and others, have been different for each location and influenced by local institutional and political factors.

The regional differences between the municipal open data initiatives (MODIs) along with their potential effects on the ways that citizens understand and interact with urban spaces, services, and government make them ripe for study by human geographers and urban planners. Of particular interest is the fact that these programs are operating at a local level where the data provided can be of more direct interest to citizens. For instance, data relating to waste collection and transit services have regular day-to-day influence on citizens as opposed to federal data about government spending. This creates the environment for more direct involvement by local actors in the provision and outcomes that derive from MODIs. Local open data programs might offer easier access for public participation through direct connections between administrators and civic actors than similar programs operating at the national or even provincial level. Anecdotal evidence is found in the large number of local “hackathons” and “apps contests” created by citizens, local government, or through collaboration between both.

Geographers and Planners have been largely absent from the discussions around these new open data programs. Whereas those interested in public administration, computers science, and other fields have started to examine open data at national levels (cf. Davies, 2010; Janssen et al., 2012; Peled, 2011; McClean, 2011; Dawes, 2012; Hogge, 2010), not much academic work has been conducted on open data at the local level. It is at this local level that I feel geography

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3 A “hackathon” is the term generally used to describe an event in which people gather to analyze and use (government) data either for general or very specific purposes. There may or may not be active participation by government officials.
4 An “apps contest” is an event in which people are encouraged to utilize (government) data to develop applications and/or visualizations for either specific or general purposes. These events are usually sponsored by government and monetary prizes are awarded to the contest winners.
has a role in analysis due to its history of interest in local governance, planning, and public participation in shaping urban policy and space.

1.1 Research Questions and Structure

This thesis provides an early understanding of how MODIs are developing in Canada. Since there is little existing empirical work on the subject, the research questions used in this study are broad and exploratory. The purpose is to provide an evaluation of ongoing developments in Canadian MODIs at a specific point (Summer/Fall 2012) to understand the purposes and challenges of the programs, and to also create a baseline for future evaluations. The research is informed by the debates about the role and effectiveness of open data in achieving open government principles of transparency, collaboration, and participation. As such, the questions focus on the functioning, output, and local interactions around Canadian MODIs. The following questions are the central questions examined in this research:

1. **What types of data are available on Canadian municipal open data catalogues?**

   The purpose of this question is to determine what data is actually being made available through these programs. Documenting the contents of open data initiatives can help to separate the rhetoric from reality. Some related questions include: how much data is being published? Is there data related to government transparency and accountability being made available? Are the programs meeting the technical requirements of open data?

2. **What are the reasons for starting MODIs in Canada?**

   This question seeks to determine what the rationale is for starting MODIs. Are the programs developed to increase government transparency and public participation? Are they merely developed to improve delivery of services by government or even private developers (e.g. the
creation of for-profit public transit apps by private actors)? Or are there alternative reasons that have not been explored previously?

3. **What role do citizens and local institutions have in MODIs?**

This primary research question seeks to understand what, if any, connections are being generated between government and local actors by these programs. If open data is truly working to improve open government principles, we should expect to see participatory and collaborative relationships between government and other local individuals and groups develop.

4. **What are some of the major challenges being faced by MODIs?**

This question highlights what institutional and political challenges are most prominent in the development of MODIs in Canada. Are there challenges related to political will? Technological barriers? Government culture? If so, how are these challenges being addressed by those in charge of the programs themselves?

To answer these questions the research was conducted in two (2) main parts. The first part is an empirical evaluation of the contents of each of the 23 Canadian municipal open data catalogues that were in operation as of the summer of 2012. No database exists at this time that provides a listing of all of the published data from the different MODIs, therefore in order to answer the first research question I needed to undertake this evaluation myself. To answer the next three (3) research questions, a more qualitative approach was required. This is the second aspect of the research which consists of in-depth semi-structured interviews with key informants from ten (10) of the cities operating open data programs.

The structure of this thesis is broken down into four chapters. The first is a wide-ranging literature review that seeks to define many of the issues and debates surrounding open data and open government. It equates open data programs with earlier e-government programs and
highlights many of the challenges that e-government have faced in the past. It also discusses the literature on local governance and neogeography to situate open data within an urban and technological geographic context that explains why the subject should be of interest to geographers and planners. The second chapter describes the mixed methods approach used to conduct the research including the categorization system that was developed to undertake the empirical evaluation portion of this thesis. The third chapter presents the findings of the research in three (3) sections: the first section provides the results of the catalogue evaluations, whereas the second provides detailed summaries of the ten (10) case study cities followed by the final section, which provides a broader description and analysis of the findings from the interviews conducted. The final chapter takes a wider perspective and looks at the implications of the findings and provides some conclusions, limitations, and possible research directions indicated by the study as a whole.
Chapter 2

Literature Review

2.1 Introduction

There has been a great deal written about open data and open government in a short time, but geographers—with a few exceptions (e.g. Lauriault & McGuire, 2008)—have not been part of the conversation. While geographers have written extensively about urban political structure, public space, and urban planning, very few human geographers have examined the changing role that technology plays in these systems. When they have discussed these issues, it tends to be at an abstract, high-level (e.g. Thrift & French, 2002; Dodge & Kitchin, 2005). As a result, they provide us with little empirical understanding of how these technological changes play out on the ground. The exception is in the realm of the Geographic Information Systems (GIS) literature. Here, we find many authors who are interested in the role of digital technology on how individuals understand space (Zook & Graham, 2007), participate in planning decisions (Drummond & French, 2008; Evans-Cowley & Hollander, 2010), and create their own digital representations of space (Goodchild, 2007; Hudson-Smith et al., 2009). As programs that provide public access to government data—much of which is geospatial in nature—municipal open data initiatives (MODIs) should be of interest to researchers exploring the development of urban systems.

This paper examines the development and position of Canadian municipal open data initiatives as potential catalysts for the emergence of modern open government principles of transparency, collaboration, and improved service delivery. I argue that open data initiatives (ODIs) are a branch of existing e-government programs that have been evolving in municipal
governments for almost two decades. These existing e-government programs have consistently failed to live up to the rhetoric surrounding their democratic transformative potential, but ODIs offer some hope of shifting this trend. This Chapter reviews the literature on open data initiatives, outlining some of the existing writing on the subject, and provides an overview of concepts that are important to this thesis.

The first section of the literature review explores the role of the citizen in local governance, paying particular attention to citizen-participation in local planning and policy-making decisions. The second section lays out the importance of transparency and accountability in democratic systems. In the third section, I provide a brief overview of the democratization of technology, the rise of web 2.0 and neogeography. I focus, in particular, on the shifting role of experts and official authorities in the creation of understanding and activity at the urban scale. The fourth section provides a definition of open (government) data and describes some of the academic debates about its functions. In section five, I provide a history of the evolution of open government as a concept and its relationship with open data, ending with a discussion of some of the concerns over this association. In the sixth section, I provide an overview of municipal e-government along with the evaluations of its functions and challenges. I end this chapter with a conclusion that summarizes the literature and sets up the remaining Chapters in this thesis.

2.2 Government and Participation

2.2.1 Governance

Over the last two decades, there has been a revival of interest within human geography and the social sciences, on the role of local democratic institutions in facilitating and encouraging public political participation (Stoker, 1996). Local government is believed to be easier to access and engage with than higher levels of government (Pratchett, 2000). Local actors are also
thought to be more knowledgeable about local circumstances and issues than distant decision makers (Jones & Steward, 1985; Fischer, 2000). The outcomes of those decisions are more apparent at the local level allowing for a greater degree of accountability for the officials who make them (Crawford, 1964).

This concern with local democracy and diffusion of decision-making power has induced a shift from conceptions of government to governance. Several scholars have noted that decision-making power has become more diffused, shifting from formal government bodies to new forms of governance involving non-governmental and non-profit organizations, individuals, and private entities. In theory, this shift to governance is believed to produce new spaces where a multitude of actors previously excluded from the policy process can become involved (Taylor, 2007). The movement can be characterized by an “emergence of ‘negotiated self-governance’ in communities, cities, and regions, based on new practices of co-ordinating activities through networks and partnerships” (Newman, 2001:24). Governance, in opposition to government, is based around open and decentralized decision-making and the development of community, social capital, and networks of trust (Taylor, 2007). These new forms of governance can also act as a ‘third-way’ to coordinate policy decisions in contemporary society (Jessop, 2003). At the same time however, governance can also lead to an increase in outsourcing of public services to the private sector (Stoker, 1998).

Hickey and Mohan (2004) worry that this devolution of power downward in scale also brings with it a devolution of responsibility with the result of the state transferring some of its own accountability onto smaller networks and partnerships. Swyngedouw (2005) reminds us to also consider that the implicit common purpose and shared values of the ‘community’ are not necessarily aligned with those of the authorities pushing the change. Raco (2000) shares this
concern that top-town voluntary partnerships may only serve to legitimate the previously set policy decisions of the more powerful institutions. Amin (1999) offers a more nuanced “institutionalist” approach to governance that seeks to address some of these substantive concerns. This approach favors bottom-up, region-specific, multi-actor based policies that rely upon “institutional thickness” (networks of association between stakeholders) to create valuable intermediate forms of governance, situating power at a more useful geographic scale.

All of these considerations of governance focus on the scale of organization, the role of local actors, and the importance of participation in policy making. The effectiveness of political action is largely dependent upon the geographic scale at which it is mobilized (Swyngedouw, 2004). Our usual understanding of governmental powers as existing on set scales (local, regional, and national) is problematic because this conception does not consider the multiple scales upon which non-governmental actors can engage (Cox, 1998).

2.2.2 Participation and Engagement

Social and political changes are no longer solely the domain of experts, large organizations, or structural forces like capitalism and modernization. There is growing room for all actors to engage in processes which can create change (Eversole, 2010).

Arnstein (1969) explains that institutions vary in their approach to the process of participation; how these institutions approach participation can have serious impacts on the level of power citizens wield in actual decision making. This variability can be captured with a metaphorical ladder of civic participation shown in Figure 2-1. The bottom two rungs: “manipulation” and “therapy” describe a system in which participation is not truly desired by the authority in charge. The next three levels illustrate levels of “tokenism” whereby stakeholders are given varying levels of voice in a process, but not given the power to ensure that their voice is
considered in the final decision. Finally, the last three rungs of the ladder offer true participation in differing degrees. “Partnership” allows for stakeholders to enter into negotiations with the authority. “Delegated power” allows stakeholders to control decisions, and “Citizen Control” gives full managerial decision-making power to the stakeholders without control from the organizing authority.

Figure 2-1: Arnstein’s Ladder of Citizen Participation (Source: D. Lithgow)

The primary role of municipal government is “to provide the means by which a local community can express and address its collective objectives; and to provide various services and programs to local residents” (Tindal & Tindal, 2009:7). In order to meet these goals, some level

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5 http://lithgow-schmidt.dk/sherry-arnstein/ladder-of-citizen-participation.html
of participation by the public is required. Local governments have a history of more direct political engagement with citizens through activities such as participatory planning projects, neighborhood meetings, and community policing (Jimenez et al., 2012; Pratchett, 2004). Researchers have found that local authorities are also further ahead than more senior level governments when it comes to experimenting with public participation (Lowndes et al., 1998). The level of participation in these activities rarely rises above the level of consultation. This consultation approach leads to problems of one-way communication, poor feedback, and limited involvement in planning and policy decisions (Woodford & Preston, 2011).

In the late 1990s and early 2000s, there was a surge of interest in the role that new information and communications technologies (ICTs)—especially the internet—might play in the way democratic governments function and engage with their citizens. The ideas fell under many different nomenclatures; most common were digital democracy, e-democracy, and virtual democracy (Hacker & Dijk, 2000). While some saw a possibility for utopian revolutionary change (cf. Rheingold, 1993; Becker, 1998; Mitchell, 1999; Ferdinand, 2000), others were less enthusiastic about technology’s effects on political engagement and the political process (Putnam, 2000; Sunstein, 2001). The hope by many was that these new technologies could help overcome concerns about elitism and corruption within the political system through the involvement of the public in active deliberation, with the internet taking on the role of the public sphere described by Habermas (1962) as a place where critical discussion of public matters could exist outside the official channels of government. As I outline in section 2.6, this interest in transforming government online was mostly unsuccessful. Government as a whole has not adapted well to new technology that offers the opportunity to free information, foster collaboration, and generate organizational change (Fyfe & Crookall, 2010).
2.3 Transparency and Accountability

2.3.1 The Role of Transparency

Transparency in government can be defined as “the ability to find out what is going on inside of public sector organizations” (Piotrowski & Van Ryzin, 2007: 308). The value of transparency is usually taken as a given, yet it is important to understand what functions it can serve.

Transparency can be viewed as a means to an end; that is, to provide accountability (Brito, 2010). Without the ability to examine and investigate the activities of their government, citizens are blind to the reasons and processes behind policy decisions. Transparency exists as a pivotal means of holding government officials accountable by “exposing the process of government to relentless public criticism and scrutiny” (Rourke, 1960: 691).

The term accountability has many different dimensions and is used quite loosely (Romzek & Dubnick, 1998). The focus of accountability can shift from organizational leaders, to performance measurement, to professional relationships. Some authors stress the notion that accountability involves participation and public deliberation of any policy-making process (Peruzotti & Smulovitz, 2006). Heusser (2012: 21) succinctly states:

In practical terms, to be accountable, means to have the responsibility to give an account to someone who is equally entitled to demand such account, and potentially take action as a result of it. Accountability is therefore connected to the idea of transparency in a way that a person (or organization) can only be accountable if there is information available to be analysed and accounted. In other words, with no access to information (transparency) there is simply nothing to account for.

Transparency can help reduce information asymmetries that cause a significant principle-agent problem within a democratic government where citizens are required to elect their
representatives (Brito, 2010). When citizens with a lack of pertinent information are unable to judge the actions and motives of their representatives or public servants, there is a reduced incentive for those in question to perform honestly and to the best of their ability. When allowed to act clandestinely government agents, like all people, will face greater incentives for working against the interests of their constituents through dealings which may improve their personal position at the expense of the electorate. This practice can increase the risk of outright corruption, but it also increases the likelihood of suboptimal performance by those agents (Sappington, 1991). Without adequate information, citizens are unable to rationally evaluate their representatives and government agencies, thereby limiting their ability to penalize individuals and groups through electoral politics or public pressure. It is important however, to keep in mind the challenges of achieving higher levels of government transparency. Increased public scrutiny may manifest in what Tauberer (2012) calls a “paradox of transparency” in which government officials will alter their behaviors to take into account the increased visibility of their actions, taking unsavory activities to less formal environments or work to game the statistics to create the appearance of accountability through deception.

Another argument for governmental transparency is a philosophical one, namely that the information collected by government belongs to the people whom the government represents (Stiglitz, 1999). Theoretical ownership is a relatively simple matter, however, access to that information is more complicated. Access to government information is subject to restrictions ranging from relatively uncontroversial security and privacy concerns to more contentious issues around intellectual property rights, copyright, and commercialization of information (cf. OKF & Access-Info, 2011). These legal issues constitute a whole other facet of government transparency, which unfortunately are beyond the scope of this paper. For our purposes, it is
sufficient to understand that transparency is *a means of achieving accountability that can improve the functioning of government and improve the role of citizens in the political process.*

### 2.3.2 Transparency in Practice

Increasing government transparency is a general long-term trend in Western governments, and the trend is partially driven by increasing citizen expectations of openness (Dahl, 1989). Achieving this transparency can generally be achieved through one or more of four main channels (Piotrowski, 2007):

1) **Proactive dissemination by government.** This is the form of transparency that open government and open data proponents are most interested in; the publishing of information without the requirement of outside action. The development of electronic databases and online tools for disseminating information has made this much more convenient and economically feasible in recent years (Bertot, et al., 2010).

2) **Release of requested materials by government.** Commonly conducted through processes outlined in Freedom of Information or Access to Information legislation, these can be costly proceedings but allow for the disclosure of information that officials do not willingly release.

3) **Public meetings.** This can take the form of publically accessible meetings, for example, parliamentary session or city council meetings. It can also include special information sessions that can serve to solicit public feedback such as neighborhood planning consultations.

4) **Leaks from whistleblowers.** Perhaps the most controversial, but often the most important form of transparency is involuntary transparency. Whistleblowers can disclose
information that officials both do not want to disclose, and are not forced to disclose through FOI or ATI legislation, exposing government corruption or incompetence.

Apart from information leaks, these transparency activities can lead to increased levels of public trust in government (Welsh & Hinnant, 2003) and, an increased sense that the democratic system is functioning well (Marlowe, 2004). Increased levels of transparency have also been shown to correlate with higher levels of government efficiency (Islam, 2003).

In order to achieve these benefits, transparency measures must be both sustainable (improving scope and accuracy over time), and be user-centric, focusing on the needs, interests, and capacities of the information users (Fung, Graham & Weil, 2007). Meeting these needs for interactivity and communication, in terms of metropolitan areas at least, may be easier in smaller cities as civic participation may often be higher in these urban areas (Oliver, 2000). Having higher levels of engagement between citizens and government officials can fuel demand for transparency (Piotrowski & Ryzin, 2007), potentially leading to better functioning transparency programs in these places.

2.4 Changing Technology

2.4.1 Democratization of Technology

The rapid improvement in technology—particularly computer technology along with a concurrent decrease in cost—has allowed for the proliferation of technologically sophisticated products for greater numbers of people. The level of expertise required to learn and become proficient with technology is decreasing, challenging previous conceptions of technical expertise (Bijker, 1995). The growth of the internet as a public platform, what is often described as Web 2.0 (O’Reilly, 2005), furthers democratization by allowing users to not only consume
information, but to publish their own work online. Open source software in parallel with consumption and the spread of information has begun to democratize the ability to alter software and distribute it for free or for minimal cost (Jesiek, 2003).

These technological/social changes have brought about a greater emphasis on the power of data to find new relationships and understand the world around us (Butler, 2007). Journalists are beginning to utilize the expanding sources of data, along with new data visualization tools, to explore connections that were previously hard to discover (Gray, Bounegru, & Chambers, 2013). For example, the Montreal Gazette uses data provided by the cities of Montreal and Laval, Quebec, to generate a searchable database of all the city-awarded contracts over $100,000⁶. This allows for citizens to quickly, and easily, examine all of the major contracts being awarded by their local governments in a way that was impossible only ten years prior. Technological tools such as these can add an additional layer of transparency and accountability for government activities by conferring new ways of accessing and analyzing government data. Significantly, the democratization of this technology allows users to create their own tools without needing to rely solely upon governments or private corporations to develop them. For instance, the Montreal Gazette’s database was created by a non-profit group called OpenNorth who are dedicated to creating these types of tools that can improve Canadian democratic engagement and access to information.

2.4.2 Neogeography

As web 2.0 technologies have developed, some geographers have been paying close attention, particularly with regards to online geospatial information and tools. Andrew Hudson-

⁶ http://documents.montrealgazette.com/
Smith and his colleagues (2009) at University College London boldly claim that the introduction of geography to the online sphere represents a third force in information technology besides computers and communications. Tagging not only the type of information but where such information is produced, who uses it and at what time it is generated is fast becoming the killer application that roots information about interactivity generated across the web to systems that users can easily access and use in their own interactions with others (Pg. 277).

Early geographic information systems (GIS) were the realm of specialists who could manipulate expensive and complicated GIS software and could also afford to acquire expensive base cartography on which to overlay spatial data (Haklay et al., 2008). The creation of GoogleEarth in 2005 suddenly allowed anybody with a computer to have virtually free access to GIS technology; what Michael Goodchild called the “democratization of GIS” (Butler, 2006).

The resurgence of geography in the Web 2.0 world by non-experts is known as ‘neogeography’. The term originated as a way of describing the growing set of practices operating outside the realm of professional geography. Haklay et al., (2008: 2021) presents neogeography as a contrast “between [the] perceived tedious, slow, boring and expensive practices of cartographers and geographers, and enjoyable, rule breaking and relevant uses of geographic information by laypersons.” This is the now familiar world of geotagging photos, sharing location information via social media, making custom maps, and using technology to convey a personal understanding of place. Zook & Graham (2007) describe the socially constructed meaning that is overlaid through neogeography onto physical space as ‘digiplace’ which links disparate digital information, such as restaurant reviews, Twitter messages, or personal photographs, to specific locations in the real world, creating a multitude of digiplaces.
that can be stitched together by users for almost any purpose. Take for instance Figure 2-2: a map of New York City that has geotagged Twitter messages mapped and color coded by language used. While this information does not exist in physical space, it is nonetheless linked to physical locations and can tell us about processes unfolding spatially (in this case, the movement/location of language usage in a specific urban environment).

Figure 2-2: Twitter NYC⁷ - A language map of 8.5 million tweets in New York City
(Cheshire, Manley, & Barratt, 2013)

One of the biggest values of neogeography is its ability to crowdsource local experts to provide and edit information. The fact that every citizen is an expert on some aspect of their own

⁷ http://ny.spatial.ly/
locality means that dense population clusters like cities provide an ideal place for the production and manipulation of geospatial data. Large commercial companies such as Google and TomTom are beginning to take advantage of crowdsourcing by soliciting local users to spot and fix errors for free while using their services in the process (Dodge & Kitchin, 2013).

Neogeography offers an alternative path for creating geographic knowledge outside of established corporate/government production. The map in Figure 2-2 is overlaid on top of OpenStreetMap (OSM) base cartography, not a Google Maps base. OSM is a not-for-profit initiative that has been generating free geographic data for over four years. The foundation relies on over a million volunteers (Wood, 2013) who organize local workshops called mapping parties where, utilizing global positioning satellite (GPS) technology, they create and annotate local geographic data (Perkins & Dodge, 2008). This ‘volunteered geographic information’ (Goodchild, 2007) covers many locations that Google has not mapped, and in terms of quality, rivals that of official government ordinance data (Haklay, 2010).

Neogeographic tools are becoming increasingly powerful and easy to use. Low cost or even free professional-level software, like Drupal and MapBox, offer a way for those without advanced training to interact with data and develop alternative meanings and contexts for its use outside of the traditional channels of government and business. At the same time, many scholars caution against being overly optimistic about these developments. Haklay (2013) reminds us, that while the level of skill required to access and manipulate neogeographic tools is decreasing over time, the number of actors able to take advantage of them is still a very small and privileged group. Evidence from developing nations shows how this disparity between those with and those without access to digital tools can lead to increasing social injustices and exploitation by those in power (Raman, 2012).
2.4.3 Planning

Urban planners have seen a shift over time from the early applied science paradigm of the 1960s, through the political approach of the 1970s, to the participation focus of the 1980s and the collaborative and design focus of the 1990s (Klosterman, 2001). This paradigmatic development continues with the implementation of new technologies such as GIS, computer aided design (CAD), 3d visualization software, and online communications networks, to help engage with communities to further understand the full implications of planning decisions (Foth et al., 2009). Participatory planning practices sometimes include the use of public participation GIS (PPGIS) which seeks to involve traditionally marginalized populations into decision making using digital GIS tools (Aberley & Sieber, 2002). But PPGIS has typically suffered from many of the same problems as other forms of public consultation. It is often run as a top-down process which does not allow much collaboration between participants and leaves the final interpretation of the collected data up to an authoritative expert (Ghose, 2007; Anderson et al., 2009).

Arnstein’s (1969) ladder of participation has been seen as a powerful critique of the theoretical ability for full citizen control of a planning process because ultimately authority lies with City Council (Goodspeed, 2008). On small scales, we have seen that citizen control can be achieved to some degree through acts of so called “guerrilla urbanism” (Hou, 2010) or “tactical urbanism” (Lydon, et al., 2010). This involves citizens or groups bypassing official planning channels to implement solutions or to create social change at a small scale. An example of such a solution includes de-paving abandoned city lots or installing public street furniture. The development of web 2.0 has improved the channels for this form of government bypassing urbanism. Sites like Neighbor.ly\(^8\) allow users to develop and crowdfund small projects that are

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\(^8\) [http://neighbor.ly/](http://neighbor.ly/)
important to their local needs which may be difficult to implement through traditional planning systems. Another route being taken is to try to bring grassroots community needs and solutions to the attention of city planners through collaborative online systems like Brickstarter\(^9\). These types of programs, and many others, illustrate the power that ICT has brought to citizens who have in the past only had traditional government led participation schemes which limit the range of options and tools available for public planning and policy making.

2.5 Open Data

2.5.1 Defining Data

“Data” is a term that is often used interchangeably with “information” though there are important differences between them, especially when discussing open government and open data. The Data-Information-Knowledge-Wisdom (DIKW) hierarchy is a common starting point for understanding the differences between different types of understanding (Ackoff, 1987). Each level of the hierarchy is built upon and includes those under it starting with data as the most basic layer.

- **Data** is comprised of symbols that represent the properties of objects, events, or the environment.
- **Information** is data processed into a useful form. It contains descriptions or answers “who”, “what”, “when”, and “how many” type questions.
- **Knowledge** is the application of data and information to answer “how” type questions.
- **Wisdom** is the addition of judgment value to knowledge.

\(^9\) [http://brickstarter.org](http://brickstarter.org)
There are debates surrounding the higher levels of the DIKW hierarchy (Rowley, 2007), but the differentiation of data and information is relatively uncontroversial. Data by itself is seen to have no value; it is an unprocessed set of discrete, objective facts or observations that convey no direct meaning (Pearlson & Saunders, 2004; Chaffey & Wood, 2005). Information is often described in terms of data, and can be described succinctly as “data + meaning” (Floridi, 2004).

Data can come in two varieties: quantitative and qualitative. Quantitative data are measurements or counts expressed in numerical variables while qualitative data are measures of ‘types’ and are expressed symbolically as categorical variables (ABS, 2013). Biases toward positivist science lead many to automatically assume quantitative data is intrinsically more valuable or of higher quality (Heinrich, 2012). Data, however, being neutral without context is always subject to bias and misinterpretation when it becomes information regardless of its original variety; all data is subject to collection errors, which can lead to errors down the line.

The ability of an individual, or group, to fully understand a complex system at a point in time may be fundamentally impossible due to the dispersed nature of information (Hayek, 1945). Yet access to large amounts of related, but differentiated, data along with the capacity for analysis can improve this condition of information poverty (Manyika et al., 2011). Through developments in computer technology, our ability to leverage data to understand and solve complex problems is growing rapidly, thereby quickly increasing the value of data as a resource for both public and private use (Ayres, 2008).

2.5.2 What is Open (Government) Data?

There are two forms of data/information: public and private. We are surrounded by public data; data which is freely available to any individual or organization that wants access to it. Private data on the other hand is generally data of a personal nature that is not provided for public
consumption. There are exceptions of course, as people voluntarily share personal information on social media sites or other platforms, but the vast majority remains within the private sphere. Governments have access to both private and public data.

Government agencies are some of the largest collectors and creators of data (Janssen, 2011). Some of the data that governments hold is public data such as spending records; other data, such as personal health information, is private data. Open government data (OGD) is the data which is both publically available and controlled by the government (see Figure 2-3). What constitutes being publically available is a point of contention. Data which is technically available but is difficult to access like paper records—what Yu and Robinson (2012) call “inert data”—is typically not what is implied by OGD. Publically available data from an OGD perspective typically means data which is available online\textsuperscript{10} as well as in other formats.

2.5.3 The Structure of Open Data

Three separate communities each advocating for OGD for different reasons have led to the current demand for OGD (Tauberer, 2012): classic open government advocates looking to improve transparency and accountability, open source and open access advocates interested in improving access to knowledge and opening data on philosophical grounds, and finally entrepreneurs and software developers looking for projects and potential business opportunities that could arise from open government data.

All of these groups are potentially looking for different content, and for differing reasons, but the issue that brings them all together is format. OGD is about format, providing public data in a machine readable, non-proprietary format that the user is able to use, reuse, and redistribute with minimal restriction. The goal is to make sure that public data held by governments—taking
privacy and security issues into consideration—is released in an open format for easy public consumption and reuse.

Canadian open data activist David Eaves (2009) lays out the three basic “laws of open government data” which offer a good introduction as to what constitutes open (government) data:

1. If it can’t be spidered\(^{11}\) or indexed, it doesn’t exist.

2. If it isn’t available in open and machine readable format, it can’t engage.

3. If a legal framework doesn’t allow it to be repurposed, it doesn’t empower.

The first law refers to the ability of users to find the data through search tools like Google. Without being accessible to search engines, the data can remain hidden inside of a government website and inaccessible except to those who know where to look for it. The second law is about the file format in which the data is provided. Machine readable formats like XML, CSV, or KML, as opposed to human-only readable formats like PDF allow for the data to be input into and analyzed with software as opposed to requiring manual digitization. Open formats are also important because they do not require the user to have access to expensive proprietary software to utilize the data. For example, KML files are non-proprietary geospatial files that can be opened with free software such as Google Earth or Google Maps, whereas SHP files are proprietary geospatial files that can only be opened with expensive and specialized ESRI software. The final law refers to the terms of use and license under which the data is distributed and stresses the importance of allowing users to reuse and republish the data without over encumbering them with stipulations or costs. When the Canadian government first opened their federal open data portal, this was a large point of contention. The federal portal did not allow users to combine the data with data from another source unless the secondary dataset’s license was “consistent with” the

\(^{11}\) “Spidered” refers to how search engines discover and index information for searches. If a website cannot be spidered then it will not appear on an internet search.
federal license, effectively making it illegal to combine federal data with other data (CIPPIC, 2012). Restrictions such as these can negate much of the value of OGD by circumscribing its potential (re)use a priori. Table 2-1 provides a list of all 11 open data principles put forth by the Open Knowledge Foundation in much more detail.

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<td><strong>1. Access</strong></td>
<td>The work shall be available as a whole and at no more than a reasonable reproduction cost, preferably downloading via the Internet without charge. The work must also be available in a convenient and modifiable form.</td>
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<tr>
<td><strong>2. Redistribution</strong></td>
<td>The license shall not restrict any party from selling or giving away the work either on its own or as part of a package made from works from many different sources. The license shall not require a royalty or other fee for such sale or distribution.</td>
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<td><strong>3. Reuse</strong></td>
<td>The license must allow for modifications and derivative works and must allow them to be distributed under the terms of the original work.</td>
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<td><strong>4. Absence of Technological Restriction</strong></td>
<td>The work must be provided in such a form that there are no technological obstacles to the performance of the above activities. This can be achieved by the provision of the work in an open data format, i.e. one whose specification is publicly and freely available and which places no restrictions -- monetary or otherwise upon its use.</td>
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<tr>
<td><strong>5. Attribution</strong></td>
<td>The license may require as a condition for redistribution and re-use the attribution of the contributors and creators to the work. If this condition is imposed it must not be onerous. For example if attribution is required a list of those requiring attribution should accompany the work.</td>
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<tr>
<td><strong>6. Integrity</strong></td>
<td>The license may require as a condition for the work being distributed in modified form that the resulting work carry a different name or version number from the original work.</td>
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| **7. No Discrimination Against Persons or Groups** | The license must not discriminate against any person or group of persons.  
*Comment: In order to get the maximum benefit from the process, the maximum diversity of persons and groups should be equally eligible to contribute to open knowledge. Therefore we forbid any open-knowledge license from locking anybody out of the process.* |
| **8. No Discrimination Against Fields of Endeavor** | The license must not restrict anyone from making use of the work in a specific field of endeavor. For example, it may not restrict the work from being used in a business, or from being used for genetic research. |
| **9. Distribution of License** | The rights attached to the work must apply to all to whom it is redistributed without the need for execution of an additional license by those parties. |
| **10. License Must Not Be Specific to a Package** | The rights attached to the work must not depend on the work being part of a particular package. If the work is extracted from that package and used or distributed within the terms of the work’s license, all parties to whom the work is redistributed should have the same rights as those that are granted in conjunction with the original package. |
| **11. License Must Not Restrict the Distribution of Other Works** | The license must not place restrictions on other works that are distributed along with the licensed work. For example, the license must not insist that all other works distributed on the same medium are open. |

Table 2-1: The Open Knowledge Foundation’s principles of open data

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12 [http://opendefinition.org/okd](http://opendefinition.org/okd)
Another important consideration in the provision of open data is the inclusion of an application programming interface (API). An API acts as a platform for accessing a stream of data that makes application development easier for visualizing and combining multiple data sources. Google, for instance, offers an API for its Google Maps that allows software developers to quickly and easily overlay or “mashup” data on top of Google’s mapping data. This is not a requirement for open data, and some data sets may be better left in repositories for bulk download, especially simpler, static datasets.

2.5.4 Benefits and Issues

The potential benefits of opening government data are numerous (Robinson et al., 2009; Deloitte, 2011; Kaltenbock, 2011; Janssen et al., 2012). The following five broad benefits described by open data advocates, (OKF & Access-Info, 2011: 79) are illustrative of some of the most common expected benefits.

1. **Transparency** – Access to budget spending data, contracts, voting records, and other government information improves democratic institutions by allowing citizens to be better informed about the functioning of government.

2. **Innovation** – Opening public data can spur innovation in the private sector as individuals and companies incorporate data into applications and services.

3. **Collaboration** – Government data creates a platform for collaborative projects between government bodies, individuals, private institutions, and civil society. External bodies may be able to work with internal government bodies to develop programs and services based around public data.
4. **Participatory Governance** – Leveraging data and technology, new forms of participation become available beyond periodic elections. Improved access to information can lead to a better informed citizenry, more capable of involvement in policy making decisions.

5. **More Efficient Governance** – Delivery of public services can be improved via technology leveraging data. Additionally improved access to performance information can increase public feedback and oversight over existing government functions as well.

These benefits closely resemble modern conceptions of open government outlined in the next section. Like the promises of open government, there is ongoing debate about whether OGD can realize the potential benefits that advocates suggest. Just publishing the data alone may not result in the benefits promised, as OGD relies greatly on the accessibility of the data and the activities of its end users (Janssen et al., 2012).

The term OGD itself is ambiguous and does not necessarily imply that all of the outlined benefits are reasonable outcomes. Yu and Robinson (2012) describe three different meanings that are often attached to OGD, each with a different implication: (1) politically important disclosures delivered with or without computers, (2) data that is in an open format and comes from the government but contains no politically important information, and finally (3), government data that is technically open data and provides politically useful information. It is hard to see how the delivery of mundane service data such as a digital bus schedule might facilitate greater transparency, collaboration, or participation; albeit, improved innovation and government efficiency may be reasonably expected. The content of the data provided is important, and conceptions of what OGD means will guide the choice of content.

Some authors are skeptical of an emphasis on the delivery of large structured datasets that could lead governments to focus too heavily on producing quantifiable data at the expense of
potentially more valuable qualitative data (Meijer, 2009). Dawes (2012) worries that the shift of
resources could detract from the production of traditional, harder to process information. The
production of the data itself can cause problems for understanding, as many organizations do not
pay close attention to metadata (data that describes data), without which it is difficult to
understand the context of how the data was collected and what it might, or might not, mean
(Dawes et al., 2004).

More critical scholars see OGD intersecting with neoliberal policies to reduce the role of
the state in public services because the OGD could potentially be co-opted by private
development interests that could direct OGD towards profitable service delivery tools (Bates,
2012; Longo, 2011). To combat this marketplace relationship of product delivery and
consumption, Michael Gurstein (2013) suggests that OGD needs to emphasize the role of the
interaction between the users and suppliers of data, namely between government and citizens.
This focus on interaction can help bring OGD in line with some of the more difficult promises of
OGD offering increased civil-society/state collaboration and citizen participation.

2.6 Open Government

2.6.1 Open Government: A Broadening Concept

The term “open government” has had a relatively short but quickly evolving history. The
concept arose in the United States (U.S.) in the post World War 2 period and centered on access
to information (Roberts, 2006; Dawes, 2010). In 1957, Counsel for the U.S. Congress’ Special
Subcommittee on Government Information, Wallace Parks coined the term open government in
an article entitled “The Open Government Principle: Applying the People’s Right to Know”
(Parks, 1957). In it, he stresses that government information should be available to the public on
principle and that this information should only be withheld under reasonable circumstances. If
citizens are to trust the processes and decisions made by their government officials, they must be able to scrutinize government activities to ensure that governments are acting in the public’s interest.

This emphasis on the public’s right to know eventually lead to the signing of the *Freedom of Information Act* in the U.S. in 1966. This formally enshrined the principle of government transparency and disclosure of public information through the process of freedom of information requests. Canada followed in 1982 with the passing of the *Access to Information (ATI) Act*, whose stated purpose is to:

> provide a right of access to information in records under the control of a government institution in accordance with the principles that government information should be available to the public, that necessary exceptions to the right of access should be limited and specific and that decisions on the disclosure of government information should be reviewed independently of government.\(^{13}\)

Following the enactment of the ATI Act, the government of Canada continued to enshrine information and privacy legislation to improve citizen access to government information while protecting personal privacy.\(^{14}\)

The focus on access to information and government transparency as the main thrust of open government has taken on a broader role in recent decades, especially since the development of ICT and e-government. A 2005 OECD report illustrates this governmental role well by combining the principles of open government with those of good governance, stating that

> ‘openness’ both encompasses and goes beyond the more commonly used term of ‘transparency’. It introduces two further aspects, namely ‘accessibility’ and

\(^{13}\) [http://laws-lois.justice.gc.ca/eng/acts/A-1/page-1.html#h-2](http://laws-lois.justice.gc.ca/eng/acts/A-1/page-1.html#h-2)

\(^{14}\) For a good overview see the Open Government Partnership’s country overview at [http://www.opengovpartnership.org/countries/canada](http://www.opengovpartnership.org/countries/canada)
‘responsiveness’, in order to capture other qualities of the interface between government and the wider community it serves” (OECD, 2005: 2).

In the report, the OECD explains that the goals of implementing open government strategies are not only to underpin legitimacy and credibility of democratic governments, but also to achieve “equally important policy goals such as economic growth or social cohesion” (OECD, 2005: 2).

2.6.2 Merging Open Government and Open Data

U.S. President Barack Obama, on his first day in office issued The Memorandum of Transparency and Open Government. This is seen by many as a watershed moment through which a new expanded conception of open government crystalized (Nam, 2012; Yu & Robinson, 2012; Weinstein & Goldstein, 2012). The Memo set out his administration’s understanding of, and commitment to, open government and called for the creation of an Open Government Directive. Compared to most of the earlier official understanding of open government, the memorandum provided a much broader understanding of what open government meant. Openness is described as having three features, which are transparency, participation, and collaboration. These features, it is said, will lead to strengthening democracy and improving the efficiency and effectiveness of government (Obama, 2009).

Obama’s Transparency and Open Government memorandum includes a strong technological focus, indicating that information about operations should be put online and be readily accessible to the public. The resultant memo led to the implementation of the Obama administration’s Open Government Directive15 which formalized some of the processes and requirements outlined earlier, namely transparency, participation, and collaboration with government. The document itself is heavily focused on transparency, only superficially dealing

15 http://www.whitehouse.gov/sites/default/files/omb/assets/memoranda_2010/m10-06.pdf
with the engagement aspects of open government (Di Maio, 2009b; Yu & Robinson, 2012). The directive requires that this transparency be filtered through online services, specifically calling for the publishing of government datasets in open formats. The move was to provide not political transparency per se, but to provide “high-value” information, meaning anything from information that increases accountability to creating economic opportunities (Obama, 2009).

This open government commitment led directly to the creation of data.gov, the U.S. government’s federal open data portal. The portal provides open data from many government departments. The portal however, has not been very successful in addressing the open government goals of participation and collaboration; the program has acted mainly as a one way distribution system for government data (Di Maio, 2009a). The output of the program fell quickly after its first year while government agencies effectively ignored the program (Peled, 2011). So while adhering to the technical prescriptions of open data and offering greater levels of government transparency, describing the program as ‘open government’ can be problematic.

The fear of tying the concept of open government to specific programs/projects like open data has caused some debate within the open government realm. Governments may utilize open data programs to provide lip service to open government while in reality providing no additional transparency, collaboration, or participation. As Yu and Robinson (2012: 3) explain, “when open data is confused with open government, governments may be able to take credit for increased transparency simply by delivering open data technology”.

The upshot of this openness and transparency, as Yu and Robinson (2012) themselves note, is that by selling the concept of open government, open data as a tool for improved service delivery can also offer an easier route to slip real open government activities in through the back door. Weinstein and Goldstein (2012: 42) add to this line of reasoning by emphasizing that
the adaptability that is so prized by open data advocates requires a culture shift for public officials—a recognition that information is more valuable if it is structured, machine readable, and available for interested users to access (or download) in raw formats. Implemented seriously, a commitment to open data necessarily makes bureaucracies more citizen facing and may even begin to change broader norms about openness.

Figure 2-4 provides a visual overview of how open government is coming to be understood. Open data is considered an essential feature but is not wholly constitutive of open government. Instead, it is the main mechanism for the provision of government transparency, while participation and collaboration are seen as interrelated but separate aspects of open government. This conception of open government is problematic because it glosses over the role that open data may directly have in fostering participation and collaboration between citizens and government as well as it overemphasizes the potential of open data for fostering government transparency.
Beth Noveck outlines why open data itself can be understood as a tool for public participation and collaboration, but she remains skeptical of its transparency/accountability claims.

"Shining a light on the misdeeds of ineffective institutions isn’t as imperative as redesigning how they work. Instead, open data can provide the raw material to convene informed conversations inside and outside institutions about what’s broken and the empirical foundation for developing solutions together." (Noveck, 2012: 34)
She points to hackathons\textsuperscript{16} as examples of this type of civic participation in action, whereby citizens are able to engage with public employees and data in such a way that “showcases how it might be possible to move away from centralized to distributed action” (Noveck, 2012: 35).

Noveck is not the only author who is skeptical of the power of open data to provide meaningful transparency in government. The late Aaron Swartz was particularly blunt in his criticism, explaining that, “the case for opening up data to hold government accountable simply isn’t there” (Swartz, 2012: 29). His main concern was that government itself is structurally resistant to reform and that simply having access to more evidence of incompetence or corruption is insufficient to generate real change. Simply publishing data online is insufficient; instead it requires structures built around it to make an impact. In Swartz’s opinion, pushing for open data without building the types of structures around it that allow for public engagement with that data, along with the mechanisms to apply pressure based on that information, is a misuse of resources and builds unrealistic expectations (Swartz, 2010).

2.7 E-government

2.7.1 Municipal E-Government

Open data programs are the latest addition to an existing series of ICT mediated programs undertaken by municipal governments commonly referred to as e-government. In the simplest sense e-government is the electronic provision of government information and services 24 hours a day, seven days a week (Norris et al., 2001). It includes a whole suite of online government tools

\textsuperscript{16} A “hackathon” is the most common term used to describe events in which people gather to examine data (often open government data) and work together to build applications and visualizations with it. Community members often organize these events with explicit or implicit support from government institutions.
and services ranging from simple city websites that provide access to commonly requested information that can be downloaded without requiring a trip to city hall, to more complex and experimental public deliberation and discussion forums. Municipalities, particularly larger ones with greater resources, have traditionally been the greatest innovators in e-government programs (Norris & Moon, 2005).

While early advocates were optimistic about the potential of e-government, over time many observers began to see the development of e-government not as a provider of digital democracy, but as an obvious extension of the pervasive New Public Management (NPM) framework that had taken hold in government in the 1980s and 1990s (Homburg 2004; Bamberg & Lehtonen, 2012). This is evident in the 2003 OECD report on e-government, which describes the internet as an important tool to improve efficiency and generate savings in regards to “provision of information and communication with customers” (pp. 2). The report speaks of building services through understanding “user requirements” and maintaining a “customer focus”, an emphasis on increased efficiency and improved service delivery common to NPM doctrine (Hood, 1991). This is not necessarily a problem, as a private sector type focus on these issues can lead to better outcomes for citizens, particularly in the online realm (Torres et al., 2005). The worry by proponents and antagonists alike is that by focusing only on service delivery, governments are not taking steps to improve citizen engagement, which has historically been the case (Nijkamp & Cohen-Blankshtain, 2011).

New Public Management is a term used to describe the shift in public sector management during the 1980s and 1990s towards a more neoliberal structure. This includes an emphasis on efficiency, competitive public services, and a more business-like model for government (see Hood, 1995 for a detailed description of the transformation).
2.7.2 Evaluations of E-government

There have been many attempts to assess the development and effectiveness of e-government programs (cf. Moon, 2002; Hale et al., 2000; Torres et al., 2006; Holzer et al., 2008; Jimenez et al., 2012). Generally, e-government programs are described as a linear progression of developments starting with basic web presence, moving through different levels of interactivity and service, finally arriving at “e-government nirvana” of “seamless delivery of governmental information and services, e-participation, e-democracy, governmental transformation, or some combination of the above” (Coursey & Norris, 2008 cited in Ahn, 2012).

Municipal e-government has not been as effective as the rhetoric suggested. While information provision is common, very few sites have offered any participatory orientation (Hale et al., 2000; Holzer et al., 2008). While many of the largest U.S. cities provide downloadable information and documents, offer some services, and one-way feedback mechanisms, virtually none have any real two-way communications or citizen-government dialogue (Jimenez et al., 2012).

The growth of social media technology may offer the possibility of a new tool for two-way engagement between government and constituent. The use of social media by local government has been shown to actually increase civic engagement in non-electoral and voluntary activities, though interestingly not in formal policymaking processes or elections (Zhang et al., 2009). Unfortunately, municipalities have been slow to adopt social media, and when it is used, it is often just as another information distributing platform, another one-way communications tool (Jimenez et al., 2012).

There is a broad consensus that municipal e-government has been improving over the years, but it has not yet reached the highest stages of development involving civic participation or
e-government 2.0 (cf. Pina et al., 2010; Scott, 2006). The level of information and services provided by municipal governments is continuing to develop, often in innovative and useful ways, but there has not been any push to encourage online or offline public dialogue or consultation. Direct or deliberative democratic function has not been actively sought out. Instead, the focus in practice remains centered around services and management (Dawes, 2008).

2.7.3 Challenges for E-Government

In the earliest stages of e-government implementation, the biggest factors impeding development were technological and human resource issues along with security and privacy concerns (Norris & Moon, 2005). Over time the burden shifted somewhat. Worries about security and privacy have receded somewhat, possibly due to a common cultural acceptance of services such as online commerce, which require the disclosure of personal and financial information (Schwester, 2009). City management still found a lack of staff with technical expertise to be a large problem, along with the difficulties of justifying investment in services whose returns were hard to measure (Schwester, 2009). While technical problems were obvious barriers early on, and in some ways may still present issues on the surface, the reality is that the greatest barriers to successful e-government implementation—that is implementation that moves beyond the early stages of service delivery and toward greater levels of civic engagement—are cultural in origin, not technical (West, 2004; Zourdis & Thaens, 2003). The presence, sophistication, and engagement of the city’s IT department, the existence of a strategic plan, and the form of governance of a local government all play an important role in the presence and quality of e-government services (Carrizales, 2008).

A digital divide—the difference in ability between groups to access and utilize computer technology—exists at multiple scales (Norris, 2001), from global/regional divides to intra-societal
divides brought about by socio-economic factors. Grunden (2012) extends this concept to include intra-organizational digital divides. He found that when trying to understand why some governments had much greater success than others in implementing e-government programs, it often came down to gaps within the organization between those employees who were reluctant and not motivated to engage in the implementation process and those who were. When this gap was too great, and there was not enough support for implementation, the quality and efficiency of the program suffered.

The internal divide was mainly understood as a generational one, though not wholly. Grunden notes:

*It is not just about learning to manage new e-services and IT systems, but also to interact in a more process-oriented organization and to communicate with customers in new ways. Implementation of e-government also means increased stress at work, when you have to work with parallel systems, for example. For older people in the organization, this means major changes compared with the situation for the younger generation, who grew up in the IT community”* (Grunden, 2012: 242).

Older employees also face different incentives within the organization. Many hope to be able to continue their work without having to deal with the changes brought on by e-government systems—maybe being able to retire before change is mandatory. New tasks and new systems are sometimes given as responsibilities to younger employees while the older ones continue with the status quo. When management does not force the change onto senior employees, it can serve to further legitimize these differences (Grunden, 2012).

This internal digital divide is exacerbated by the traditional attitude of government that tends to treat IT as an outside consulting project (Burton, 2010). Many governments bring on IT staff part-time during the implementation phase of e-government projects, bringing them back periodically when needed, but not as permanent staff (Schwester, 2009). This reduces the quality
of the project in both the short and long term as those with technical know-how – tacit skills and knowledge – are not in daily contact with the stakeholders of the project, and therefore are unable to actively experiment and tweak the system for the best results. Having technical staff on hand can also bring a secondary benefit, which is the spread of understanding and enthusiasm for a project that comes from close daily interaction between groups with different skills and knowledge (cf. Morgan, 2004).

One final problem facing e-government is that of constituent buy-in. This is in some ways a circular problem whereby city management may seek to expand its online services, but run into the problem of the public not showing any interest, out of fear that automation will remove their ability to deal with issues face to face with government officials (Schwester, 2009). This reduces the incentive to improve the existing service, and without an improved service to compare to, citizens continue not to demand more investment in e-government.

2.7.4 Open Data: A New E-government Program

The growth and apparent stagnation of e-government programs as catalysts for open government goals of transparency and participation may not be a foregone conclusion. New and changing technological trends may create a second chance for transformative change. While in the past government’s role was that of a monopolistic provider of information and service solutions for public goods, there now exists the possibility for non-governmental actors to fulfill that role in some aspects (Ahn, 2012).

Ideas by proponents of e-government are being augmented by discussions of “government 2.0”, a new technologically adept form of government that leverages web 2.0 technologies to deliver services in a more effective manner whilst increasing public participation and collaboration (Eggers, 2007; Tapscott, Williams, & Herman, 2007). Roy (2012) describes
the evolution of e-government from the initial phases (“egov 1.0”) centered on service and information provision, to the current (“egov 2.0”) emphasis on networking and participatory governance.

Some scholars have begun to include open data initiatives into the broadening scope of e-government (e.g. Longo, 2011; Nam, 2012). Open data is a key component of the government 2.0 concept and provides a delivery mechanism for these open government ends. Whereas the earlier years of e-government provided little more than rhetoric about participation and collaboration, open data may provide a tangible structure on which to develop meaningful citizen engagement that has historically been lacking (Nam, 2012).

2.8 Conclusion

The literature reviewed in this chapter outlines the different aspects of open data and open government of importance for this study. It couches open data in the existing literature around governance, e-government, and neogeography, each of which touches on some aspect of the topic but often only in passing. My contention is that open data, particularly at the municipal level, is a new type of e-government program that offers an opportunity to move beyond the traditional limitations of e-government programs. The development and democratization of new technologies, particularly those surrounding online geographic information, make this evolution possible. Using these tools, citizens are increasingly able to take advantage of government data to develop alternatives to public services and engage with government as producers, and not just consumers of information and services.

There is debate about the role that open data may actually play in fostering the principles of open government, but little empirical research has been done to determine whether or not this is the case, and if so, how it is manifesting. The goal of my research is to begin to map out the
development of open data initiatives in cities across Canada; to discover why these programs are being started, what role local institutions and citizens are playing in them and what kinds of data they are providing as well as what challenges they face for sustainability and growth.

In the next Chapter, I will reiterate my key research questions and explain the methods used to address them.
Chapter 3

Research Methods

3.1 Chapter Overview

Chapter two reviews the literature on the emergence of open data programs as potential platforms for the implementation of the open government principles of transparency, collaboration, and participation. This area is becoming increasingly interesting to urban geographers and planners as the data revolution begins to affect the traditional delivery of local government services. As I demonstrated in the previous Chapter, there is still fierce debate about the real role that these open data programs are playing, whether they are truly the paragons of open government and government 2.0 that their proponents claim, or whether they are simply an evolution of traditional e-government programs that do little to advance the open government principles mentioned above. As I argue in Chapter two, there are two main factors that can help to determine whether open government principles are being advanced. The first factor concerns the types of data being made available and the second concerns the tendency for these programs to facilitate real participation and collaboration between citizens and government. These factors raise several interesting questions that are addressed with this research:

1. What types of data are available on Canadian municipal open data catalogues?
2. What are the reasons for starting municipal open data initiatives in Canada?
3. What role do citizens and local institutions have in municipal open data initiatives?
4. What are some of the major challenges being faced by municipal open data initiatives?
This chapter outlines the research methods and procedures used to formulate answers to these questions. I decided to adopt a mixed-method approach, as it seemed to offer the best way forward to answer my research questions. Section 3.2 describes the mixed methods approach and why it is valuable for social science research in general. Section 3.3 then explains how these methods are used in this study in more detail and describes the case selection process for both the cities that are evaluated and the interview participants involved. Section 3.4 outlines the open data catalogue content evaluation system developed for this study and how its output was analyzed. Finally, section 3.5 provides a summary of the chapter along with a description of some of the limitations of the methods used.

3.2 Mixed Methods

There is a problematic dualism that exists in the social sciences between quantitative and qualitative methods. This dualism arises as a tendency to represent quantitative methods as objective and value-free as opposed to qualitative methods that are sometimes presented as subjective, supplementary, and inferior to “real” science (Hammersley, 1992). On a less contentious point of view, these two approaches can be seen as providing different ways of examining a topic, with the qualitative perspective providing a wide lens, and the quantitative providing a narrow one (Brannen, 1992). In recent decades research in human geography has shifted from a predominantly quantitative approach to a more qualitative one (Brannen 1992; Limb & Dwyer, 2001). This has led to the increasing prevalence of mixed methods approaches to research, where the twin lenses of qualitative and quantitative methods can be brought to bear on the topic under investigation (Nolan, 2003).

Denzin (1978) outlines the concept of methodological triangulation, in which multiple methods are used to study a research problem in order to overcome the limitations of using a
single research paradigm. The use of qualitative methods in conjunction with quantitative methods can help to provide depth or context to quantitative data. Traditionally, qualitative methods have been used in a mixed methods approach to help search for validity and corroborative evidence, as well as to reveal subjective, unquantifiable factors such as feelings, attitudes, and perceptions (Hay, 2005).

3.2.1 Case Study Method

In a qualitative context a case study method allows the researcher to examine one or more cases through the use of multiple different techniques such as interviews, observation, and textual analysis. Yin (2003) suggests that a case study design should be considered when: (1) the focus of the study is to answer “how” and “why” questions; (2) the behavior of those involved in the study cannot be manipulated; (3) there are contextual conditions that are believed to be relevant to the phenomena being studied; (4) there are not clear boundaries between phenomenon and context.

There are a multitude of different types of case study, each serving to answer different questions. Yin (2003) categorizes these into three types, explanatory, exploratory, and descriptive (see Table 3-1). Along with these he also differentiates between single, holistic case studies and multiple-case studies. A single case study allows for an in-depth analysis of a single case while a multiple-case studies approach is useful for examining the similarities or differences between several different cases.
<table>
<thead>
<tr>
<th>Case Study Type</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explanatory</td>
<td>Case study seeking to explain presumed causal links in real life interventions that are too complex for survey or experimental strategies.</td>
</tr>
<tr>
<td>Exploratory</td>
<td>Case study used to explore situations in which the intervention being evaluated has no clear, single set of outcomes.</td>
</tr>
<tr>
<td>Descriptive</td>
<td>Case study used to describe an intervention or phenomenon and the real life context in which it occurs.</td>
</tr>
</tbody>
</table>

Table 3-1: Definitions of Different Types of Case Studies (Based on Baxter & Jack, 2008)

3.2.2 Semi-structured Interviews

Semi-structured interviews provide an oral method of inquiry with participants that can help to unearth context and themes behind a phenomenon which might otherwise be unavailable to the researcher. The semi-structured interview is a flexible method bookended by the structured interview on one side and the unstructured interview on the other. The structured interview consists of a rigid set of questions to be applied to all participants without any room for variation or exploration (Dunn, 2005). On the other hand, the unstructured interview provides complete freedom of discussion about an agreed upon topic by the participant, with at most small prompts from the researcher to follow up on certain points. The semi-structured interview lies between these two extremes. The researcher comes to each interview with a list of questions or topics to be covered, but the participant is given a great deal of leeway in how they can reply (Dunn, 2005).

The questions asked or topics discussed in a semi-structured interview are often referred to as an interview guide. The guide is used to generate consistency between interviews and can consist of a list of topics or specific questions. The content of the interview guide may change
depending on the participant involved and there is room for the researcher to ask questions not included on the guide as they follow up on topics raised by the participant (Bryman, Teevan & Bell, 2009). In this way the semi-structured interview acts as a flexible tool for answering research questions while offering a path for discovering unforeseen issues and themes on the topic under investigation.

3.3 Research Process

3.3.1 Research Overview

Open data in government is a relatively new phenomenon. This means that studying its development requires primary research because the researcher cannot rely on prior examinations. In order to examine the current state of Canadian MODIs—what data is being published, who is involved, what role are they playing—this study takes a mixed methods approach. It includes a quantitative evaluation of the contents of all of the municipal open data catalogues in Canada, and a series of small case studies of ten particular open data initiatives.

The online data catalogues of each Canadian MODI are the empirical source of information about what is being published. In order to analyze this information a categorization system is developed for this purpose and is outlined in detail in section 3.4.

A descriptive, multi-case study approach is taken to the qualitative aspect of the research. The case studies involve semi-structured interviews with between one and four actors in each of the case cities. This was necessary in order to answer further questions about the implementation and operations of the ODIs. The selection of the case studies and the interview questions are partially informed by the results of the catalogue evaluations.

Along with these two primary methods, observation of online discussions and social media were conducted in a non-systematic manner. As well, observations were made of
government and civic actors at three open data related events (Table 3-2) where informal discussions and formal presentations provided background understanding of open data issues and processes. Table 3-3 outlines the structure of the research and the role of each method in answering the research questions.

<table>
<thead>
<tr>
<th>Event</th>
<th>Location</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creative Commons Salon Ottawa: Open Data</td>
<td>Ottawa, Ontario</td>
<td>March 14, 2012</td>
</tr>
<tr>
<td>Sask 3.0 Summit</td>
<td>Regina, Saskatchewan</td>
<td>April 24-25, 2012</td>
</tr>
<tr>
<td>Learn Hack YOW</td>
<td>Ottawa, Ontario</td>
<td>December 8, 2012</td>
</tr>
</tbody>
</table>

Table 3-2: Open Data/Open Government Events Attended

<table>
<thead>
<tr>
<th>Method Used</th>
<th>Purpose</th>
<th>Data Collection Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Literature Review</td>
<td>Develop research questions and background knowledge</td>
<td>March 2012 – Feb 2013</td>
</tr>
<tr>
<td>Event and online observation</td>
<td>Develop background and contextual knowledge</td>
<td>March 2012 – December 2012</td>
</tr>
<tr>
<td>Open data catalogue content evaluation</td>
<td>Answer research question 1 and inform case study selection</td>
<td>June 2012 – September 2012 + November 2012</td>
</tr>
<tr>
<td>Staff and open data advocate/user interviews in 10 case study cities</td>
<td>Answer research questions 2 – 4 and provide context to research question 1</td>
<td>October 2012 – December 2012</td>
</tr>
</tbody>
</table>

Table 3-3: Research Methods Overview

3.3.2 Case Study Selection

A purposeful selection method was used in determining which municipalities to investigate in more detail through the use of qualitative interviews. The goal was to examine the programs of five or six geographically dispersed cities that appeared to be running dynamic and successful open data initiatives. This would allow for a reasonable number of interviews (15-20)
with participants from inside and outside of government. The goal was to get a sense of the how each open data initiative started and how they were being run.

After an initial examination of each of the municipal open data catalogues in the country, as well as any other online information discovered during this period, five case cities were chosen based on their differing yet seemingly successful approaches to their open data programs. The initial six cities were:

- **Toronto, Ontario.** This city was chosen based on the City’s open data social media presence, the size of the catalogue, and the presence of the WellBeing Toronto project.

- **Edmonton, Alberta.** This city was chosen based on the use of the Socrata platform, volume of data, and reputation concerning the City’s enthusiastic CIO and Strategic Coordinator.

- **Ottawa, Ontario.** This city was chosen based mainly on the presence of the highly visible Open Data Ottawa advocacy group, as well as interest in the troubles regarding OC Transportation’s GPS data feed.

- **Montreal, Quebec.** This city was chosen based on the layout of the City’s open data catalogue and the presence of online comments and responses regarding individual datasets. This City is also known for its collaborative approach through their public consultations around open data.

- **The District of North Vancouver, British Columbia.** This city was chosen based on the unique and impressive design of their open data catalogue and the fact that it is housed completely within the GIS department. It was chosen rather than Vancouver itself, which has a nice open data catalogue but is in many way similar to Toronto and Ottawa’s catalogues.
• **Mississauga, Ontario.** This city was chosen based on the existence of hundreds of PDF documents dating back to the 1960s. The program also appeared to be run out of a different area in the planning department, making it unique among Canadian MODIs.

Shortly after these initial choices were made, I traveled to Saskatchewan to attend an open government conference called Sask 3.0. While there I became aware of the launch of Regina’s open government and open data programs (the first hackathon of which I unfortunately missed by several days). I spoke with some people involved in the program briefly, including the main person in charge of the program. She described the approach they were taking, which was a much broader and more collaborative open government approach than many other cities. After this discussion I decided that **Regina, Saskatchewan** would make an interesting addition this study and it became the seventh case study city.

During the course of recruiting and interviewing participants from the initial seven cities, I found that the number of valuable key informants in each location was small. In some cities such as the district of North Vancouver, there was no obvious choice for a non-governmental participant. The interview with that municipality’s open data lead provided a great deal of information; this was indicative of many of the interviews with other city staff. Rather than spending time trying to find another participant that could confirm the information that had already been gathered, I decided to seek out several disconfirming cases; municipalities where their open data programs seemed to have stalled. Iain Hay (2005) explains that disconfirming cases can be important in qualitative research as they may highlight alternative institutional arrangements and provide an alternative understanding of the process under investigation. With this in mind I sought out several municipalities that could highlight open data programs in
different stages of development that appeared not to be successful. The following three cities were chosen to fill this role:

- **Fredericton, New Brunswick.** At the time (Spring, 2012) it was the only city in Atlantic Canada with an open data program and it appeared to have been abandoned. It had been running for a relatively long time (since summer, 2011) and appeared to be relatively well populated with data but had not been updated in several months. I was curious as to whether the program was still running.

- **Guelph, Ontario.** The city had an open data page listed as a pilot program that had not been updated since its creation. Many of the links on the catalogue were not functioning. I wanted to know if the pilot project had led to a larger official open data program, perhaps under development.

- **Hamilton, Ontario.** I had heard Joey Coleman speak briefly at an open data event at the University of Ottawa about the troubles that he and the open data advocacy group Open Data Hamilton were having in getting the City to move on an open data policy. The City had an ‘open data’ page, but it consisted only of the GTFS package for the bus service. I wanted to find out why they were having so much difficulty and what the advocacy group’s relationship was like with the City.

I also wanted to speak to somebody at the City of Calgary, Alberta, about the unusual (and poorly implemented) open data portal available on the City website. After several failed attempts to contact somebody in charge of the program or to gather any other information I abandoned it as a case city.

**3.3.3 Interviews**
I conducted eighteen (18) semi-structured oral interviews with 19 participants (one interview was a conference call with two participants) from the case study cities between October 3 and December 3, 2012 (Table 3-4). Semi-structured interviews were chosen due to their flexibility and the ability to follow interesting avenues of discussion with participants about subjects that might be valuable to the research but were not predicted ahead of time.

The interviews were conducted via the Skype voice over IP (VOIP) program and were audio recorded with Call Graph 1.3.0.0. Each interview lasted between 30 and 80 minutes, with the majority lasting about 60 minutes. Interviews with each participant used a variation on a base interview guide that was adjusted for each participant based on their position in relation to the ODI and any specialized knowledge that they had that was of interest to the study. Before the interviews all participants were provided with a letter of information about the research (appendix C). They also received a GREB ethics consent form that outlined the potential risks involved in participating with the research and offered several choices for privacy protection (appendix D).

Participants were purposely chosen due to their involvement with each case city’s open data program. At least one individual employed by the city was chosen in each case in order to provide information about the origin and operation of their ODI. Hamilton, Ontario is the one exception to this pattern, as it was added late in the research process and it proved difficult to access somebody at the city to interview. Instead I opted to speak only with a local open data advocate in the City of Hamilton. Fortunately, this person has been deeply involved in the Hamilton process and proved to be a good informant on what was happening in that city. If possible, citizens involved in local open data advocacy, especially organized groups were also interviewed in order to gain an outsiders perspective on each city’s ODI. This was not always possible however, as many cities do not have an organized open data group present.
In order to find participants, the first step was to contact the staff at the city in question via email, usually obtained on their open data website. This preliminary email was used to solicit contact information regarding city employees as well as citizens who were directly involved in the ODIs. Early interviews with individuals in each city sometimes provided additional potential participants who could be contacted if it was felt that more information was required about that case city.

<table>
<thead>
<tr>
<th>Case City</th>
<th>Participant Name/Position</th>
<th>Staff or User/Advocate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toronto, ON</td>
<td><strong>Harvey Low</strong>, Acting Manager, City of Toronto</td>
<td>Staff</td>
</tr>
<tr>
<td>Toronto, ON</td>
<td><strong>John Jones</strong>, Manager, Information Policy and Standards, Corporate Information Management Services</td>
<td>Staff</td>
</tr>
<tr>
<td>Toronto, ON</td>
<td><strong>Reham Gorgis-Youssef</strong>, Marketing and Communications/Strategy Consultant at the City of Toronto</td>
<td>Staff</td>
</tr>
<tr>
<td>Toronto, ON</td>
<td><strong>Gina Porcarelli</strong>, Spatial Products Analyst, Geospatial Competency Centre</td>
<td>Staff</td>
</tr>
<tr>
<td>Edmonton, AB</td>
<td>“<strong>Open Data Staff Member</strong>”, City of Edmonton</td>
<td>Staff</td>
</tr>
<tr>
<td>Edmonton, AB</td>
<td><strong>Matthew Dance</strong>, Web-GIS Researcher</td>
<td>User/Advocate</td>
</tr>
<tr>
<td>Edmonton, AB</td>
<td><strong>Mack Male</strong>, Software Developer, Local Blogger&lt;sup&gt;18&lt;/sup&gt;</td>
<td>User/Advocate</td>
</tr>
<tr>
<td>Ottawa, ON</td>
<td><strong>Robert Giggey</strong>, Strategic Support Coordinator, ITS (Open Data Lead)</td>
<td>Staff</td>
</tr>
<tr>
<td>Ottawa, ON</td>
<td>“<strong>Open Data Advocate</strong>”, Ottawa</td>
<td>User/Advocate</td>
</tr>
<tr>
<td>Ottawa, ON</td>
<td><strong>Mary Beth Baker</strong>, Co-Founder of Open Data Ottawa</td>
<td>User/Advocate</td>
</tr>
<tr>
<td>Ottawa, ON</td>
<td><strong>Edward Ocampo-Gooding</strong>, Co-Founder of Open Data Ottawa</td>
<td>User/Advocate</td>
</tr>
<tr>
<td>Montreal, QC</td>
<td><strong>Diane Mercier</strong>, PhD, Open Data Lead, City of Montreal</td>
<td>Staff</td>
</tr>
<tr>
<td>Montreal, QC</td>
<td><strong>Michael Lenczer</strong>, Co-Founder of Montreal Ouvert</td>
<td>User/Advocate</td>
</tr>
<tr>
<td>District of North Vancouver, BC</td>
<td><strong>Andrew Durnin</strong>, GIS Coordinator (Open Data Lead)</td>
<td>Staff</td>
</tr>
<tr>
<td>Regina, SK</td>
<td><strong>Alyssa Daku</strong>, Manager, Corporate Information Governance (Open Data Lead)</td>
<td>Staff</td>
</tr>
<tr>
<td>Regina, SK</td>
<td><strong>Andrew Dyck</strong>, Founder of Open Data Saskatchewan</td>
<td>User/Advocate</td>
</tr>
<tr>
<td>Mississauga, ON</td>
<td><strong>Steve Czajka</strong>, Supervisor, Information Planning (Open Data Lead)</td>
<td>Staff</td>
</tr>
<tr>
<td>Fredericton, ON</td>
<td><strong>Robert Lunn</strong>, GIS Coordinator (Open Data Lead)</td>
<td>Staff</td>
</tr>
<tr>
<td>Guelph, ON</td>
<td><strong>Blair Labelle</strong>, City Clerk</td>
<td>Staff</td>
</tr>
<tr>
<td>Hamilton, ON</td>
<td><strong>Joey Coleman</strong>, Journalist</td>
<td>User/Advocate</td>
</tr>
</tbody>
</table>

<sup>18</sup> This person runs the local Edmonton news blog www.shareedmonton.ca

Table 3-4: Interview participants<sup>19</sup>

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<sup>19</sup>
Participants were consulted as to whether they wished to be named or to remain anonymous. Given the small number of individuals involved in municipal open data, many of the participants’ identities would be obvious to others with knowledge of this area. The vast majority of participants were comfortable with being quoted by name, though two individuals did wish to be referred to only by their position due to potential conflicts of interest. Throughout the Findings and Analysis chapter I chose to cite the quotation sources by title rather than name in order to simplify the writing and not overburden the reader with names that were not relevant. The exception to this is in the Case Study Summary section (Chapter 4.3), where names are used. This is because the identities of actors involved in specific ODIs can be important in describing how they developed and are moving forward.

3.3.4 Analysis

Audio recordings were maintained on an encrypted USB stick and personal hard drive using TrueCrypt 7.1. The recordings were transcribed manually during the months of December 2012 and January 2013 using the Express Scribe 5.5 software. The transcriptions were selective and did not include sections of the conversation which were not pertinent to the research such as introductions, questions about my research, and off topic tangents. The transcriptions are saved as Microsoft Word documents and are stored along with the audio files.

Interview transcripts were analyzed with an open coding procedure. Open coding is one of the initial steps in finding concepts and themes in a large quantity of qualitative data and help the researcher organize the data (Babbie & Benaquisto, 2002). The initial open coding provides

\(^{19}\) The vast majority of participants were willing to be named in this study. The two exceptions wished only to be identified by a title. They have been referred to here as either an “open data staff member” or an “open data advocate”.

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the main concepts to emerge from the interviews. Next a system of focused coding was used to analyze the transcripts using the concepts from the open coding procedure on a more systematic level.

During the coding process, a large number of relationships, themes, and ideas emerged which were collected and analyzed using memoing. Memoing is a way of analyzing qualitative data through the use of ever more abstract levels of notes or memos. At first elemental memos are made which provide a detailed description of some relatively specific matter, next the elemental memos are reviewed and key issues are identified in sorting memos. Finally the sorting memos are reviewed and more abstract integrating memos are created which define generalized relationships among the coding (Babbie & Benaquisto, 2002).

### 3.4 Data Catalogue Content Evaluation

#### 3.4.1 Rationale

A few sources track the development of municipal open data catalogues in Canada such as ESRI Software\(^20\), University of Waterloo\(^21\), and to a lesser extent the Open Knowledge Foundation (OKF)\(^22\) and CTIC\(^23\). The first two of these programs are focused on the provision of GIS data, and all of them provide minimal information about the actual content of the data. Typically the number of datasets is recorded along with information about the formats on offer at each open data portal. For users interested in sources of geospatial data or for those interested in keeping track of the number of datasets available, these sources can be helpful. However, in

\(^{20}\) [http://www.arcgis.com/home/webmap/viewer.html?webmap=f7bd0971a65c40f0a33451dbc3d7909d](http://www.arcgis.com/home/webmap/viewer.html?webmap=f7bd0971a65c40f0a33451dbc3d7909d)


\(^{22}\) [http://census.okfn.org/catalogs/](http://census.okfn.org/catalogs/)

\(^{23}\) [http://datos.fundacionctic.org/sandbox/catalog/faceted/](http://datos.fundacionctic.org/sandbox/catalog/faceted/)
order to get a better understanding of the content of these data catalogues, a more in depth examination must be undertaken.

At least one study has been conducted that has tried to break down the content of open data catalogues on an international level (Vincey, 2012). In this study, the author compares the catalogues of the UK, US, and France, examining the differences not only in the number, but in the types of data being offered. He breaks down the data by topic (e.g. economic, geographic, health), by data source, and by structure (format). Since his study included several thousand datasets, the author developed a categorizing system that relied on word associations that could be programmed for automatic analysis of the data. The end result is an approximation of the content of each dataset classified into one of nine relatively arbitrary categories. The broad comparison that the author is making is achieved, but could be improved upon when dealing with smaller data catalogues where individual attention can be given to each dataset.

Using the Vincey (2012) study as a general guide for examining open data catalogues, I developed a categorization system that can help answer some of the questions raised by Yu and Robinson (2012) about what types of data are being made available. The goal of this system is to evaluate each open data catalogue based on the number of datasets, the topic covered by each dataset, and whether that dataset contains data that is geographic, textual/numerical, provides a public service, and/or provides public transparency/accountability. Along with this, each dataset will be evaluated based on whether it meets the technical requirements of open data, namely that it is machine readable and in an open format.

The choice of categories is deliberately limited for reasons of time and resources. It would be interesting to evaluate datasets based on additional characteristics such as data precision and accuracy, the quality of metadata provided, the number of downloads, or to note the date that
each set was added. These may provide some additional clues as to the development process as well as the quality of open data sites. Unfortunately not all of the sites provide this additional information, and devising a system to try to collect it is beyond the scope of this research project. Instead, readily and universally available information such as file names and formats were used. Only if an insufficient amount of information was provided by the data portal did the additional work of downloading and manually examining datasets occur. The time required for this was deemed worthwhile however, as this was sometimes the only way to determine the actual content of a dataset.

3.4.2 Collection Procedure

In order to evaluate and compare the existing municipal open data catalogues, I created an inventory of all of the available datasets. To do this, each open data site was individually examined and each dataset was described in terms of its title, format, and (when necessary) content. Many datasets are straightforward or have detailed metadata, requiring little explanation, while others require download and examination to determine their actual contents. Quite often the datasets were poorly documented making the manual examination of the files necessary. This was especially true with regards to geospatial datasets that varied widely in terms of quality and content. Many of these datasets contained no information other than a point location, while others contained detailed attributes and descriptions. Without examining the file itself this was often impossible to ascertain.

Twenty-three (23) data catalogues were examined based on all of the existing municipal open data initiatives in Canada as of June of 2012 (along with the addition of Regina in August of
Data collection was completed between June and September of 2012, and later a follow up was done between November 6 and November 12, 2012, where any updates or changes to data catalogues were added. This follow up was done in order to maintain a consistent date of examination between catalogues rather than the four month period of initial data collection.

### 3.4.3 Data Taxonomy

Several cities have some form of categorization of their datasets, usually in a small set of broad categories with significant overlap (i.e. a dataset may be available across several different categories at the same time). While these categorization systems may be useful for users searching for specific types of data, it creates a problem when trying to catalogue and evaluate the available datasets on each open data site. In order to address this problem, a data taxonomy has been created (Table 3-5) that is universally applicable across municipal open data sites and allows for datasets to fit into singular categories without overlap.

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain</td>
<td>12</td>
</tr>
<tr>
<td>Type</td>
<td>4</td>
</tr>
<tr>
<td>Structure</td>
<td>3 + 1</td>
</tr>
<tr>
<td>Format</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Table 3-5: Data Taxonomy**

There are 12 *domains* which are detailed below. They are applied to the datasets by the researcher and have been chosen to help minimize subjectivity while still being small enough in number to be easily manageable.

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24 Existing programs in Canada were found via http://datacatalogs.org/, an actively updated listing of government open data programs worldwide.
After a dataset has been placed into its respective domain, it is then assigned one or more *types*. The type refers to what kind of data exists in the dataset. It is possible for a dataset to have all four types of data, with a general rule that more complex datasets will have more types assigned to it.

The *structure* of the dataset is an objective measure based on its format. This is used to classify the dataset based on whether it fits the technical definition of open data. When multiple formats are available, it is based on the most structured of these.

The format is a listing of what *format(s)* the dataset is available in. It is useful in helping to understand the structure measurement as it gives context to the value given.

This classification system has undergone several iterations. One system was developed and implemented to find out what kinds of problems it presented in terms of the actually existing data sets and it would be adjusted and implemented again. The current system is a culmination of trial and error along with informal discussions with others who have experienced open data programs or have attempted to devise similar evaluation tools (e.g. David Eaves, David Robinson, Cyrille Vinc ey).

### 3.4.3.1 Domain

The domain is the primary classification applied to the datasets. It classifies each dataset into one of 12 areas that correspond to what the data describes.

The domains are primarily based on Montreal’s internal classification system (City of Montreal, 2008). Some domains from the original are not applicable and have been merged into other domains in order to streamline the system as much as possible. The classification system needed to be adjusted considerably because data on Montreal’s catalogue could fall under multiple domains but no overlapping was allowed in the system in this study.
While ideally there would only be four to six domains, this has proven to create a number of problems, both subjectively, with datasets seeming to fit easily into multiple domains, and in that the descriptive power of each is reduced as its breadth increases. The purpose of classifying the datasets by domain is to provide an overview of what kinds of data are available in each of Canada’s municipal open data portals. Reducing the number of domains too greatly was seen to negate much of the value of categorizing the data in the first place.

Table 3-6 lists the domains that are used in this classification system along with an explanation of each and examples of what types of datasets fall into each domain:

<table>
<thead>
<tr>
<th>Domain</th>
<th>Description</th>
<th>Example Datasets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment/Geography</td>
<td>Data that describes either the natural landscape or ecosystem. Manmade alterations such as urban street trees fall within this domain.</td>
<td>Geography, Hydrology, Topography, Tree Cover and Location, Nature Conservation Areas.</td>
</tr>
<tr>
<td>Infrastructure – Physical and Service</td>
<td>Data that describes either the physical infrastructure of the city or services that are related to its infrastructure. Transportation infrastructure and services are excluded and have a separate domain.</td>
<td>Physical Equipment, Survey Markers, Waste and Water Infrastructure, Waste Management Services, Building Infrastructure</td>
</tr>
<tr>
<td>Elections</td>
<td>Data concerning electoral infrastructure, administration, or services. This can include local, provincial, or federal election data.</td>
<td>Electoral Ward Boundaries, Voting Station Locations, Election Results, Campaign Contributions</td>
</tr>
<tr>
<td>Legislation and Licensing</td>
<td>Data concerning legal or licensing issues at any scale.</td>
<td>Bylaws, Licensing Information, FOI Requests</td>
</tr>
<tr>
<td>Civic Administration and Services</td>
<td>Data concerning the political and administrative side of the city.</td>
<td>Council Minutes, Municipal Service Reviews, Job Postings, Lobbyist Registry, 311 Data, Council Expenditures</td>
</tr>
<tr>
<td>Finance</td>
<td>Data concerning city financing, revenue collection, or spending.</td>
<td>Budgets, Land/Building Sales and Acquisitions, Tax Information, City Purchases</td>
</tr>
<tr>
<td>Health and Public Safety</td>
<td>Data relating to health, safety, and crime.</td>
<td>Health Inspection Data; Fire, Police, Hospital Locations;</td>
</tr>
<tr>
<td>Domain</td>
<td>Description</td>
<td>Notes and Clarifications</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Sport, Leisure, and Culture</td>
<td>Data concerning all aspects of cultural and recreational programs and infrastructure.</td>
<td>Certain choices were made regarding the domain as well as what they contain which require some explanation:</td>
</tr>
<tr>
<td>Planning and Development</td>
<td>Data relating to both the inputs and outputs municipal planning and development. It includes aspects such as demographics, permits, and urban form that may otherwise fall into other domains.</td>
<td>1. Transportation and Infrastructure are two different domains, hence a choice had to be made as to which domain to include transportation infrastructure. Originally anything infrastructure related was put into the Infrastructure domain. This created a problem with data such as bicycle lanes which are clearly transportation related but could also be physical infrastructure (e.g. dedicated bike lanes), or simply a route promoted by the city.</td>
</tr>
<tr>
<td>Transportation</td>
<td>Data describing both the infrastructure and service aspects of transportation, both public and private. Recreational aspects of transportation such as hiking trails or park paths are not included in this domain.</td>
<td></td>
</tr>
<tr>
<td>Education and Social Services</td>
<td>Data concerning educational and social service facilities and programs. These include both public and private providers.</td>
<td></td>
</tr>
<tr>
<td>Information Management</td>
<td>Data related to other data or that helps to explain other data (metadata), data management tools, or the open data service itself.</td>
<td></td>
</tr>
</tbody>
</table>
but without any infrastructure component (e.g. “sharrows” or shared streets). Another example would be parking lots or bus shelters, which are hard infrastructure, but are also physical aspects of transportation services.

To avoid confusion it was decided to include any transportation related services or infrastructure in the Transportation domain. The exception is made for movement infrastructure that is not based on transportation, but more on physical leisure (e.g. walking paths, park cycling trails, etc.).

2. Datasets related to the built form of the city are in Planning and Development while datasets related to city or utility service structures/buildings are in Infrastructure. At first this may seem a strange distinction, but this is done to differentiate between building data related to things like waste management, water treatment, or other city infrastructure services, and the non-infrastructure related buildings. While a water treatment plant may be seen as part of planning and development data, it fits more strongly in understanding the physical and service infrastructure of the city.

3. Demographic data is included in the Planning and Development domain rather than being given its own separate domain. This choice is based on both a logical argument that demographic data is primarily in the domain of municipal planning (growth forecasting, etc.), and on the precedent set by the City of Mississauga’s planning information services unit, which includes a number of demographic datasets in its own data publications. It was also felt that adding an extra domain just for demographic data was unnecessarily narrow and did not fit with the other domain choices.
4. 311 data is in the Civic Administration and Services domain although arguably it could fit in Health and Public Safety or Infrastructure as well depending on the specific content of the data. To save confusion it is placed in this domain as it relates to city administration and service delivery more generally (usually 311 datasets are made up of service request data).

3.4.3.2 Type

Four types of data were chosen for this study: Geographic data, Statistical data, Service data, and Accountability data. The choices are based on the service-accountability-adaptability matrix developed by Yu & Robinson (2012). The goal of their conceptual evaluation model was to place government data into a matrix that differentiates between, on the one axis, adaptability and inertness, and, on the other axis, service and accountability.

The problem with this matrix is not the adaptability axis, which is mostly a function of format, but the service-accountability axis, as one of the authors admits (personal communication). In reality there exists no spectrum between service data (e.g. bus schedules) on the one hand and accountability data (e.g. councilor spending records) on the other. There are some types of data that could be considered both service and accountability data at the same time (e.g. an up-to-date contract bidding system), or do not fit either category depending on their definition (e.g. broad demographic data).

In order to preserve the valuable basic framework of this system while increasing its functionality, the spectrum concept has been replaced. In its place is a checklist of attributes that include the two original attributes, plus two others which arose from trying to apply the original dichotomous system to existing datasets. This allows for datasets which contain data that is not specifically service or accountability oriented and also allows for more complex datasets to
contain multiple attributes, removing part of the subjective problem of trying to decide which type best classifies the data included in the dataset.

Almost all datasets will contain geographic data, statistic/documentation data, or both. The purpose of separating the two is to identify how many datasets are linked to a physical location. Geographic data can often be the link between multiple datasets, tying different data to one spatial area or point. Datasets which do not contain geographic data will often be more abstract, higher level data such as budget data, bylaws, or public reports.

Table 3-7 provides a definition of each of the four types of data along with a description and details of how it is applied:

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
</table>
| Geographic               | Geo-spatial data. Data that provides mapping information such as location points, spatial areas or paths. | This category is relatively objective, as the format itself will usually dictate the category (.shp, .kml, etc.). This is not always the case, however, as geographic data is sometimes stored in spreadsheets as location data (e.g. lat-long coordinates or street addresses).

In order for a non-spatial dataset to be classified as containing geographic data, the dataset must contain geographic data at smaller scales than the city boundary. This is because we are primarily interested in data at the municipal scale or less (though exceptions may exist). An example of this would be Statscan data: data at the municipal level would not be considered geographic, while the same data disseminated at the neighbourhood level would be. |
| Statistics/Documentation | Factual data, whether quantitative or qualitative. | This class is not strictly statistical data in the sense of numbers and may include things such as prepared reports, qualitative survey information, indexes or annotations, etc.

It may contain information about services, but is primarily factual data provided for other purposes. Often geospatial datasets will contain Statistics/documentation data in addition to geographic data in the form of attributes. An example would be a geospatial dataset that maps the point location of all parking meters but |
also contains the hours and rates for each point as an attribute.

| Service | Data that actively provides a service in and of itself or improves an existing city service. | This is a difficult attribute to apply since almost any dataset can be argued to provide a service to a certain audience. To clarify this, data that is labeled as service data is that which acts as a primary output of the service itself and whose purpose is to improve the functioning of that service. For example, transit GPS data, which is released primarily to improve transit services for users. Another example would be schedules for events or activities. A rule of thumb used for classifying assets/program data (e.g., public library, recreation facilities, etc.) as service data is to ask whether the data provides hours of operation or other information which improves the user access to that service/asset. If so, then the dataset can be said to provide service data. |
| Accountability/Transparency | Data that illuminates the functioning of government, government services, or private services. | While primarily referring to municipal government, depending on the category in which this type is applied it may refer to different parties. For instance, within the Education and Social Services category, “Accountability/Transparency” may refer to non-municipal agencies such as provincial health providers or even non-profit sector social service providers. |

Table 3-7: Data Type Categories

3.4.3.3 Structure

There are two variables for this classification: how structured the dataset is and whether it is available in an open format. As open data is technically required to be offered in machine readable open formats; this is an important measurement of whether MODIs are meeting this requirement.

Datasets are given a numerical value based on their structure. When a dataset is available in multiple formats, the value given is based on the most structured format available. For instance, if a dataset provides both an XLS (Microsoft Excel) format and a KML (Google’s Keyhole Markup Language) format, the KML format will be used to evaluate the structure of the dataset since it is more highly structured. This structuring taxonomy is based directly on that of Vincey (2012).
<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unstructured Data (1)²⁵</td>
<td>Text, video, audio, or images which may be human readable, but are not readily machine readable.</td>
<td>DOC, TXT, PDF, JPEG</td>
</tr>
<tr>
<td>Semi-Structured Data (2)</td>
<td>Usually tabular data, machine readable, but may require some cleanup.</td>
<td>XLS, CSV, ODS</td>
</tr>
<tr>
<td>Structured Data (3)</td>
<td>Machine readable, ready-to-use data for applications development.</td>
<td>XML, JSON, RDF, SHP, KML, GTFS</td>
</tr>
<tr>
<td>Open Format (1/0)</td>
<td>Data is in an open, non-proprietary format.</td>
<td>PDF, KML, ODF, CSV, XML, TXT</td>
</tr>
</tbody>
</table>

Table 3-8: Data Structure Categories

3.4.3.4 Format

The format of each dataset is a descriptive classification which lists all of the formats in which the dataset is available. Whenever possible these have been checked for accuracy, as some catalogues indicate that datasets are in one set of formats, but in reality are not. The format is used to measure how data is being released and can clarify some of the ambiguity that will arise from the application of the “type” of data in each dataset. For instance, when analyzing a city’s data offerings, there may be a large number of datasets that offer geographic data, but without knowing the format, it is difficult to know whether the data is a geospatial dataset or another format which contains geographic data such as a spreadsheet with address listings. With regards to point locations such as addresses, the providing geographic data may not be the purpose of the dataset, but the location data becomes a common reference point for linking multiple datasets together.

²⁵ The number in brackets indicates the value used to label each type of structure in the database created for this research.
3.4.4 Content Analysis

The purpose of this data collection is to provide an inventory of what datasets currently exist in municipal open data catalogues within Canada. The goal is not to try to determine why some datasets appear in one place and not another, nor is it to try to find correlations between the presence of one type of dataset and other variables. While it may be possible to try to correlate the presence of certain types of data to variables such as city size, program age, or local demographics, the limited number of datasets and the vast number of idiosyncratic variables would risk turning the enterprise into a statistical fishing expedition (Liao, 2004). Instead, the interviews conducted with staff and data users in several cities are used to try to derive very broad, general patterns in how datasets are chosen and published.

The analysis of the data collected is conducted on a city by city, as well as an aggregated country-wide level. Each city’s catalogue is described according to the number of datasets in each of the 12 domains that fall into each of the described data type, structure, and format categories. As well, two additional subcategories are created during the analysis:

1. Geographic Only data & Statistic/Documentation Only data
2. Data Format

The first subcategory is created by examining which datasets contain geographic data but no statistic/documentation data, or vice versa. This provides an indication of the level of complexity of the geographic datasets (i.e. it only contains point locations or boundary polygons) and the presence of geographic data within non-geospatial datasets (useful for linking to physical locations and other datasets).

The second subcategory is developed by first examining each format that a dataset is available in and then describing what form the data is available in in more general terms (Table 3-
9). For instance if a dataset is available in KML, SHP, and CSV, then it would be said to be available in a geospatial format (KML and SHP) as well as a spreadsheet format (CSV). Since the file formats were collected already, this sorting takes little effort and provides an additional level of detail beyond the classification of formats into Structured, Semi-Structured, and Unstructured.

<table>
<thead>
<tr>
<th>Data Format Type</th>
<th>File Formats Included</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geospatial</td>
<td>KML, KMZ, DWG, SHP</td>
</tr>
<tr>
<td>Spreadsheet</td>
<td>CSV, XLS, XLSX, ODS</td>
</tr>
<tr>
<td>Document</td>
<td>PDF, ODF, RTF, DOC, DOCX</td>
</tr>
<tr>
<td>Image</td>
<td>MR SID, JPG, JPEG, GIF, LAS, TIFF</td>
</tr>
<tr>
<td>Transit</td>
<td>GTFS</td>
</tr>
<tr>
<td>XML/JSON</td>
<td>XML, JSON</td>
</tr>
<tr>
<td>RSS Feed(^{26})</td>
<td>RSS</td>
</tr>
<tr>
<td>API</td>
<td>API</td>
</tr>
</tbody>
</table>

Table 3-9: File Format Classification

This data is analyzed using simple comparison and statistical methods (average, mean, standard deviation) to examine broad patterns in the publishing of data in Canadian MODIs in section 4.2. The use of qualitative interviews are later used to help bring context to the findings of this analysis (section 4.4).

3.5 Limitations and Summary

3.5.1 Limitations

There are a number of limitations to this study that should be acknowledged. The first is the limited number of case studies and interview participants. Ideally this study should include case studies of all of the Canadian MODIs, and include many more participants. The differences between programs in the limited number of cities examined are large enough to assume that I

\(^{26}\)RSS feeds and APIs are technically not file formats but are included here as they provide data feeds as opposed to static data repositories that many users prefer.
missed out on some other interesting or unique programs. There were a number of individuals that I wanted to interview but I was unable to contact or arrange an interview. Fortunately I was able to speak with the vast majority of the individuals I wanted to speak with, but I feel that there are a few notable gaps from some cities.

I purposely chose not to involve people outside of staff working on ODIs and civic advocates. This certainly causes some biases in the results of my interviews because of the vested interest that many of these interviewees have in open data. This is partially why it was important to include a more quantitative side to the research. By examining what is actually being published in open data catalogues, I hope that I can ground the discussion in reality.

One of the biggest early challenges was to develop the catalogue content evaluation system. I had little empirical work to draw on and relied greatly upon trial and error as well as discussions with colleagues and individuals with much more experience than me in the open data realm. Some compromises had to be made in terms of the choice of categories and what was analyzed and what was ignored. Manually examining almost every dataset in every open data catalogue is a tedious and time consuming task. It requires a great deal of subjective choice as to whether or not to classify data into domains and types. In the end, the system is a working model that functions for the purposes of this study but may not be ideal for other work.

3.5.2 Summary

The exploratory nature of this study is best served with a mixed methods approach. The four methods used are: (1) a broad, multi-disciplinary literature review (both academic and grey literature); (2) participant observation; (3) a quantitative analysis of the subject matter under investigation; and (4) a series of semi-structured interviews with key informants from selected case study locations. The relative novelty of the topic to human and urban geographers means
that much of the background theory regarding the importance of the subject is to be found in the work of academics and practitioners in other fields of study. Participant observation at relevant events and in online discussion boards, mailing lists, and blogs provides additional context and knowledge about a rapidly evolving set of ideas and practices. The quantitative evaluation and qualitative interviews provide the empirical work of this study. The analysis of these interviews along with information from the prior two methods will contribute to the understanding of emerging urban policy programs in the context of their specific geographic and institutional locations.
Chapter 4

Findings

4.1 Introduction

The purpose of this Chapter is to present the results of the research conducted using the methods outlined in Chapter 3. To remind the reader, the main research questions that I seek to answer in this Chapter are as follows:

(1) What types of data are available on Canadian municipal open data catalogues?
(2) What are the reasons for starting MODIs in Canada?
(3) What role do citizens and local institutions have in MODIs?
(4) What are some of the major challenges being faced by Canadian MODIs?

The results are presented in three sections representing three different purposes. The first section (4.2) provides the results of the content evaluation of all of the municipal open data catalogues in the country. The purpose is to answer research question 1 and provide a better understanding to the reader of what constitutes open data at the municipal level in Canada. Section 4.3 is a descriptive overview of each of the ten case study programs outlined in 3.3.2. The purpose of this section is to provide qualitative context to the data found in section 4.2 as well as to start to answer the research questions in very specific case examples. In section 4.4 an exploratory examination is made of some of the broad trends and themes that emerged from the research. The purpose here is to abstract away from the individual case studies and attempt to answer the research questions on a larger, national scale. This section concludes by offering a
summary of the results from all of the sections and sets up the next chapter, which examines the implications and conclusions of the research.

4.2 Canadian Municipal Open Data Catalogues

The purpose of this section is to examine the actual publications of Canadian MODIs. It uses the content evaluation system developed in section 3.4 to analyze all of the datasets available in each of the 23 open data catalogues under investigation. The goal of examining the data is to determine what is available and where it falls in Yu and Robinson’s (2012) conceptual open government data matrix. A side benefit of this analysis is to create a benchmark database describing where Canadian MODIs are at developmentally at the time of this study to provide a basis for more longitudinal examination in the future.

The data in this section is current up to November 12, 2012. There have been additions made to several of the data catalogues since this time. These changes are noted in Appendix B where a more detailed description of each city’s catalogue is given.

4.2.1 Total Available Data

There is a wide variation in the total number of datasets available on Canadian municipal open data catalogues ranging from a single dataset (Hamilton, ON) to 182 (District of North Vancouver, BC) (see Figure 4-1). The average and median numbers of datasets available are 51 and 33 respectively. Of the 23 catalogues available, a total of 8 have higher than average numbers of datasets, with 15 coming in below average. The total number of datasets available on municipal open data catalogues across the country 117727.

\footnote{Note that this number does not count double entries of datasets found on a few open data catalogues. It also only lists GTFS datasets as a single dataset rather than the package of up to 8 individual datasets. As well, it does not include Mississauga’s additional 242 PDF documents.}
4.2.2 Data Categories

4.2.2.1 Domains

The majority of data available nation-wide (71.1%) falls into four domains: Planning and Development\(^{28}\) (24.3%); Infrastructure (18.1%); Sport, Leisure, and Culture (17.1%); and Transportation (11.6%) (See Figure 4-2). The remaining datasets are split relatively evenly (2.0% - 6.5%) between the other 8 domains.

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\(^{28}\) Note that this number does not include the additional 242 planning and development datasets from the City of Mississauga which were not included. See Appendix B for explanation.
Across cities, the four main domains remain the largest by far, though their rankings are slightly different. The individual cities have a great deal of variation in what domains their data falls into, as can be seen in the large standard deviations in these four major domains (Figure 4-3).
Some cities have a wide spread of datasets that encompass many domains such as Toronto, while others are much more concentrated on one or two domains such as Langely, BC, or Mississauga, ON (Figure 4-4). For a complete list of these breakdowns for each city, see Appendix B.
Figure 4-4: Example of Variation in Data Distributions for Three Cities

Most cities are not providing very many datasets outside of the four major domains (Figure 4-5). The median numbers show that the majority of cities are not providing any Finance; Civic Administration and Services; Legislative and Licensing; or Educational and Social Services data. The averages provide only slightly more optimistic numbers, but these are still small and easily skewed by a few cities offering relatively high numbers of datasets in these domains.
4.2.2.2 Types

As seen in Figure 4-6, the vast majority of datasets available in Canadian municipal open data catalogues contains some form of geographic data (84.0%). Nearly half of the available datasets (47.2%) contain only geographic information, either as point locations or spatial boundaries, but without any additional data. Forty two point eight percent (42.8%) of datasets contain some form of statistical or textual information and only 14.3% contain only statistical or textual information. Of the datasets available, 11.9% contain service related data, and 8.7% contain transparency/accountability data.
Service data is found primarily in the Sport, Leisure, and Culture; and in the Transportation domains (36.2% and 22.3% respectively). This is unsurprising, as many cities publish data about local events and services such as park hours and amenities, transit schedules and parking information. The infrastructure domain is relatively well populated with service data (10.7%), mostly due to the common practice of publishing garbage collection zones and schedules. Education and Social Services also contain a number of service datasets (13 total, or 8.6% of all service data) which mostly provide information about library services. Interestingly, Civic Administration and Services contains a small but important number of the service datasets (7.6%) which is made up of datasets that provide information on things like council voting and attendance (e.g. Edmonton) and city contract bid opportunities (e.g. Nanaimo).

Three domains contain almost all (73.5%) of the 102 Transparency/Accountability datasets available (Table 4-1). These are Finance (35.3%), Civic Administration and Services (24.5%), and Health and Public Safety (13.7%). The majority of these datasets in the Finance domain are city budgets in one form or another. Of the datasets in the Civic Administration and

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29 Note that because each dataset may contain multiple types of data, the numbers in this table do not add up to 100%
Services domain, 311 statistics are common as well as information about City Council such as voting records and expenditures. Health and Public Safety contains a number of accountability datasets about health inspections and water quality reports.

<table>
<thead>
<tr>
<th>Domain</th>
<th>Geographic</th>
<th>Statistic/Document</th>
<th>Service</th>
<th>Transparency/Accountability</th>
</tr>
</thead>
<tbody>
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<td>Environment/Geography</td>
<td>72</td>
<td>15</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Infrastructure - Physical and Service</td>
<td>209</td>
<td>37</td>
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<td>3</td>
</tr>
<tr>
<td>Elections</td>
<td>34</td>
<td>21</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Legislation and Licensing Services</td>
<td>27</td>
<td>14</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Civic Administration and Services</td>
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<td>41</td>
<td>11</td>
<td>25</td>
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<td>36</td>
</tr>
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<td>14</td>
</tr>
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<td>1</td>
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<td>3</td>
</tr>
<tr>
<td>Transportation</td>
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<td>47</td>
<td>32</td>
<td>7</td>
</tr>
<tr>
<td>Education and Social Services</td>
<td>37</td>
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<td>13</td>
<td>3</td>
</tr>
<tr>
<td>Information Management</td>
<td>7</td>
<td>16</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Total:</td>
<td>989</td>
<td>504</td>
<td>140</td>
<td>102</td>
</tr>
</tbody>
</table>

Table 4-1: Datasets Available Nationwide by Domain and Type

Looking across cities, the average number of datasets available which contain service or accountability data is very low (6.1 and 4.4 respectively). These numbers themselves are highly skewed by a few cities which contain the vast majority of each type of data (Table 4-2). Only 7 cities are above average in terms of the number of service datasets available and only 6 are above average in terms of Transparency/Accountability data. The median numbers give a better indication of the real availability of these types of data: 3 datasets that contain service data and 1 dataset that contains transparency/accountability data (Table 4-2).
London and Toronto stand out for providing a relatively large number of transparency/accountability datasets (28 and 29 respectively). When examined in more detail the differences between them are clear. London’s numbers result from publishing 22 different simple budget spreadsheets and 6 water sample quality reports covering several years. Toronto’s accountability data is much more varied, covering several different domains and including data about child care facilities, 311 service requests, the lobbyist registry, and transit ridership and revenue statistics.

<table>
<thead>
<tr>
<th>City / Type</th>
<th>Total # of Sets</th>
<th>Geographic</th>
<th>Statistic/Document</th>
<th>Service</th>
<th>Transparency/Accountability</th>
</tr>
</thead>
<tbody>
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<td>3</td>
<td>0</td>
<td>0</td>
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</tr>
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<tr>
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<td>32</td>
<td>3</td>
<td>28</td>
</tr>
<tr>
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<td>9</td>
<td>3</td>
<td>0</td>
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<td>1</td>
</tr>
<tr>
<td>Montreal, QC</td>
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<td>20</td>
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<td>5</td>
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<td>11</td>
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<td>61</td>
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</tr>
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</tr>
<tr>
<td>Median:</td>
<td>33</td>
<td>26</td>
<td>9</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Average:</td>
<td>51.2</td>
<td>43.0</td>
<td>21.9</td>
<td>6.1</td>
<td>4.4</td>
</tr>
</tbody>
</table>

Table 4-2: Dataset Types per City
4.2.2.3 Structures and Formats

The majority (75%) of datasets available on Canadian municipal open data catalogues are available in structured, non-proprietary, open formats. Only 3.1% of datasets are in unstructured formats such as PDFs and the majority of those (20 of 36) can be found in Mississauga’s open data catalogue, a conscious choice explained later in section 4.3.7. 84.3% of all datasets are available in a structured, machine readable format and 12.7% are available only in semi-structured formats like spreadsheets that may require manual cleanup before being useable (Table 4-3). 82.8% of the datasets are available in at least one open, non-proprietary format. The remaining 17.2% are only available in closed, proprietary formats, the majority of which are Microsoft Excel files (.xls) and ESRI ArcGIS files (.shp).

<table>
<thead>
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<th>Structure</th>
<th>Total</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Unstructured</td>
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<td>36</td>
<td>0</td>
</tr>
<tr>
<td>Semi-Structured</td>
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<td>54</td>
<td>95</td>
</tr>
<tr>
<td>Structured</td>
<td>992</td>
<td>885</td>
<td>107</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>1177</td>
<td>975</td>
<td>202</td>
</tr>
</tbody>
</table>

Table 4-3: Dataset Structure - Nationwide

Note that the City of Edmonton uses the Socrata open data platform which provides all of the datasets through an API as well as in multiple formats. Since Edmonton publishes a large number of datasets relative to other Canadian cities, its influence can radically change the results of the analysis. For this reason, the analysis of available formats will be presented both with and without Edmonton’s data. Numbers that include Edmonton’s data will be marked with “IE”. For example (50%, 65%IE) means that the value is 50% without Edmonton but 65% with Edmonton’s data.

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30 Two other cities, Regina and Medicine Hat, use a similar system, Microsoft’s OGDI. Their data is available in a number of formats as well, though not as many formats as Edmonton, and they do not include document files and RSS feeds which are rarely seen.
Most of the data provided in Canadian municipal open data sites is available in geospatial formats (63.4%, 63%IE) (Table 4-3 and Fig 4-7). Spreadsheet formats are the next most commonly available (24.0%, 37.1%IE). The remainder of format types are minor with the exception of XML/JSON formats (9.0%, 22.2%IE).
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
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<td>5</td>
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<td>Infrastructure - Physical and Service</td>
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<td>7</td>
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<td>0</td>
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</tr>
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<td>Transportation</td>
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<td>5</td>
<td>4</td>
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<td>11</td>
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<td>7</td>
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</tr>
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<td>0</td>
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<td>1</td>
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<td>0</td>
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</tr>
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<td>1.2</td>
<td>0.4</td>
<td>4.8</td>
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<td>7.9</td>
<td>0.3</td>
<td>11.3</td>
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</tr>
</tbody>
</table>
| Percent of Total                  | 63.0%      | 24.0%       | 3.3%          | 0.3% | 2.3% | 0.7%   | 9.0%     | 3.0%| 63.4%      | 37.1%        | 16.5%           | 0.3% | 15.5%| 0.7%  | 22.2%     | 16.1%

Table 4-4: Data Formats Available per Domain - Nationwide
Many cities do not provide data in any format other than geospatial files and spreadsheets (Table 4-4); with the exception of XML/JSON files the median number of datasets available in formats other than geospatial or spreadsheets is zero (Table 4-3 and Figure 4-7). Mississauga offers a number of PDF documents (24) and Montreal provides a number of written documents (11) such as a report on the city’s open data program. These are the only two cities that offer any sizable amount of textual data. Four cities make their GTFS transit data available on their open data catalogues and two cities offer regular RSS feeds of data. Three cities provide an API for

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31 Guelph has RSS feeds listed on their site, but they are not updated and are simply containers for XML files.
accessing all of their data (Regina, Medicine Hat, and Edmonton), and two other cities provide an API for accessing a couple of individual datasets (Ottawa\textsuperscript{32} and Nanaimo).

<table>
<thead>
<tr>
<th>City / Formats</th>
<th>Geospatial format</th>
<th>Spreadsheet</th>
<th>Text File / Document</th>
<th>GTFS</th>
<th>RSS Feed</th>
<th>Photo</th>
<th>XML / JSON</th>
<th>API</th>
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</thead>
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Table 4-5: Data Formats Available per City

\textsuperscript{32} Note that since this data was collected, Ottawa has moved to a new platform for their data catalogue that provides API access to all of their datasets.
4.2.2.4 Data Portals

Most of the catalogues are hosted as basic HTML pages with links to the data files for download. There are a couple of other systems in place as well. Edmonton uses the Socrata platform which provides an API interface with online mapping and other visualization options. Regina and Medicine Hat use Microsoft’s OGDI platform that is similar to Socrata. Ottawa is now using CKAN, an open source platform for hosting data that also provides an API as well as some tagging and search functions but lacks the visualization tools of OGDI and Socrata.

Several cities have built customized web portals that provide more functionality than a simple data repository. The District of North Vancouver’s website has many additional functions, detailed and useful metadata, and provides a sleek, easy to use interface. The city of Vancouver uses direct links to Google and Bing maps for its KML files so that users can see the geospatial data directly on their web browser along with its attendant attribute data. For example, the city provides parking meter locations in a KML format which when examined in Google or Bing Maps shows not only the locations, but the usage cost in the different areas. This takes advantage of existing, free functionality (Google and Bing Maps APIs) to increase the usability of the city’s data for everyday use.

4.2.3 Summary

This evaluation shows that there is a large variation in the size and content of each of the available municipal open data catalogues in Canada. The majority of the programs provide only a few dozen datasets, most of which consist of simple geospatial data. A few cities are further ahead in terms of the number and detail of data provided. Predictably, these tend to be the cities that have had their ODIs in place for longer periods, although this is not always the case (for example Nanaimo and London). It is worth noting as well that quantity of data provided is not a
good indicator of a successful and useful program. The quality and usefulness of datasets is quite subjective and difficult to measure, and as such the numbers here should be taken as an indicator of progress and not necessarily quality. In terms of providing data that might be seen to provide transparency into government functions or accountability for programs and services, none of the cities are very active. Many catalogues provide budget data and civic election results, which are a positive first step, but few have gone beyond this. There are a few places that are performing better than others though. Edmonton’s publication of city council voting and attendance records along with meeting agendas is one of the standout examples of genuinely valuable transparency data. Toronto also publishes some unique transparency datasets such as the city’s lobbyist registry. They also provide a number of accountability datasets that can allow users to track service statistics such as child care facility wait times and food inspection details.

Many more cities are publishing a few basic service datasets. Most common are transit and waste collection information provided so that application-developers can work with them. Garbage collection schedules and zone boundary files, transit GTFS files, location and hours of operation for city services such as parks and libraries are all quite common. A few cities publish regular data feeds (usually in RSS feeds) that provide information about specific topics of interest such as fire emergency incidents and upcoming city events and meetings.

These programs are still in their infancy. During the research for this study, many of the catalogues have grown steadily. Every time I return to most catalogues, new and interesting datasets are available. The information in this section is a snapshot of the catalogues as of early November, 2012 and for many of the programs it is already greatly out of date as of the time of writing (March/April, 2013). By now several additional Canadian cities have begun to start their
own ODIs. The basic comparison between programs is still illustrative of how different cities are approaching their programs, and what types of data are being published around the country.

4.3 Case Study City Overviews

4.3.1 Introduction

At the time of this writing, I have not been able to find any detailed descriptions of municipal open data initiatives in Canadian cities. The purpose of this section is to provide a series of short descriptive summaries of each of the programs in the case studies chosen for this research. These summaries are meant to illustrate the similarities and differences between Canadian MODIs and provide the reader with a better understanding of how the programs were developed and are now being operated. Broader themes that are not raised here will be taken up in the next section (4.4).

Each overview begins with a set of basic information about each program along with a summary table of what data is available on their open data catalogue. Next a description of the origin and development of each program is provided with highlights of interesting aspects of the individual case studies.

The information was gathered primarily through the participant interviews, but also through systematically examining each of the open data portals and related websites/documents. The information in these summaries is as accurate as was manageable, but due to the lack of public information and the limitations of what each participant knew about affairs outside of their areas of expertise, there will inevitably be some small errors.
4.3.2 Toronto, Ontario

**Population:** 2,615,060 (2011)

**Date of Incorporation:** 1834

**Open Data Portal:** www.toronto.ca/open

**ODI Start Date:** November 2009

**ODI Started By:** Mayoral directive, run out of IT and Geospatial Competency Centre

**Budget:** No dedicated budget

**Staff:** Part time work for existing staff

**Formal Policy:** Open Data Policy

**License:** Custom License (version 2.0)

**Local Organized Open Data Advocacy Group:** No official organized groups

**Notes:** Website contains links to Google Groups discussion board, city-run open data blog, social media, etc. Toronto also has a related program called WellBeing Toronto operated out of the Social Policy Analysis and Research unit that shares some data with the open data catalogue.

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**Development and Operation**

The open data initiative at the city of Toronto started in November of 2009, after former mayor David Miller began pushing for a program in September of that year. It was taken on by staff in the Web Competency Centre and Geospatial Competency Centre without any added budget, staff, or specific policy direction. The focus was purely on providing open data, presumably for applications development.

A few months later, open data came to be understood in the context of the larger goal of open government at the city, and staff realized that the open data initiative had to be better organized. A draft of the city’s open data policy was written in September, 2010 and after about a year of processing, the City Manager approved the policy in November 2011. Along with the open data policy—which lays out the responsibilities with regards to data management and sharing, the city officially created the Open Government Committee (OGC) in January of 2012—though those involved had been engaged with the creation of the open data policy prior to this date.

The OGC consists of 12 to 15 key representatives from different divisions in the city who are at a high level, (1) to influence divisional operations, project, and initiatives to adopt open government policies, tools, and techniques; (2) to coordinate open government objectives with other corporate committees so that open government objectives permeate different divisional goals and objectives; and (3) to recommend changes in city policy regarding access to information and data management. Early on, the OGC was focused primarily on the open data initiative, but the program has expanded over time to include the creation of a new record retention policy. The program also reviews FOI and other legislation that affects data management and distribution at an organization-wide level.
The combination of the OGC and the city’s open data policy has been invaluable for the expansion of the open data initiative. Due to the size of the city’s government (which includes 44 separate divisions), it is very difficult for the staff that run the day to day operations of the ODI to access the key members of each division. “Oh trust me”, one city employee explains (Nov, 2012), “if [the OGC] did not exist I would still be doing dog and pony shows to get a policy created … [they] get us around dealing with every division head.” While the open data policy technically provides only recommendations, it is valuable for reminding different divisions of their responsibilities toward open data.

Output

The data available on the city’s open data portal is quite varied and is constantly expanding. In terms of sheer numbers, Toronto’s open data portal contains more accountability/transparency datasets than any other city surveyed. It also contains the second most service datasets. The available datasets cover a wide range of domains and include a number of city permit datasets, lobbyist information, transit revenue statistics, and more. City staff explained that the City Clerk’s Office is very supportive of open data. It is also relatively easy to get access to financial data and other non-politically neutral datasets from the open data catalogue.

One unusual aspect of Toronto’s catalogue is the large number of datasets published in non-open formats. The majority of this comes from publishing spreadsheet data in Excel format and geospatial data in ESRI’s SHP format. The City of Toronto states the lack of resources to convert the datasets as the reason why these datasets are not in open format. Rather than not

33 Though arguably it has the greatest number of unique and functioning service datasets since Edmonton’s numbers are inflated by the multiple of out of date Fringe Festival datasets.
publishing the data, the intent is to publish what is available rather than waiting until all of the data can be altered to fit an ideal set of formats.

**Community/Institutional Involvement**

Unique amongst the cases examined in this study is the connection between the city’s open data program and local educational institutions such as the University of Toronto, Ryerson University, and York University. Unlike in the other cities examined, there are much closer ties between the City of Toronto and academic players. Members of the universities take part in local open data events, use the city’s data, and have even offered to do some of the cleanup and reformatting work for the city’s datasets. Unfortunately this has not been taken advantage of as of yet due to logistical and legal concerns (e.g. moving data out of City Hall, quality assurance, and insurance issues with bringing students to work at City Hall).

The connection with the public data users and advocates is also fairly strong, but I could find no unified open data advocacy group within the City of Toronto similar in kind to those found in Montreal, Hamilton, Ottawa, or Regina. Like Edmonton, the City of Toronto does take part in publically run events, and has begun to host their own events to try to build more public engagement. Along with this, Toronto also maintains a strong online social media presence with regards to open data. Staff members maintain a blog\(^34\), a very active Twitter feed\(^35\), and engage with users on a Google Groups website dedicated to Toronto’s open data\(^36\).

\(^{34}\) [http://webrebrand.blogspot.ca/](http://webrebrand.blogspot.ca/) (recently put on hold)

\(^{35}\) [@open_TO](https://twitter.com/open_TO)

\(^{36}\) [https://groups.google.com/forum/?fromgroups=#!forum/datato](https://groups.google.com/forum/?fromgroups=#!forum/datato)
Wellbeing Toronto

Along with the open data portal, the Social Planning and Research Council has been running a separate project called Wellbeing Toronto\(^\text{37}\) which is a web-based application that allows users to map a large number of data onto the City of Toronto in a variety of ways (see Figure 4-8). Wellbeing Toronto (WBT) was initially developed as an internal planning tool, but after realizing the value that it could present to individuals and organizations as an analytic and illustrative tool, the City made the program publically accessible. Wellbeing Toronto is meant to be a complementary site to the open data programs. WBT uses a different aspect of government data provision, focusing on providing data in a user-defined context instead of in its raw form.

Figure 4-8: Wellbeing Toronto (showing weighted violent crimes per neighbourhood and location of drop-in centres)

WBT has individual agreements with many organizations to present their data publically. The most prominent is Statistics Canada, which has agreed to allow the city to publish their data

\(^{37}\) http://map.toronto.ca/wellbeing
for free. Other external sources include the local health integration networks and the Toronto District School Boards. They also have agreements with non-profits such as the YMCA who provide some data for the application. City staff are working to gather other collaborators like this in the future. One area that the program has had problems with is in the acquisition of academic and private data. For example, while the Toronto Real Estate Board (TREB) was critical of the superficial level of real estate data made available in WBT, yet the Real Estate Board nevertheless has refused to provide the data themselves, highlighting a potentially interesting issue around data use and the lack of a reciprocal relationship between users and providers.

Some of the data used in WBT is found in the City of Toronto’s open data catalogue, and some of the processed data is available for download in the form of PDF maps and analysis. The majority of the data however, exists only for WBT and is not available for download in its raw format. There are attempts to merge the two databases, but there are several challenges to accomplishing this. The primary issue is the nature of the data provided to WBT, which does not necessarily meet the requirements for data management that the ODI requires. Where the data provided on the open data catalogue is created and administered by data stewards within the city, the data on WBT may have been created by 3rd and 4th parties. It may have only been provided as a one-time offering and is not being updated, or it may have incomplete or unreliable metadata.

**Future Developments and Challenges**

Along with the open data catalogue and WBT, the city of Toronto is actively pursuing several other avenues for delivering data to its citizens. I have been told that city staff are aware of Regina’s open information portal (see Section 4.3.8) and are interested in starting a similar program for sharing human-readable documents with attendant metadata. For now the city
publishes a large number of useful statistics in a PDF document format on its Progress Portal38 (see Figure 4-9). The open data catalogue itself is being updated quite often with many new datasets, and WBT has just been updated to its second version which offers users more tools for customizing their data analysis. As well, the city is developing its second version of its open data policy and intends to open it up for more external input throughout the process.

![Image](http://www.toronto.ca/progress/)

**Figure 4-9: Example from Toronto’s Progress Report Dashboard Q4, 2012 (City of Toronto, 2013)**

The major challenge for those working on open data in Toronto is the lack of resources and the size of the government structure. Lack of resources entails technical resources, funding, and especially staffing. The ODI has been described to me as an ‘off-the-corner-of-the-desk program’ that passionate staff work on but cannot devote their full time to it. The second challenge of having a large and complex government bureaucracy is partially mitigated by the OGC, though convincing departments to take on extra work to create and maintain open data outputs is always challenging. Some staff members did indicate that there are still cultural issues to deal with when it comes to the attitudes of some individuals toward giving up ‘their’ data.

38 [http://www.toronto.ca/progress/](http://www.toronto.ca/progress/)
This is a common problem and one that will not disappear overnight. The fact that the program continues to run and continues to expand in the face of these challenges shows the strong commitment that many individuals involved have to the program. Their commitment is also encouraging for the future sustainability of Toronto’s open data and open government initiatives.

4.3.3 Edmonton, Alberta

**Population**: 812,201 (2011)
**Date of Incorporation**: 1904
**Open Data Portal**: data.edmonton.ca
**ODI Start Date**: January 2010
**ODI Started By**: CIO directive, run out of IT department
**Budget**: Project funding
**Staff**: Two full time, one part time
**Formal Policy**: None (under development)
**License**: Adapted Vancouver License

**Local Organized Open Data Advocacy Group**: None

**Notes**: Uses Socrata platform. Website also provides a dashboard that is under development.

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Structured 155 155 0
Total: 155 155 0

Development

The City of Edmonton launched their open data initiative in January 2010. Prior to the launch of the OD catalogue the City began publishing their public transit data in the GTFS format in May 2009 which spurred the creation of the first application(s) built around city data. Some public pressure to expand OD was later generated by citizens who had been involved in the local Change Camp in October 2009. In November of 2009, the City’s IT branch hosted an open data workshop to gather community input on the creation of an open data catalogue. The event was attended by over 45 people and again showed that there was substantial community interest in municipal open data. Edmonton’s CIO, Chris Moore took on the project after the initial consultation and developed internally within IT. The program currently has a dedicated staff of two fulltime, and one part time persons, as well as several others who do occasional related work.

The portal was initially run on Microsoft’s OGDI platform, but was switched over to Socrata about a year later in July 2011. At the time of this study, Edmonton is the only municipality in Canada that has adopted this popular U.S.-based government open data platform. The choice to switch was based on two main factors. First, Socrata reduces the amount of internal work for IT staff since all of the software is maintained externally by a professional company. Datasets are simply exported to the company and there is no need for internal development or maintenance. “Our business is putting datasets up, that’s our reason to exist,” says one employee of the city, “we’re not there to program and develop a repository”. Second,
the software provides an API as well as online visualization and mapping features that create a functional website for both developers and less technical users.

**Output**

The focus of the City’s ODI is to provide valuable information to help inform discussion and decision-making. While the number of datasets provided is relatively large in comparison to other Canadian cities, a staff member told me that “it’s more quality I want to push for. It’s not quantity. If you look at other places, they’ve played the numbers game. I can play the numbers game too. I would rather have good stuff.” This makes some sense when examining the number of datasets more closely, as many are different facets of one larger dataset but provided in a smaller, more focused way. For example there are 60 datasets which are all different demographic statistics for the city. Yet still there are some datasets that are seen by both staff and users as questionable, such as the 24 Fringe Festival datasets which are very short lived and of limited usefulness (these make up the majority of the “service” datasets seen in the City’s catalogue). The City of Edmonton does have one very interesting and unique set of five datasets that provide machine-readable collections of City Council information. Councilor voting records, meeting details, and other datasets are available and cross-referenceable.\(^{39}\)

Edmonton itself has begun to leverage the data through their citizen dashboard (Fig 4-10), which is still in its initial stages of development. The dashboard provides a simple visual indicator of performance metrics related to city services and statistics such as traffic injury rates, transit ridership, and number of potholes filled to date. It was only started in mid-2012 and still

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\(^{39}\) Interestingly, while doing my initial examination of the City’s data, I found that some of these datasets were not functioning correctly. Several months later they were still not working. I spoke with someone at the City who works on the open data catalogue and brought this up; they were unaware of the problem and it has since been fixed. This does highlight the fact that this data seems to be unused since nobody had contacted the City prior to me pointing out the problem.
contains only information related to the City’s transportation master plan, but it is planned to include information related to environment, finances, economic statistics, and more.

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**Figure 4-10: City of Edmonton's Dashboard**

Community Engagement

Reception to the program internally and externally has been generally positive or indifferent. The main complaint I found was that there has been a noticeable lack of engagement recently with the community. Edmonton does not have an organized civic open data advocacy group, which may make forming direct ties between the City and the technology community difficult. “Any kind of group we have for open data is kind of ad hoc” says Mack Male, a local developer and open data advocate, “there’s a few folks … I really try to reach out to, but we don’t

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40 https://data.edmonton.ca/dashboard
have an open data meet up. We see each other at other tech events. We have a pretty vibrant tech community in Edmonton, but no open data specific group”. He feels that the community was closer to having an organized presence earlier on in the program’s history but that while they had some good traction to start with, the activity died out. Open data users have noted that it is difficult to engage directly with the data providers, mentioning that they have put in suggestions and requests through the open data portal’s feedback channels but have either heard nothing in response, or the response came so late that they had moved on to other things. There has not been any strong attempts to build this community from the City’s side either. A staff member at the City explains: “we do occasionally get emails asking about things, making comments, but they’re very far between. We’d be lucky to get anything once a week”. “We don’t go looking [for partnerships]. We take suggestions, but we don’t have any tie-ins with the community or organizations.”

In direct opposition to this, the CIO, Chris Moore and his Strategic Coordinator, Ashley Casovan are recognized nationally as outgoing spokespersons for the City’s open data program and open data across the country. Both can be reached easily through Twitter and regularly engage with members of the larger open data community, and can sometimes solve day-to-day problems around the City’s open data program. Generally, however, they operate at a higher level and are unable to work directly with the data catalogue and individual users. Matt Dance, a researcher and open data advocate in Edmonton explains,

*Chris [Moore] is ambitious. He really has a good vision for where the portal should go and what open data could do for the City. But they’re two people, Chris and Ashley [Casovan], fighting on many fronts. I think that there’s a huge culture that they’re trying to overcome within the City. And they’re still trying to keep up with the conversations with citizens and developers and people like me, researchers who are also interested in the data.*
He notes that while he can get a response from Chris, and have a high level conversation about
the direction of open data, when trying to deal with the minutia of a specific dataset, it is not the
best system and that the open data site itself is not a very good medium for dialogue with the data
owners.

While the program began and has been funded as a project out of the CIO fund, there is a
growing interest in moving open data out of IT and making it a corporate level program in order
to try to raise awareness of open government and open data within the corporation. Mack Male
points out that,

"we’ve now got three years of examples to say that it’s not really working. The IT folks
have banged their heads against getting the Business Units to do something with data
internally and I think it would be a lot easier if there was a directive that said ‘open data
is important to the City of Edmonton. When we’re making data available we need to
make it available in both human and machine readable format."

There is an open data roadmap posted on the City’s website41 that shows the creation of an open
government policy which was to be completed by mid-2012. However speaking to an employee
involved in the program as well as involved community members, the state of this policy is
unknown. The website says that a draft is complete but it is not available for public examination.

4.3.4 Ottawa, Ontario

Date of Incorporation: 1855
Open Data Portal: http://data.ottawa.ca/
ODI Start Date: June 2010

41 https://docs.google.com/file/d/0B4uvfFiCVS1iOGNjnZnl2OGYtZmFjNy00YTI4LTk3ZWItYTliZGFiM2E0ZjE0/edit?pli=1&hl=en_US#
**ODI Started By**: IT department

**Budget**: Capital funding for full time support position plus one time infrastructure and contest funding.

**Staff**: One full time position. Temporary staff hired for projects.

**Formal Policy**: Open Data Policy

**License**: Adapted Vancouver License

**Local Organized Open Data Advocacy Group**: Open Data Ottawa

**Notes**: The data portal moved to a new host between the time of data gathering and writing. The portal is now hosted on a CKAN platform that provides API access to all datasets. The site also contains a showcase of applications developed with City data.

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**Development**

[42](http://ottawa.ca/calendar/ottawa/citycouncil/occ/2010/05-12/csedc/08-ACS2010-COS-ITS-0005-Open%20data%20(2))
The impetus for Ottawa’s open data initiative came from a report issued by the Mayor of Ottawa’s Taskforce on Egovernment (City of Ottawa, 2008) which contained a section that highlighted a local blogger who had been looking for outdoor skating rinks on the City’s website but could only find a long list of addresses in text format. He took these addresses and created a Google map of the locations of all of the skating rinks and requested that the City make some of its data available in an open format to make further projects like this easier. The taskforce suggested that staff look into the City’s data dissemination policy to determine if this would be feasible.

Also at this time a group of friends/developers were meeting together regularly in bars to try to learn how to use a programming language called Ruby. Members of the group had recently been to an event called Ignite Ottawa and became interested in open data as a way that they might improve their City. Two of them, Edward Ocampo-Gooding and Daniel Beauchamp, along with Mary Beth Baker, a government librarian, formed an advocacy group called Open Data Ottawa (ODO) to create public pressure for the City to begin an open data program. Initially Edward went to one of the IT subcommittee meetings where open data was being discussed due to the initial taskforce report. He explained that he was a developer interested in the City’s data and asked that they go forward with the program. In April 2010, ODO got permission from the City to host a hackathon at City Hall. This was prior to the opening of the City’s catalogue, so participants began by scraping data from the City’s website. There was a large turnout of citizens, both tech-savvy and otherwise, as well as City staff, including the CIO at the time Guy Michaud. “It seemed like it was going to be really hard and we’d have to fight for the data, but actually the City was pretty willing all along. There was never really a fight.” Mary Beth Baker
notes. In June 2010, shortly after the show of public support the City launched its open data catalogue officially.

The City held a successful app contest at the end of 2010 that included prizes not only for actual applications, but also for application ideas as a way to include people outside of the developer community. The contest legitimized the assumptions that proponents of open data in the City had that people would actually utilize the data to make applications. It also generated interest among the City and province’s software developers who were the principal audience for the program at the time. The second iteration of the apps contest (Apps4Ottawa) is scheduled to run between February and June 2013, and will be expanded to include entries from across the country rather than just Ontario.

Community Engagement

Ottawa and ODO have had a good relationship since before the launch of the ODI. The group acts as a cheerleader for open data and as a liaison between data users and the City itself. They can help put people in touch with who they need to talk to in order to get the data that they need. The City’s open data lead, Rob Giggey is involved in community events and is praised by members of ODO for his work both as a valuable contact at the City but also for his promotion of open data internally. “He’s super friendly,” explains a member of ODO, “[he’s] easy to talk to, and he has all these cool projects going on and he tweets about the projects. It’s super collaborative.”

ODO is responsible for a large portion of the community involvement through organizing events such as hackathons. This has led to some fragility though, as the City has perhaps come to rely upon the group too much. One member suggests that relying on them to take months of time
to set up an event without any compensation is not something that is sustainable. They lament the fact that,

*[the City’s] not aggressive enough about running events. This is all still citizen done; we’re doing this on our own dime. ... I went into this thinking ‘oh, I’ll get the ball rolling and the City will pick this up’. But that hasn’t really happened. I get that they’re tied up with their own stuff, but I really wish this was just run by the City.*

This is coupled with the fact that ODO does not have any obvious replacement if the members moved on – “if we got wiped out, if we got hit by a bus then it’d be done”.

**Output**

Ottawa’s open data catalogue contains a wide variety of datasets with the majority focused on local social and cultural programs. These include details about local child care facilities, public library locations and hours, and even the location of pharmacies where needles and other bio hazardous materials can be deposited. The City also produces a number of budget spreadsheets and other accountability data such as water quality reports and 311 and bicycle lane usage statistics. Most data is available in open formats, though many of the spreadsheets are only available in Microsoft Excel formats.

There was some trouble early on in acquiring what is arguably the City’s most important and most used data: OCTransportation’s real-time bus GPS feed. Early on OCT agreed to release the GPS data as a pilot project and allowed users to sign up and get access to the data through an API. The people’s choice winner of the City’s first apps contest actually used this data to create a transit application called Where’s My Bus. Shortly after, OCT stopped giving out the data and decided that instead they would build their own application in hopes of generating revenue, but also out of fear of the response of the public to 3rd party applications which could be abandoned or malfunction and be seen to be the responsibility of OCT. ODO began a media campaign to
pressure for the re-release of the data. Eventually OCT did release the data again and developers began creating tools with it immediately. ODO brought together people from the City, OCT, and developers for a transit data day event to discuss the future of open data and GPS data. The event was a successful, positive meeting where interested parties showed what they could do with transportation data in general, including using it for transit planning research. OCT has since come to embrace open data as a service enhancement tool and have given up trying to develop their own in-house transit applications, but instead link to the 3rd party applications that they were originally concerned about.

The ODI in Ottawa continues to evolve relatively quickly. “I’m really impressed at how fast people have moved on this stuff”, one OD advocate told me, “My personal experience is that it takes time to do things in government, and that’s OK.” Giggey explains that the program has been seen as a success in multiple departments including the Survey and Mapping group, who have found the provision of much of their commonly requested datasets through the self-serve portal has increased their efficiency. He does lament that there has not been as much interaction with special interest groups, researchers, non-profit associations, and individuals.

They have a role in letting us know what we should be releasing. I don’t want to just hear from the developers what data they want so they can make apps, I want to know from researchers and community associations what data they want that helps them... we have a job to help educate non-technical people what this program can mean to them.(R. Giggey, Oct. 2012).

He hopes that the move to the next version of the data catalogue to CKAN (an open source data sharing platform) will improve the rate of dataset publishing and will be able to attract the interest of this secondary audience.
4.3.5 Montreal, Quebec

Population: 1,649,519
Date of Incorporation: 1642

ODI Start Date: October 2011
ODI Started By: Communications department
Budget: None

Staff: One full time coordinator and one part time staff member

Formal Policy: Open data policy
License: Custom license (based on Creative Commons CC-BY license)

Local Organized Open Data Advocacy Group: Montreal Ouvert

Notes: Website contains showcase of applications developed with city data. Comments sections are available for all datasets and show evidence of some use.

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Development

In the summer of 2010 a group of local citizens created a lobbying group called Montreal Ouvert (MO) to begin pressuring the City of Montreal to create an open data policy and start distributing data to the community. The group began holding meetings and speaking with City staff and politicians about open data and found several interested individuals at the City who had been trying to get an open data program off the ground but had been unsuccessful. They got media attention and started to raise awareness of open data, getting the developer community involved and showing the City that there was public demand for data. In order to alleviate initial fears around opening data, developers created some concrete and useful applications to show the value for citizens and service provision. “We weren’t demanding information that much and we were explicitly not phrasing our efforts in terms of transparency, accountability, or democracy”, says Michael Lenczner, co-founder of MO, “it was about economic development and useful and fun applications for iPhones. We thought those were stronger selling points.”

In March 2011, the director general of the City created a committee under the Communications Branch called the Working Group on Open Data (GTDO) to interact with the community, and begin working on developing an open data mandate. The choice was made not to go through the IT department, which was seen by some as having a top down “fire and forget” approach to projects. Instead the choice was to take a community approach. Montreal has a history of public consultation and community dialogue (Hamel, 2002), and this was seen as important for creating a successful and accountable program. The official mandate came in March 2011. Along with the community interaction, the committee began meetings with City employees to begin educating them on open data and developing a report on how the City should
proceed. The final report (City of Montreal, 2011) was approved by executive committee in October of 2011 and the program started shortly after.

**Operation**

The GTDO consists of two bodies, a Steering Committee and a Table of Respondents. The Steering Committee is responsible for the development of the City’s open data program and is made up of 11 senior managers from a cross section of City departments. The makeup of the group is not necessarily permanent and changes based on the particular focus of the program at any given time. The early focus was on transport, so members were sought out in related units. The Table of Respondents is a larger body that meets regularly—though less regularly since June of 2011; mainly using social media and email for the majority of discussion. This larger body of between 30 and 100 people brings together city managers, members of the steering committee, as well as representatives from civil society representing three groups: community, institutions, and entrepreneurs. The Table of Respondents maintains connections between stakeholders internal and external to the City. Leczner sits on the table as a member of the public and praises it as a “very collaborative” system where “members of civil society and institutions sit on a table with the government and work together on moving [open data] along. The City has made itself directly responsible to addressing those stakeholders.” He considers it to be the most interesting aspect of Montreal’s open data initiative relative to others nationally and internationally.

The lead on the open data project, Diane Mercier (a PhD in Information Science), emphasizes the importance of this community engagement, pointing out that the background for the City’s open data program is open government and the need for dialogue with citizens. Developer groups such as Montreal Ouvert and Techno Montreal were instrumental to getting the program started, noting that “If we didn’t have external activity we wouldn’t have an open data
portal”. This emphasis on dialogue is evident not only through the GTDO’s consultations but also in the City’s open data portal itself which includes prominent (and active) social media links as well as applications created with City data, and comments on specific datasets; which while few in number are often responded to by City staff.

The City publishes a wide variety of data, including reports regarding the open data program itself. The majority of the data is politically neutral and mostly transportation related. There are several interesting datasets that have been used to create valuable applications for citizens however, such as the restaurant inspection offender data and traffic construction information.

Challenges

The program, like many others examined here, is run with no additional budget and only one full time and one part time employee engaged with open data. It can be difficult to acquire new datasets due to Montreal’s complex government made up of 19 boroughs and their attendant government bodies. Mercier gives the example of getting parking signalization data which took nine months to acquire because she needed to speak individually with 19 managers from the different boroughs to get the data, then convince Geomatics to publish it in KML format, and then convince IT to create it also in JSON to make it easier for developers to work with. “It is a very complex project management program” she says, but is hopeful that it will improve with time. The program is a long term one in her view, and the initial stages are difficult.

Mercier sees IT as a potential barrier to work around, noting that they have been uncooperative from the beginning. She feels that IT is unwilling to embrace open source solutions due to long-term relationships with proprietary software vendors which impedes their ability to experiment and respond to feedback. Leczner notes that they have not been large
supporters, but from his perspective nobody seems to be blocking the progress of the program. From the outside it continues to be supported by the developer community. MO has changed their focus to a provincial level now, but along with other groups, continue to host events such as the Quebec anti-corruption hackathon that took place in Montreal in November 2012.

4.3.6 District of North Vancouver, British Columbia

Population: 84,412 (2011)
Date of Incorporation: 1891
Open Data Portal: http://www.geoweb.dnv.org/
ODI Start Date: Fall 2009 (Exact date is uncertain)
ODI Started By: GIS department
Budget: No dedicated budget
Staff: GIS staff maintain the program as part of normal duties
Formal Policy: None (in development)
License: Custom License43 (moving to Canadian Government license in the future)
Local Organized Open Data Advocacy Group: None
Notes: Website also has access to engineering drawings, legal plans, an online mapping application, and a simple dashboard.

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43 http://geoweb.dnv.org/ancillary/site-legal.html
Development

Since 2000, the GIS department at the District of North Vancouver (DNV) had been providing some geospatial datasets to the public for free. These consisted of six simple GIS datasets provided for educational purposes to schools and other interested users. The majority of the data that the department had available was provided for a user fee in order to generate revenue and offset costs.

Selling data was onerous for two reasons. First, there was the human resources cost of dealing with paperwork and licensing agreements around the data. Second, there was tension between the department and the users of the data, specifically consultants for the City who felt that they should not be forced to pay for the data that was needed for work they were contracted to do. There was pressure to start providing free information for consultants to streamline the process. The department did start providing free datasets to consultants, but this lead to more work for staff who now had to maintain different programs for different users.

The system was seen as inefficient and did not justify the minor revenue that it was generating. Other cities at this time were just beginning to start open data programs, so the GIS manager consulted with other cities in Canada and the U.S. about starting an ODI in the DNV.
The concept was still quite new at the time and many cities were still trying to figure out how to run an open data program. In 2009, the DNV’s GIS department decided to create their own version of an ODI geared for their specific needs, serving the users of geospatial information in the best way possible.

The GIS department at the DNV is a mature, modern department with some degree of autonomy from the rest of the corporation. They have had systems in place to provide engineering drawings and legal plans online through self-serve applications since 2001, as well as their own GIS website that is separate from the corporate website of the DNV. The initial version of the website that hosts their open data, GeoWeb44, was a system called Property Information Explorer. It was a successful system that was heavily used by internal staff, members of the public, and real estate agents for accessing property information.

The department’s experience in providing online services, along with a modern data management system allowed the department to easily transition to open data. As the GIS coordinator Andrew Durnin puts it:

*We had half a dozen datasets available for free to the public so it wasn't a huge stretch to bundle that stuff up—the GIS data, engineering drawings, the legal plans, PDFs—include all of that under the Open Data umbrella. But also, sort of by clicking a few checkboxes, stop translating 6 datasets we made available to the public, and crank it up to about 180 and do it in multiple formats. Because like I say, we were already doing that to support internal processes with CAD users and archiving. It wasn't that onerous other than making the web page.*

Developing the program was done without any dedicated funding or extra staff; all of the processes were already in place prior to the ODI. The amount of extra work required to run the

44 http://www.geoweb.dnv.org
program is negligible. Starting and running the program out of the GIS department also allowed for a quicker startup time. Durnin notes that,

\[w]e just didn’t have to go through the usual bureaucracy of setting up a committee and getting all our stakeholders—our Engineering department, our Planning department—getting everybody on board and talking about it for 2 years, which I see a lot of organizations doing, and have to do.

All of the development work was also done in-house. The Coordinator and the Manager were both interested in web design, so for them a priority was to create a website that could “provide more functionality but try to make it as clear and easy to use as possible”, to “serve up an application and not have to create a help page”.

**Output and Goals**

The result is an attractive and intuitive website that provides geospatial open data, engineering drawings, legal plans, an interactive mapping application, and a simple information dashboard. The catalogue does not provide any service or accountability data. Its function is very narrowly focused on providing a large number of high quality geospatial datasets primarily regarding infrastructure and planning. This data is detailed and is accompanied by rich, well documented metadata that provides context to the content of the files.

The goal of the ODI and prior data distribution services has been to increase service and to decrease time requirements on staff. By creating a self-serve system the department has seen a significant decrease in requests for data, saving time and money and improving service for data users. Philosophically the department acknowledges that the data that they provide belongs to the taxpayers and should be freely available on principle. This forms the background that further helps them justify the free provision of open data.
Community

While the ODI has been well received both internally and externally there has been little in the way of community engagement around the data. There are no visible local developer groups asking for data or providing public pressure to move the ODI out of GIS and into a broader corporate mandate (though there are internal discussions about this). Local colleges utilize the datasets for GIS courses, but there does not seem to be any formal or informal connections between them and the data providers. The City does not actively promote their ODI and does not actively try to engage with the community. There are no blogs or social media channels for connecting with the City on this front. Setting up systems for suggestions, communications, and dialogue are all on the radar as possible future endeavors, but for now the goal is to quietly provide open data to traditional geo-spatial data consumers.

4.3.7 Mississauga, Ontario

Population: 713,443 (2011)
Date of Incorporation: 1974
Open Data Portal: http://www.mississauga.ca/portal/residents/publicationsopendatacatalogue
ODI Start Date: March 2010
ODI Started By: Information Planning Unit (part of the Planning and Building Department)
Budget: Startup funding. No continual budget
Staff: Run by staff of the Information Planning Unit as part of regular duties
Formal Policy: None
License: Adapted Toronto License
Local Organized Open Data Advocacy Group: None
Notes: The portal contains an archive of several hundred digitized documents in PDF format.

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The open data initiative in Mississauga is operated out of the Information Planning Unit in the Policy Division of the Planning and Building Department. The unit is responsible for research involving statistical geospatial data for the City. The manager of Information Planning, Steve Czajka arrived at the City in 2009, and began a 5 year plan for what was still a new department. His background in GIS, he says, had made him aware of open data programs happening elsewhere, especially the work being done in the UK. He felt that it would make sense to initiate something similar in his own department to cut down on staff time while improving service to both other City departments and to the public.

After taking about a year to gear up, the open data program officially began in May 2010. It began with, among others, a collection of almost 300 documents dating back all the way to 1967, which had been frequently requested in the past. The documents were physical paper
documents, so the department hired a summer student to digitize them so they could be made available in PDF format. While not ideal open data, Czajka feels that providing the documents in a digital format is consistent with the goals of the program. Strictly open data in its technical sense is often not the only product that the users want. It is not likely that someone will take a dataset to council, instead they often want the resulting document. The program aims to provide both the official document that is the result of their research, but also the underlying data that went into the report.

The program itself was relatively easy to setup since it was localized to the Information Planning unit. Some assistance in branding was received from the Communications department, and help with the website was provided by IT, but there was little required in terms of startup funding and no extra budget was required. Open data has been built into the work of the unit Czajka says. “Open data isn’t our main program, we come into work to do research and open data is our end product.” “Our primary job here is doing research projects, our secondary is doing requests. … We need lots of data … when we have our core research done, the byproduct is open data.”

Considering the small scale and relatively narrow focus of the open data initiative in Mississauga, it seems to be quite successful.

*We were getting maybe 100 to 150 requests per year. Because all of our information was on paper, we needed to scan, copy, make a statement, and give it to the person. It was a long chain of events to shorten up. ... Now we’re putting out over 200 requests per year, easy. So we’ve doubled our throughput... [because of the open data portal] it’s easier for both the external staff to self-serve and for my staff to deliver. We can direct people over the phone as opposed to our old process.*

Staff keep an eye on the number of downloads that the data receives and note that they are coming up on their one millionth download of data from the site in the almost three years it has
been running. They see this as an indication that they are providing a valuable service that many people are accessing.

**Output**

Mississauga’s ODI deals entirely in planning related datasets. The older reports that were digitized are part of the open data catalogue but the data that went into those reports is not available. All of the new reports that are published are accompanied by the datasets that they are based on as long as they are available for publishing. The vast majority of the data is available in multiple formats, including at least one non-proprietary format.

So far there has not been any trouble regarding the distribution of formally monetized datasets, but Czajka notes that the program does not host any orthographic files or any other datasets that might be contentious. He expects that there may be some pushback over this, but is not concerned because a good business case can be made regarding the savings in labour time associated with the decreased demand for data requests.

**Community Engagement**

There are some informal ties to local educational institutions such as the University of Toronto and Sheridan College, who use the data for courses, and where Czajka has spoken at regarding open data. There do not appear to be any visible local open data advocates or groups though. “We’ve never been approached by any group from the public” he says, but he has actually gone to public open data meetings to get a sense of what people are looking for, however they were in the Burlington/Halton region. He would like to see more communication with the public though the current system is not ideal. Twitter is the main communication channel for Mississauga Data, but it is primarily a one-way channel due to City policy regarding the use of social media. Another problem is that the website is quite limited and they are looking to find
better ways to build a new open data portal, one with better tools, embedded visualizations, and better communications platforms. Regardless of the lack of local engagement around open data, the program is seen as completely sustainable. “Oh yeah, no question about that,” says Czajka, “because really, like I say, it’s a byproduct of what we do and it saves us time in doing it. It makes sense to do it”.

**Future**

The director of IT is looking at expanding the program outside of the Information Planning (IP) unit and creating a corporate wide initiative. It is unclear whether the program will be moved over to IT or if the IP unit will simply expand the system to incorporate additional departments’ data. Currently the IP unit is looking at working more closely and integrating databases with two other units: Transportation Planning, out of the Transportation and Works department, and Transit Planning in the Transit department. The hope is that by integrating transit, transportation, and policy data, the unit could better model the effects of land use decisions and improve the output of each of the units.

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**4.3.8 Regina, Saskatchewan**

**Population**: 193,100 (2011)

**Date of Incorporation**: 1882

**Open Data Portal**: http://openregina.cloudapp.net/

**ODI Start Date**: February 2012

**ODI Started By**: Corporate Information Governance

**Budget**: Initial startup funding and continued project funding

**Staff**: One full time coordinator spends a large amount of time on open government program

**Formal Policy**: City of Regina Open Government Strategy

**License**: Custom License (http://www.regina.ca/residents/open-
Local Organized Open Data Advocacy Group: Open Data Saskatchewan

Notes: Open data is part of an Open Government program which includes Open Data and Open Information. The data catalogue is hosted on Microsoft’s OGDI platform. Website provides links to applications built with city data.

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Development

Regina’s open data initiative is the youngest of the programs in this study, starting officially in February, 2012. The impetus for the ODI was an internal corporate information assessment which highlighted a need by numerous stakeholders for information held by the City. The Office of Corporate Information Governance (situated in the City Clerk’s Office) was
already focused on transparency and accountability for FOI and privacy protection. They expanded upon this to propose an open government strategy for the corporation, of which open data was to play a key part. There was no acute external pressure to start the program; it was an internal process. Alyssa Daku, the manager of Corporate Information Governance, and lead on the open government initiative, noted that “we didn’t have lobbyists or public pressure, we did the evaluation internally and said ‘this is a good decision for us; a good business decision, a good public transparency decision’”.

Before starting out, staff conducted research into other open data programs in Canada and the US at different levels of government. The information gathered helped them craft their open government and open data strategies to reach their specific goals and to avoid the problems that many other governments had encountered through trial and error. For instance it was determined that running open data primarily out of the IT department would limit the scope that they desired, so they chose to create a cross-organizational team to work on open government similar to the approach taken by Montreal (see below). Open government was sold as both a citizen engagement and democratic facilitation strategy, but importantly, also as a good business decision for the corporation which would save money through reduced information requests.

During development, Daku began looking online for public open data advocates to engage with. She discovered that coincidentally a citizen led open data group called Open Data Saskatchewan (ODSask) had just started up. "I think that was a little bit of serendipity in that she was looking to connect with the community at the same time that I was looking to start a community”, says Andrew Dyck, the group’s founder. They were independently setting up their first hackathon in Regina and asked if the City would be willing to bring out some datasets for them to work with. The City managed to gather a half dozen GIS datasets and brought them to
the first event in December 2011. Staff spoke with the developers at the event, and used their feedback to help convince City Council to give full support for starting an open government program.

ODSask and another group, HackRegina, were preparing for their next event in March of 2012, and were hopeful that the City could launch the OD catalogue before that time. Staff scrambled, and the catalogue was launched in February so that several City employees were able to attend the event. The early and frequent collaboration between the City and the OD community has been a theme which both groups are extremely happy with. Communication takes place mostly through Twitter and other social media, but rather than one-way distribution of information seen in some organizations, the City is willing to take feedback through the same medium.

**Operations**

The open government framework adopted by Regina is unique in that it features three different avenues of approaching the goals of open government. Open Dialogue, embodied by engagement with citizens through social media; Open Data, which is provided and continuously improved through the open data catalogue and discussions with the developer community; and Open Information, which is a commitment to providing the human readable documents and information that do not meet the technical requirements of open data.

In the summer of 2012 the City launched their Open Information Portal\(^{45}\). The portal provides a central repository for the City to host digital documents which are requested through the *Local Authority Freedom of Information and Protection of Privacy Act*\(^{46}\) that are not personal in nature and do not contain any private information. Instead of providing an individual with a

\(^{45}\) [http://www.regina.ca/residents/open-government/open-info/](http://www.regina.ca/residents/open-government/open-info/)

single document as the result of a common FOI request, the City will now post the document online for anyone to retrieve and will refund the FOI charge to the party that made the request. This is designed to reduce the duplication of FOI requests that cost citizens money and City staff time. The documents hosted on the open information portal are valuable documents that are not available as open data. Instead, they are usually the product of a system that cannot output the information in an open format. Ideally the open data and open information portals will complement each other, providing both a machine readable dataset and a human readable report on the same topic. For example councilor expenses are only available as a PDF document currently, but that document is issued from a database which eventually could be published as open data alongside the report.

The management of the open government initiative is interesting because it is intentionally cross-organizational and includes systems for input from outside of the government. There are two open government committees in place: the Strategy Committee and the Operational Committee. The Strategy Committee is comprised of managers and directors from multiple areas within the organization along with a member of the public who meet quarterly to discuss the development of the City’s open government initiative. The Operational Committee meets more frequently and is made up of five people who are responsible for working with business areas, publishing datasets, and other day-to-day operations. This distribution of responsibility and emphasis on developing open government and open data as a program not a project (i.e. it operates on an ongoing basis rather than as a single project with a set lifespan), that has contributed to its success and sustainability.

The collaborative approach taken within the organization as well as with the external community is one of the strong points of Regina’s ODI. It highlights the importance of having a
strong champion at the City and the value of strong engagement with the local open data community. ODSask’s Andrew Dyck praises the work of the City:

*I think the City’s approach should be an example that one would want to see emulated elsewhere. And I say that because of the openness that I’ve seen. It’s more of a grassroots effort. Without Alyssa, I don’t know how far things would have gone because she’s been such a force. But in that sense the individuals who are interested in using the data have been influential too.*

4.3.9 Guelph, Ontario

**Population**: 121,888 (2011)

**Date of Incorporation**: 1879

**Open Data Portal**: http://webdev.guelph.ca/services.cfm?itemid=78870&smocid=1550

**ODI Start Date**: April 2010 (pilot)

**ODI Started By**: IT department

**Budget**: None

**Staff**: None

**Formal Policy**: None (in development)

**License**: None (Disclaimer on the site explaining that data is for testing purposes and not guaranteed).

**Local Organized Open Data Advocacy Group**: OpenGuelph (appears to have disbanded).

**Notes**: Pilot program. Not maintained. Contains broken links for some data.

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**Development and Future**

Guelph developed an open data pilot project in 2010 in response to a local interest group called OpenGuelph (which appears to have disbanded since then) that was looking for municipal data to build applications. No terms of use or policy were developed in response to the pilot, the City just created it in order to provide some static datasets to this one group which shortly after seems to have disbanded. Guelph’s City Clerk, Blair Labelle, notes that “it should probably be removed. I can’t speak to the validity of the data, there’s no terms of use, we’re not promoting it, so it’s just a webpage sitting out there”.

The pilot does show a willingness of the City to support open data. According to Labelle, there is a renewed interest now at the City to create a functional open data program coming out of the new Technology Strategic Plan, and the development of an Open Government Framework that includes open data as a key pillar.
4.3.10 Fredericton, New Brunswick

Population: 56,224 (2011)

Date of Incorporation: 1785


ODI Start Date: July 2011

ODI Started By: Directive by CIO given to GIS department

Budget: None

Staff: GIS staff maintain the program as part of normal duties

Formal Policy: None

License: Adapted Toronto’s License

Local Organized Open Data Advocacy Group: None

Notes: Program is currently on hold due to municipal restructuring

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Development

The City of Fredericton began their open data initiative in July 2011. Through his work as president of the Municipal Information Systems Association (MISA), Fredericton’s CIO, Maurice Gallant had had contact with a number of people involved in other Canadian MODIs. He gave the directive to the GIS department, which is housed in IT, to start the open data program.

The GIS department in Fredericton was already moving in this direction by giving out their data to contractors and educational institutions for free, so open data seemed like a natural fit. No official policy was created, and the terms of use were taken adapted from Toronto’s terms of use license at the time. There was some contention from the open source community early on around the reference requirements of the license, but these were worked out individually with users.

The initiative was not identified as a project, and therefore did not receive any funding early on and still has no official budget. The work is taken on by existing staff in addition to their other day-to-day tasks. Political support was easy to receive due to the small size and relatively congenial culture within the local government.

Output and Users

The original intention was not to focus solely on geospatial datasets, but since they are the City’s most historically requested datasets they have been the early focus. The datasets provided are basic location and boundary datasets in a number of domains. Several datasets are only available in SHP files and not in non-proprietary formats. Links to City Council minutes are provided (hence the 1 accountability dataset) but these are only available in PDF documents, severely reducing their usefulness.
The users of the data are typically those who have traditionally been interested in GIS datasets: educational institutes, consultants, and software developers. There has been some engagement with the local developer community through a presentation and dialogue event, though this was done early in the program and has not been continued.

**Future**

The main reason for the slowdown in the development of the ODI recently has been the restructuring of departments within the municipal government that began in summer of 2012. A number of departments, including IT, have been broken up and moved into new departments. This has caused a serious but most likely temporary setback for the program. The GIS coordinator, Rob Lunn is adamant that the program is sustainable and that the cultural mentality around open data is well ingrained into the corporate culture of the City.

4.3.11 Hamilton, Ontario

**Population:** 519,949 (2011)

**Date of Incorporation:** 1846

**Open Data Portal:** [http://www.hamilton.ca/ProjectsInitiatives/OpenData/](http://www.hamilton.ca/ProjectsInitiatives/OpenData/)

**ODI Start Date:** Early 2010 (exact date is unknown)

**ODI Started By:** Unknown

**Budget:** None

**Staff:** None

**Formal Policy:** None (in development)

**License:** website Terms of Use

**Local Organized Open Data Advocacy Group:** Open Hamilton

**Notes:** The ODI technically exists but is only a webpage that hosts the transit GTFS feed.

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**Attempts to Develop**

While it officially has an “open data” page on its website, Hamilton only provides transit GTFS data. There has been a struggle by local open data advocates for several years now to get the City to begin a serious open data program, but without much success.

After the 2010 civic election a group of local programmers, journalists, and other interested parties started Open Hamilton. The group’s goal is to get the City to begin to release more data to citizens and then to serve as a facilitator for civic participation in open data through hackathons and other events like those held in other cities. They are hosted by a local hacker space called Thinkhouse which provides a place to meet, and they work with a number of
community associations sharing data between the groups. The group is also aligned with a local blog called RaiseTheHammer, which provides a repository\(^{47}\) of scraped City data.

The City began providing data to Google transit as well as providing some datasets to Mohawk College for students to work with in early 2010. Those datasets however are not publically available at this time, only the GTFS data still exists. In January 2011 the City Manager provided an information update about the state of open data at the City. In it he explains that “we are currently working to understand the implications and our organizational state of readiness and will look to Council for direction before we implement a plan for open data.” (McGreal, 2011) Two years later, there appears to be little progress, though there are encouraging words from the City’s Mayor in his 2013 State of the City address: “I look at the so-called ‘open data’ models that progressive governments are starting to embrace and say: why not here in Hamilton?”

**Lack of Cooperation**

Joey Coleman, a local digital journalist, programmer, and member of OpenHamilton is hopeful that the City is moving forward. The problem in his opinion is the particularly risk averse government culture in Hamilton, coupled with the City’s lack of dedicated website or online communications staff has left them without a natural champion for open data. The relationship between OpenHamilton and the City is a good one, especially with their main contact in the City Manager’s Office, but open data is not considered a high priority and is continually overshadowed by other issues.

Coleman uses City documents and data to provide information to the readers of his local journalism site\(^{48}\) and says that it can be frustrating to get even simple, politically neutral datasets

\(^{47}\) [http://www.raisethehammer.org/data](http://www.raisethehammer.org/data)
from the City. He describes the challenge of getting ward boundary shape files in order to build an application to show people who their City Councilor is.

They sell it for $95. And we’re going ‘this is a basic fundamental of democracy: who is your councilor?’ And that’s what we want to use it for. ... Eventually when election Canada opened its census tracts as open data we were able to use those. ... We [manually] redid the census tracts into ward boundaries. Then OpenHamilton, we released it ourselves. The thing was that it was an 18 month struggle and eventually we had to go around the City. ... That’s always what I find to be the biggest challenge with my city. Some of the stuff we fight over is small potatoes.

Hamilton represents the only city in this study that appears to have completely stalled on their ODI. Even the presence of an active and vocal local advocacy group—which has been a valuable indicator of public demand in other cities—has not been able to move the program forward. It illustrates the importance of a natural champion within the City and the challenges of overcoming an entrenched and reluctant government culture.

4.3.12 Summary

This section has provided a description of the open data programs in ten Canadian cities. It has shown that there are large variations in the size, success, and implementation strategies between Canadian MODIs. Of the cases examined no two were exactly alike, though some patterns are recognizable. The presence a strong local advocacy group can be instrumental for the creation of a program. Without a dedicated individual or group of individuals within the municipal government, the presence of an advocacy group is not enough. Often that champion is a city’s CIO or a senior manager within a GIS department. This is not always the case though, as

48 http://www.joeycoleman.ca
illustrated by the examples of Regina and Montreal where the programs are more geared toward open government and are championed out of the City Clerk’s office or Communications.

Different approaches are taken toward citizen engagement and collaboration as well as budgets and using official policies. Some cities run their programs as a side project, while others are much more devoted to the idea, whether for reasons of efficiency and service, or for democratic notions of collaboration and increased accountability. Cities are also starting to take different approaches to leveraging their OD. Some are actively trying to encourage application development through contests and showcases, while others are trying to develop tools such as dashboards to make the data more accessible.

The findings from this section will give context to the next section (4.4) where some of the broad trends that emerged in the research are expanded upon.

4.4 Themes and Trends in Open Data Initiatives

4.4.1 Introduction

The purpose of this section is to outline the broader themes emerging from the research regarding the functioning of MODIs in Canada. The information is based on the ten case studies of open data programs and derived mainly from the participant interviews as well as, to a lesser degree, the observations online and at open data events. It is broken down into four main subsections based loosely on the research questions described in Chapter 1. The first subsection (4.4.2) describes the process of publishing government data and what role the outside community has in the process. The next subsection (4.4.3) examines the goals and processes behind the creation of MODIs. Subsection (4.4.4) looks at the role of the community; who is the target audience and how they are engaging with the programs—if at all. Subsection (4.4.5) then
outlines the main challenges faced by staff working on ODIs and how some of these challenges are being addressed. The final subsection (4.4.6) provides a summary of the findings in this section.

4.4.2 Datasets

4.4.2.1 Data Publishing

Given that every city government is constrained by resources both human, financial, and technological, decisions need to be made about which datasets are to be released early on and which ones are worth investing resources in trying to acquire later. All of the city staff I spoke with adopted a “low hanging fruit” philosophy early on in the life of their open data programs. Data that already exists in formats easily amenable to open data, especially geospatial data is seen as an ideal candidate to populated newly created open data portals. Along with the easy formatting, geospatial data tends to be relatively politically neutral, uncontroversial, and easy for developers to use to create simple applications quickly.

After the initial geospatial datasets are released there is a large variation in what is published next. “In the first round [the City will] put up whatever they can find that’s sitting around” said one open data user. “You’re probably seeing a grab bag from every city. There doesn’t seem to be rhyme or reason for what datasets got released first” (Oct. 2012). Depending on what departments are involved early on and what types of systems the data is stored in, the early offerings do tend to be rather haphazard. None of the city staff interviewed expressed much concern about publishing datasets that might be less politically neutral. The challenge is always framed around trying to access datasets in departments that are not actively involved in the ODI. Longer running programs are more likely to publish transparency/accountability data which would suggest that as they slowly get more city departments involved with the program they are
able to present more diverse types of data. Early politically neutral GIS offerings may become supplemented over time by financial or statistical data more prevalent in other departments.

City staff would like to release “high value” datasets, however it is difficult to determine what constitutes “high value”. GPS transit data and other service data that can be used by citizens on a day to day basis has been successful in terms of the number of downloads and citizen response. Apart from a few datasets like these, there is always an uncertainty about what might be useful since nobody is certain how the data will be used prior to its release. Many seemingly mundane datasets in the hands of an inventive user could end up being quite valuable when combined with other government or private data.

One solution is to ask the users what data they would like to see published. Asking this question raises a concern expressed by a number of participants:

One of the big challenges is that people in the community don’t know what’s available. They don’t know what kinds of datasets the City might have. Sometimes I feel like the City will say ‘well what do you want?’ and we’re like ‘well, what do you have?’ It doesn’t really move forward. (Nov. 2012)

4.4.2.2 Data Requests

All of the municipalities offer some way for the public to make data requests. Most commonly this is done through email. The impact of the public requests is hard to measure, but the general sense I have received is that it is a secondary consideration, quickly overshadowed by internal considerations. A staff member at one city explained that public input probably only accounts for “1% of the decision making” (Oct. 2012) in regards to what datasets to release. A contact at another city explains how requests can have an indirect impact:

I wouldn’t say the outside community has a huge influence on what gets released. I definitely use it as a stick when I go into meetings with directors or managers of program
areas where I say ‘we’ve received several requests for this dataset and it’s heavily demanded. (Nov. 2012)

Others have indicated that public input plays a larger role in their organization, but can be difficult because often the people who request the data often have no real understanding of what data actually exists and what it is realistic to expect.

Some types of data were consistently brought up as potentially valuable by participants. Many people want to see less emphasis on geospatial data and more statistical and accountability types of data. Socio-economic indicators, quality of life indicators, financial data, crime statistics, and health information were frequently cited as hoped for releases (see also: Socrata, 2010 for a list of other important datasets requested by users in that study). Some participants expressed a desire for cities to start to provide more regular data feeds as well, for example real-time traffic sensor data delivered via API. Along with this there is interest in acquiring historical data about these systems that could be used for analyzing long-term trends. As outlined in section 4.4.5, there are a number of problems in providing this type of data early on in the life of open data programs, and city staff are trying to provide what they can with the resources available to them.

4.4.3 Development

4.4.3.1 Departmental Versus Organizational Programs

There is a great deal of variation in how MODIs start in Canada. In speaking to participants involved in the ten case study cities, I found two main approaches based on where the program is started within the organization. The first is a planned corporate initiative involving several departments; the second is the creation of a department-level program designed usually to improve service delivery.
The corporate initiatives may or may not have been pushed by outside advocacy groups. Ottawa and Montreal are examples of strong external pressure while Edmonton, Toronto, and Regina are examples of an internally generated program that then sought out external influence. These programs are often run by a branch of IT or a group related to the City Clerk’s office or Communications and are usually integrated into a larger corporate open government strategy either initially or later in the program’s life. The corporate initiatives are more likely to be focused (at least rhetorically) on open government principles of accountability and collaboration, for example Regina, Toronto, and Montreal.

The smaller department-level programs examined in this study were less likely to have been created in response to external pressure. Instead they were often the creation of a single individual or small group within a department that see a benefit in providing open data to better serve their stakeholders. Due to the regular need to provide geospatial data to users within and outside of government, departments in charge of this type of information are ideal candidates for these types of programs. The cases of Mississauga and the District of North Vancouver offer excellent examples of this as both provide land use and geospatial data to their constituents on a regular basis. For them it is seen primarily as a good business decision to provide open data so that users can self-serve. Of the cases studied which fall into the department-level program, all have expressed some interest in expanding their program to a corporate-wide initiative but have not been directly involved in the planning.

4.4.3.2 Developing Policies

All of the case study cities in this study either had an open data and/or open government policy in place or were in the process of developing one. These policies provide an executive mandate for all departments to begin to provide data in open formats and lay out the principles,
roles, and responsibilities of municipal government in making data public. This includes setting information management standards across the organization, providing initial or ongoing funding (if any), and defining the implementation structure for the open data program, for instance creating an open government committee or a consultation committee like those in Regina, Toronto, and Montreal.

Many of the early adopters began their programs without putting a policy in place but began to craft one afterwards in order to standardize practices and formalize the program. The later adopters have tended to create an open data policy early on and utilized this to guide their early development and spread awareness and compliance across the organization. Having a policy in place is seen as a stepping stone for moving forward with programs that have slowed or not been able to take hold, like those of Guelph and Hamilton. Participants from the departmental programs of Fredericton, North Vancouver, and Mississauga all acknowledged the importance of creating a high-level open data policy in order to expand the program beyond their one area, and they have heard that these policies are under discussion usually at the CIO level. Edmonton is the city with the longest running program that does not have an official open data policy in place (though a draft policy is apparently available, though not publically). Participants that I spoke with, both employees and citizens, described the need for policy to move the program out of IT of a perceived stagnant period.

4.4.3.3 Philosophy and Purpose

To a greater or lesser degree everyone involved in Canadian municipal open data initiatives was aware of the role that open data plays in a broader open government movement. In cities like Regina, this is made explicit through the implementation of an open government
mandate, of which open data is only one aspect alongside goals of accountability and civic engagement. As one city staff member stated,

If you’re going to talk open government and not talk about citizen engagement, then I wonder why you’re having the conversation. Just throwing up a bunch of data without fostering the citizen engagement with that information and the discourse and dialogue around that information; I’m again going to ask ‘why are you doing it?’ If you’re just doing it because it looks like you’re accountable... (Nov. 2012).

More often though, open government is implicit in the goals and rhetoric used when discussing open data. Many participants talked about open government explicitly or spoke about using open data to drive engagement and transparency in the future. Even in cities with smaller department-level programs where the goal of open data is mainly improved departmental service delivery, it is seen as a potential building block for more open government within their organizations.

Advocates of many of the programs now in place did not try to use improved public participation or government accountability as a way to sell the programs to City Council or senior staff. Many participants talked about how important it was to emphasize the business case for Open Data. Reduced access to information and government data requests are explained as cost reduction strategies. Improving service delivery through privately made applications, usually built around transit data, also helps make the case for open data having a positive return on investment. This business case rationale is seen as a necessity in promoting any programs in cities struggling with increased responsibilities and decreased resources prevalent in the current Canadian neoliberal context (Tindal & Tindal, 2009).

The creation of useful digital applications by developers is often cited as a valuable product of open data; an immediate and visual demonstration of the value of open data. This is a
function which is seen as a benefit running in parallel to wider, more abstract open government benefits which are expected to come along as the programs mature.

Although open data is ... definitely not all about apps, that side of it can help grow these programs and allow them to do more on their transparency and accountability side than if that’s all it was about. There would be a lot less progress made if there wasn’t the benefit and advantage of having people creating bus apps and garbage apps and recreation apps and websites. If it wasn’t for that, a lot of open data programs probably wouldn’t have gotten off the ground or gone forward because some are looking at open data specifically through a business case lens (Oct. 2012).

The development of applications and the development of open government principles are not mutually exclusive (O’Reilly, 2013). Most people I spoke to, including both city staff and civic advocates saw the growth of both of these aspects of ODIs as beneficial to citizens and government. As one open data advocate I spoke with told me:

We want to continue to make sure that application developers are building great toys for use on iPhones. And that’s not sarcastic, that’s genuine. I have a company that uses open data to provide our service and hopefully there will be more of those. But at the same time we do also want to see open data being used to explain to people how City Hall works. What’s happening at City Hall and who’s making what decisions and stuff like the budget, stuff like contracts that are being awarded, looking into the details of that; voting records of City Councilors and all that kind of stuff (Oct. 2012).

Some participants emphasized the importance of open data for developing open government in practice. They were not hostile toward creating applications, but like others (Morozov, 2013; Yu & Robinson, 2012) they worry that this aspect of open data might overshadow the more important governance side.

The whole point of this is not to get an iPhone app. It’s to get the City using technology better for its citizens. The way to do that is to have a sustainable initiative where every
year we can look and see improvements. Get people thinking, ‘how could I connect to citizen? How can I give my data to citizens? How could I work better with citizens? (Oct. 2012).

Another staff member described the importance of open data:

Open data is not interesting in that it is a gadget—a hacker gadget. But for ordinary citizens, for journalists, it is another thing. It is a thing to have more information, more democracy, more impact in participation; it is important in that. If open data does not give more democracy it is not useful. And in the organization, if open data does not help to [facilitate] work between units it is not useful (Oct. 2012).

Open data in this sense takes on the role of a wedge for driving open government principles into local government. As one participant explained to me, city government could have implemented better information management and data sharing programs internally at any time but chose not to. They could have created policies that allow for the use of social media by civil servants, but most have not. Open data creates a process through which data sharing and two-way dialogue become the norm and can begin to change government culture around these processes. This view sees open data not so much as a system for delivering new applications, but as a way to increase government transparency and collaboration with citizens.

4.4.4 Open Data Users

4.4.4.1 The Audience

The audience for open government data can be classified into four broad groups: (1) the private sector, (2) researchers and non-profits, (3) the general public, and (4) government itself (Konga, 2010). The private sector includes software developers and entrepreneurs as well as businesses that can use the government data. The second audience includes people who are
comfortable with data and analytics such as researchers, analysts, and even some journalists working for large or small institutions, or on their own. The third audience does not necessarily mean all of the general public, but a smaller group of average citizens with a moderate set of technical skills (Merritt, 2013). The fourth audience, the government, acts as an audience for open data within and across different levels (municipal, provincial, federal), as both data producers and consumers.

**Private Sector**

The community that has primarily been involved in Canadian MODIs is local programmers/developers. Sometimes this comes in the form of organized advocacy groups such as Open Data Ottawa, other times in more ad hoc connections within the local technology scene. An advocate in Edmonton explains that the ODI has “connect[ed] the tech folks in Edmonton with the IT folks at the City of Edmonton. They’ve become more involved in the community stuff. Prior to open data and open government, I didn’t see anybody from the City. That’s different now” (Nov. 2012). The majority of the founding members of the organized groups I have spoken to are developers or are linked to that community. The founders of OpenData Ottawa are all programmers except one person (a librarian interested in technology and government), Montreal Ouvert and Open Hamilton were similarly founded by developers, while Open Data Saskatchewan was founded by an economist and data analyst who had had previous experience with another open data group in British Columbia. This is in line with findings from other studies of open data users which find a large amount of developers (Davies, 2010) or at least well educated individuals (Bates, 2012) involved in these programs.

There is another private sector audience that was not represented in any of the advocacy groups or at open data events to my knowledge. This is the traditional user of government data,
particularly users of geospatial data regarding infrastructure and planning. Some city staff
participants explicitly mentioned this audience as a primary user of their data. Property
developers, engineers, contractors for the City; all of these data users benefit from easy access to
digital City data that at one time may have cost significant amounts of time and money to gather.
For these users it is less of a problem to have datasets provided in non-proprietary formats since
changes are they already own the expensive software required to utilize formats like AutoCAD
.dwg files and ESRI .shp files which are the only available formats for some datasets.

**Researchers, Analysts, and Non-Profits**

Most of the staff who work directly on the open data programs have described a non-
formal relationship with local educational institutions. This involves the use of city data for
courses, particularly GIS related courses that are looking to work with geospatial datasets. Some
people did describe more direct relationships with universities that involved speaking
engagements related to the use of open data, but these are always described as loose, informal
ties. This is not to say that there are no connections between the academic community and
municipal open data programs. Groups such as Civic Access and CIPPIC are actively engaged in
a number of open data initiatives at different scales. The interest for these groups however lies
less with day-to-day activities regarding open data and more with larger overarching issues such
as licensing and access to information policy. At least one participant described the relationship
between open data and the academic community in a negative light. The complaint was that there
is little reciprocity in the relationship and in particular that researchers ask for and take data but
do not provide the results or their own data in return.

When asked about data sharing agreements or data use by non-profit organizations, none
of the participants were aware of any such activities. The only exception is Toronto’s WellBeing
Toronto project which hosts some data provided by non-profit organizations like the YMCA. This is not explicitly an open data program however, and the data provided is not available in a raw, machine readable, open format.

**The General Public**

The third audience for open data, the moderately technical citizen, has been mostly absent from the engagement around open data. Participants in every city I spoke with, staff and advocate alike, pointed to this lack of engagement with the non-technical community as a noticeable problem. Some felt that this audience would never be directly involved in open data; that their engagement should come about through intermediaries powered by the underlying data and that open data itself is too niche and “boring” of a subject. Alternatively, the data itself may be the problem. Certain datasets are known to be extremely well received such as transit data, health inspection reports, and other service data that affects people on a day to day basis. The amount of this type of data available right now is minimal compared to datasets that the average person would probably not be interested in such as geospatial infrastructure data.

**The Government**

Whether local governments use their open data internally is unclear. Many participants repeated anecdotal evidence that this is the case at the provincial and federal levels, but when city staff were asked about this many said that the programs were too small to be valuable and that internal systems already exist that work better for internal data access. One exception is the GeoWeb tool that was built at the District of North Vancouver. This system is used by internal staff for accessing GIS and property data instead of their internal system due mainly to its ease of use. It should be noted that this program provides a great deal of detailed geospatial data (more than any other city in the country) and has attendant property and engineering data lookup
functions, making it particularly well suited to this task. An internal audience was not the intended one for this program, nor is it the intended audience for the other ODIs examined in this study.

**The Target Audience**

Most city staff participants indicated that they did not want their open data catalogues to be directed only toward the first two audience types (the private sector and researchers/analysts). The reason that Edmonton chose to use Socrata as a platform was partially informed by its built-in visualization functions which it is hoped will make the data more accessible for citizens. Many people that I spoke with are skeptical of its ability to perform this role. Current systems are “basically for a much more advanced audience like developers, hackers—in the good sense; people who understand how to use the data for their own planning needs, like analysts,” explains one city staff member. “I would argue that it is not for the common citizenry yet” (Nov. 2012).

Part of the problem stems from the way that data is currently delivered. The platforms are not very intuitive or user friendly, nor are they prominently featured through the cities’ websites. It is difficult for the average citizen to connect with the data hosted only on a city’s data catalogue. The non-technical audience has no real incentive to visit an open data catalogue since it takes a certain level of skill and proficiency to use at this time.

Some cities and groups have tried to draw in a more diverse crowd through other means. For example the City of Ottawa’s two apps contests have included space for those without technical coding skills to input ideas for applications which are then voted on. They also offer prizes for creating visualizations and analysis. These prizes may attract not just developers but also those actors have analytical and/or design skills. Unfortunately, while this does provide a
role for members of the analyst audience, the average citizen without these skills is unable to meaningfully participate except in the voting process.

A couple of participants in this study implicitly or explicitly questioned whether MODIs should be directed toward the non-technical audience at all because the idea is that open data is really only valuable as a resource for those that have the skills to use it. Once developers, analysts, and journalists have processed the raw data into useable information, then it becomes valuable to the general public. As one participant explained, the goal should not be to “sell the open data concept, but to sell the products that come out of it. Most people don’t need to worry about the backend” (Oct. 2012).

4.4.4.2 Community Engagement

Online

The ways in which different cities have attempted to engage with the community around open data differ from location to location, but there are a few common themes. All of the programs provide some form of online communication, whether through email, question and comment areas of the open data portal, or social media. Many use Twitter as a primary communication tool. Cities such as Toronto and Montreal have a dedicated Twitter account which is used to communicate information about new datasets, events, point to applications and related developments. In addition, many of the individuals involved in open data at the City utilize Twitter to communicate directly with users and other open data folk across the country and the world. “It’s kind of funny but I never used to be on Twitter,” says one city staff member, “I went on it to find [a local open data] community and now I have over 200 followers on Twitter and almost all of them are from that community, and that’s kind of our communication channel” (Nov. 2012).
Other online channels exist for communication as well. Toronto maintains a blog along with its Twitter feed called DataEh\textsuperscript{49}, which provides news and information about the open data program as well as a place for comments and discussion. Along with this, city staff are actively engaged with the community on a long running Google Groups page, DataTO\textsuperscript{50}, where people can post events, ask questions and discuss the details of the City’s open data. These informal discussion groups along with social media applications provide a platform where city staff and active citizens can discuss ideas, setup events, and have personal, friendly, two way conversations (Eaves, 2012).

Not all of the cities examined have a two-way dialogue through social media. Some of the smaller departmental programs that are not as engagement-focused still use tools like Twitter, but only as an information dissemination tool. Mississauga Open Data utilizes their twitter feed\textsuperscript{51} to provide statistics and data output from the Planning Unit in which the program is housed, but the account does not follow other users and does not have a history of engaging with other Twitter accounts.

**Offline**

Another common means of engagement are local events such as hackathons, Change Camps, or apps contests. Many programs start off with an apps contest hosted by the City where prizes are awarded for developing useful applications using City data. They also serve to generate interest and engagement around the new program. There are differing opinions about the value of apps contests (cf. Howard, 2011), but generally they are seen favorably by city staff who can point to measurable direct outcomes for the effort in the form of useful applications and

\textsuperscript{49} http://webrebrand.blogspot.ca/
\textsuperscript{50} https://groups.google.com/forum/?fromgroups#!forum/datato
\textsuperscript{51} @MississaugaData
citizen participation. While the apps contests are generally hosted by the cities themselves due to the cost of providing prizes, other events are more often organized by outside groups with the collaboration of the City.

The frequency of the events and level of engagement between the City and community is quite variable. A major factor seems to be the existence of an ongoing local advocacy group that has a good working relationship with at least one city staff member who deals directly with the open data program. This allows for collaboration around finding a location to hold the event and for organizing resources such as new datasets or bringing out data owners from different units within the City. The Learn Hack YOW event that occurred in Ottawa in December of 2012 is an example of this sort of collaboration. The event was organized and hosted by the local advocacy group Open Data Ottawa and given space and accommodations at City Hall. The focus of the event was to bring together different groups outside of the traditional developer community, and to host speakers and sessions from Ladies Learning Code, open data entrepreneurs, developers, and city staff about open data and how to begin to engage with it. City staff included the open data lead and an enthusiastic and tech-savvy City Councilor, as well as data stewards from several City departments who were available to speak with informally in short ‘speed dating’ sessions. The atmosphere was congenial and light-hearted and allowed for some interesting conversations between citizens and city staff around the value and demand for city data as well as the internal challenges as to why some data is not available in a non-adversarial one on one dialogue.

52 “a women-run not-for-profit group working to empower everyone to feel comfortable learning beginner-friendly technical skills in a social, collaborative way” - http://ladieslearningcode.com (last accessed March 12, 2013)
53 A “data steward” is the term commonly used to describe city staff that create and work with government data.
Collaboration

For the ODIs that had early outside pressure or have actively sought out interaction with the local community, there has generally been a good relationship between the two. There are small complaints, but overall the responses from both city employees and the community have been extremely positive. Several participants pointed out that the relationship is not just beneficial for the community; the City itself benefits from the expertise provided externally as well. The data users provide input into the process of delivering data in terms of formats and services, but they also provide a valuable service in error checking the datasets and delivery mechanisms. “We’ve probably had tens of thousands of dollars in consulting done just through the open data portal, [through] these guys using the data and contacting us [about problems]” (Nov. 2012).

The collaborative relationship between the open data community and city staff is one that was echoed by many people. Some participants describe it as a unique relationship between citizens and government.

“It’s citizen engagement in a way that I’ve never seen before. It’s not citizens saying ‘hey you’re not doing this for us, you’re not doing that for us’; being critical. It’s citizens trying to engage and work with you (City Staff, Nov. 2012).

This leads to a feeling of collaborative construction in some instances.

They have a feeling that it’s almost their program as well as the City’s. It’s incredible and very different. Rarely in government do you get something where the citizens feel like they helped develop it, this is their program too and feel like they have a role in encouraging use, etcetera. The [civic open data] group will get us involved in career fairs and talks at the university, and in turn the City is very responsive and provides people for these events, any opportunity we can have to be involved, we get in to and they use their connections to get us those opportunities (Nov. 2012).
This type of engagement is considered by many advocates as the key for success in a City’s open data program. This direct and regular communication between an e-government program’s staff and users is important for developing a real understanding of how the program works and how to improve it (Morgan, 2004). It is especially important to have direct relationships between the data users and the data owners; between the developer and the individual who actually creates and maintains a specific government dataset.

*To be honest, the number and availability of datasets is not as important as the engagement with the community. And when I say community I mean, as a consumer it’s really important for me to have a good relationship with the data curators or stewards. Even if there’s only a handful but they’re really awesome about taking my corrections and changes and suggestions, then I think that’s a far better use of resources than putting out a zillion datasets that may not be relevant and are probably put together poorly and not maintained, which is closer to what the Canadian [Federal] government has done (Open Data Advocate, Nov. 2012).*

Unfortunately these relationships do not exist in every location. Many of the participants who are open data users explained the need for some form of liaison between the data owners and the community in order to create the collaborative environment that is so important in other locations.

*I do think the City needs a public facing open government/open data person. Somebody who’s not going to build the community because that’s not the way things work, but will participate actively in that community. (Open Data Advocate, Nov. 2012)*

Another advocate notes that in their location that “the relation with the City is really good, but the challenge is having somebody at the City to have the relationship with” (Nov. 2012).

The programs that arose out of a specific department and that have not become corporate-wide initiatives have tended to have less interaction with the public. Had there been an existing
community demanding open data before the programs began, then perhaps a relationship would have developed like we see in many of the larger programs. In the cases examined, the focus is generally on providing better service to existing customers and the staff involved does not actively promote or seek out the input of the external community. There is no evidence that they do not want to develop a relationship. To the contrary, all of the people I spoke with in the smaller programs have stated an interest in increasing the level of engagement between themselves and local community groups and institutions in the future. For now though, they are more focused on developing their program for the current audience and are not actively seeking to expand unless their program becomes part of a larger corporate mandate.

4.4.5 Challenges

Five main challenges to developing mature open government focused MODIs emerged during the research. (1) A lack of dedicated resources, both financial and human resources; (2) technical constraints stemming from old equipment and information management practices; (3) cultural barriers within the organizations; (4) institutional constraints regarding data dissemination; and (5) a need for cross-organizational education and commitment to open data and open government. Many of these challenges are reminiscent of those encountered in the growth of other municipal e-government programs (see section 2.7.3).

4.4.5.1 Resources

A consistent problem that came up in interviews was the lack of resources allocated to the ODIs. Most cities run the programs without any additional budget. There is often project funding to setup the website and maybe run an apps contest, but many of the programs lack dedicated staff and are run ‘off the corner of the desk’ by employees who have shifted roles in the
This lack of resources can make it difficult to create a high quality website or to engage in meaningful interaction with community members through online services or by hosting events.

The startup of the ODI is the most resource intensive since it requires developing a data catalogue and gathering and cleaning up an initial offering of datasets. Once this is complete, it requires little time or money to maintain. But without dedicated staff, it can be difficult to grow the program to justify a good return on investment for hiring additional staff. One city staff member explained that even though their ODI was probably saving the municipality money and providing better service to data users, quantifying this is very difficult since it is hard to isolate the effects of the ODI when looking at resource use at the end of the year. In fact, they noted, you could even end up seeing a loss since only the costs associated with the ODI are accounted for, but not the savings and improved service it generates. Like in development of other e-government programs, lack of staffing expertise and a difficult to measure return on investment can significantly affect the growth of MODIs.

4.4.5.2 Technical Constraints

Technical constraints were a commonly cited challenge in the programs. The information and data management systems in most cities are made up of older technology that was not designed with open data in mind. These systems may not be able to export the desired data in an open, non-proprietary or machine readable format, nor can many of them be adapted to automatically update data, a necessity for certain types of datasets. Even if the systems are technically able to produce open data with some additional programming, the department may not have the technical expertise or staff time to do so. Another related issue is inconsistent and poor
data management standards used by different departments or individuals. All of these make acquiring and publishing some datasets extremely cumbersome and overly resource intensive.

Most participants minimized the role of these technical issues claiming that they are only temporary. New software systems are being made open data capable and will slowly replace the old systems which are causing some of the trouble. Information and data management is also being standardized through organizations like the Municipal Information Systems Association (MISA) that should improve data quality over time.

4.4.5.3 Cultural Barriers

There is an engrained culture around ownership and distribution of government data that poses a problem for MODIs. Some participants emphasized that for some individuals in government, there still exists a sense that information is power and that openly sharing that information is not an easy transition to make. Others “still have the mindset that they own the data. They created it so it’s their data” (City Staff, Nov. 2012). Some departments are concerned that publishing their data might lead to misinterpretation by City Council or the public leading to criticism or increased workload. There were also concerns by some officials that providing data such as crime statistics without context and leaving it up to users to potentially misinterpret or misrepresent. This fear of releasing data due to potential misinterpretation highlights a larger issue of mistrust of the public by government.

Several participants pointed out the difficulties that arose from an internal generational divide. One interviewee explains this in terms of the work environment. “I have to deal with three different generations, baby boomers, gen X, and gen Y. They all have different work expectations and styles” (Nov. 2012). Another staff member points out the effect that age is having on technological uptake:
We still have a lot of work to do to convince people of the benefits of open government and open data. I’m finding it’s also a generational thing. The younger people are more tech-savvy and are more eager to embrace it. The older generation, while I don’t want to say they have no use for it, it’s not a priority in their work. (Oct. 2012)

There is also a culture of caution around releasing public information that may have privacy or security implications. While privacy and security are serious issues that need to be taken into account, sometimes the fear of mistakes or public outcry can make people hesitate in publishing certain types of data. There is often a real concern about violating privacy legislation that can cause some staff to err on the side of caution, choosing to not release any questionable data for fear of the repercussions.

4.4.5.4 Institutional Constraints

An issue that came up several times in different cities was that of some departments selling data as part of a cost recovery strategy. This is commonly seen in the GIS departments where selling different types of geospatial data and aerial photography is often standard practice. Some cities such as Edmonton explicitly avoid the problem by not offering certain types of data and leaving it up to the department to sell. In Toronto, the Geospatial Competency Center charges for providing some data; this charge is mandated by council. A staff member describes the frustration of, on one hand promoting open data, but on the other hand being forced to monetize their own department’s output. Some people understand the benefits to giving away data “but when half of your operating budget is supported by the revenue you’re generating, it’s a lot harder to buy that. Unless in a new budget that is taken into account, then it’s a tough sell to say ‘just stop selling it’” (Nov. 2012).
Charging for data is not the only institutional challenge facing open data programs. Some potentially valuable datasets in the possession of city departments is also under contract with 3rd parties that limit their ability to share the data. Legislation created prior to the development of modern ICT can also stand in the way of providing some data. For example, Toronto’s *Assessment Act*\(^{54}\) forbids the release of data externally. The data can be used internally within the City, but it does not allow for the data to be published publicly. Ironically, the data is publically available via the Municipal Property Assessment Corporation during office hours\(^{55}\) where any member of the public can physically examine the assessment rolls, but the same data cannot be published on the City’s open data catalogue. While this may have made sense at the time that the legislation was written, these types of regulations now stand in the way of providing some types of public data in digital, online formats.

### 4.4.5.5 Cross-Organizational Education

Part of the reason that open data has not taken hold in all city departments is a simple lack of understanding of open data and open government by staff across the organization. A large task taken on by city staff running open data programs is to engage with data owners in multiple departments across the organization to inform them about what open data is and what the benefits are for investing their limited time in providing it. “I’ve had a lot of people when [setting up the ODI] say ‘look, there’s just open data, it’s information and how you present it doesn’t matter; whether it’s PDF or CSV, it’s still the same information’” (Dec. 2012). A developer told an illustrative story about their struggles with this issue in Edmonton early on in the program when they were trying to get the city’s garbage collection schedule to build applications with.

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\(^{54}\) [http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90a31_e.htm](http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90a31_e.htm)

\(^{55}\) *Assessment Act*, 1990, section 39(2).
I called up the waste management department and talked to the manager for about an hour—hour and a bit, and I was trying to explain to him why I would want the entire schedule and all of the regions in the city—you know, all of the garbage collection zones—and why I would want boundary information for that. Now he couldn’t quite wrap his head around the fact that I’d want anything more than my own garbage collection schedule for where I live (Nov. 2012).

Unless staff members are educated about the value of open data there is a larger chance of them not understanding or accepting these types of requests from citizens.

This type of situation is not unusual. Speaking with data owners from the City of Ottawa at the Learn Hack YOW event, I found several of them did not really understand why somebody might want certain types of data. “What would you do with it?” “Why do you want that?” were common refrains from some individuals; very practical and utility focused. Others, for example a representative from Waste Management in that city, were incredibly enthusiastic and excited to hear what kind of data people were interested in regardless of the ultimate purpose. This experience echoes the situation that many participants described where no whole department seriously opposes or supports the ODI, instead it comes down to individuals within those departments. “You’ll find that in a given department there may be pockets that have really embraced it, but the work areas around them have not. It’s isolated pockets. It comes down to the leadership in those groups” (Open data staff, Oct. 2012).

The importance of accessing data owners in different departments emphasizes the need for communication and education about open data across departments. Most of the participants who worked in government described internal promotion and education as one of their primary tasks related to open data. “The social network is the base of everything. If you want open data you need to talk to and convince the professionals and managers [of different departments]” explains Montreal’s open data lead (Nov. 2012). On top of this broad social network she
emphasizes the importance of top managers. “If I don’t have a top manager around me I do nothing. In a bureaucratic organization I have scholarity, I have a PhD, I have a big social network around me, but I couldn’t do anything if a top manager did not support me” (Nov. 2012).

Accessing senior managers from across the organization—and consequently the staff in those areas—is understood as an important aspect of running a successful ODI. As such it is structured into the programs in some cities. For instance Toronto and Regina both have some form of Open Government Committees to insure that top managers from many departments are represented and involved in open government policies. Regina’s open data lead explains:

For open government you want it to become a cultural shift, you want it to be something that everybody in the organization does and not just one person. So I think that’s one of the risks, that if you start an open government area, that people start to think that it’s not their responsibility. And really open government is the entire government body’s responsibility. It’s a government mandate. … I would rather have 20 people from different business areas sitting on my committee than, say, two people that are dedicated in my organization, because now I have 20 advocates in 20 areas (Nov. 2012).

Over time these internal communications strategies have been slowly yielding results. Every participant I spoke with described an increasing level of buy-in from other departments. More and more often departments which at one point needed to be convinced to release any data at all are starting to come to the open data team asking for help to release more data. “Now that we have it up and they’ve seen the benefits of it, they are the ones trying to publish more … and I’m trying to keep up with them” explains one city staff member (Oct. 2012). This is echoed by many other participants who noted a changing internal culture around their open data programs, with more departments starting to understand that open data provides another avenue for them to share the output of (some) of their work.
We’re getting areas come to us now saying, ‘we’re starting a new program and we want
to make our data open. So how do we set this up?’ I’ve had other areas come to us and
say, ‘we’ve had this policy approved and in order to show accountability, we want to post
this data on a regular basis’. Those kinds of things are big wins. When you organization
starts thinking in those terms. (Nov. 2012)

4.4.6 Summary

This section has illustrated many of the themes and patterns found within Canadian
MODIs. It outlines two broadly different approaches to open data: the department-level program
and the organization-wide program. It also explains why the catalogue contents examined in
section 4.2 predominantly consist of geospatial data and a seemingly random sample of simple,
politically neutral datasets. The role of the community in deciding on the datasets is explained as
minimal, and in general MODIs have not engaged many of their potential audiences.

Of interest is the connection between the developer audience and the staff involved in
MODIs. There appears to be a genuinely collaborative engagement between these two groups.
The high degree of constituent buy-in, regardless of the small number of people involved is a
healthy sign for open data that has not been evident in past e-government programs (Schwester,
2009). The level of engagement is not constant between or within cities, but for those that have a
strong relationship it is seen by both city staff and the developer community as mutually
beneficial and important.

The motivations and goals of different MODIs vary, but there is a consistent desire to see
the principles of open government advanced through these programs. The realities of a neoliberal
political environment are understood by those involved and hence open data is described in new
public management terms of improved efficiency and increased customer service. Those who see
open data as an important facet of open government hope that this business case can allow open
government principles to take hold through these programs where traditional advocates have not been successful.

The MODIs themselves encounter many of the same challenges that other e-government programs have encountered in the past. Technological and legislative challenges exist but are seen as secondary to the cultural challenges of organizational silos and old mentalities over the power of information within an organization. Anecdotal evidence is provided that MODIs are starting to address some of these challenges, particularly in regards to cultural challenges through their emphasis on cross-organizational education.
Chapter 5

Implications and Conclusions

5.1 Introduction

In the previous chapter the output of Canadian MODIs and the results of the interviews with individuals involved in the programs were presented. In this chapter I use this information to inform a broader discussion about the implications of the research and provide some concluding remarks about the results.

In the implications section I begin by discussing the potential problems and benefits of the different approaches being taken toward open data in Canadian cities. I then move on to discuss the ways in which data is interpreted and the role of government and 3rd parties in presenting that data. Next, I examine some of the larger issues around access to open data programs and weigh in on some of the debates concerning privatizing public services and the position of open data in regards to open government.

This chapter ends with a conclusion section that lays out the results of the research in response to each of the research questions presented earlier (Chapter 1). It concludes by presenting some of the limitations to the results and provides some ideas about future research possibilities concerning municipal open data.

5.2 Implications

Differing Approaches

The differences between the origins, goals, operation, and output of Canadian MODIs may be one of the greatest strengths of the system as a whole. As described in section 4.4, there are two basic origins and strategies evident in the MODIs studied. The smaller, department-level
programs are more focused on providing open data as a service for existing data consumers and are less focused on open data as a tool for community engagement. As well, these programs also do not seem as interested in the creation of applications for citizen use. The advantage of these smaller, department-level programs is their focus on service provision based around one type of data (e.g. GIS data in the District of North Vancouver or planning and forecasting data in Mississauga). This means that those in charge of the programs avoid many of the larger organizational-scale problems that others face, such as the need to educate and include multiple departments. At the same time, however, the wider ranging organizational-level programs are less focused on any one type of data provision and offer more opportunities for user engagement. These programs, by virtue of their cross-department scale, are forced to involve multiple groups of people within the organization in the ODI thereby creating a stronger base for future open data development.

There is a great deal of experimentation among MODIs in terms of hosting platforms, data offerings, engagement strategies (or lack thereof), policies, and implementation strategies. While it is difficult to measure success, it is possible to observe some of the outcomes of the different approaches to MODIs taken by each city. Through this early experimentation, there will inevitably be programs that excel in one area or another which can subsequently be examined by others and implemented into individualized programs seeking similar outcomes. The late-comer to open data in this study, Regina, is an example of this phenomenon. City staff had a particular goal for their open government initiative—namely greater public accountability and collaboration—and they had a wide range of cities to study in order to find one that had an approach that they could emulate—in this case it was Montreal.
Experimentation is one of the great benefits of open data at the municipal scale. As opposed to more senior-level government bodies (provincial or federal government), municipal governments are more flexible in their ability to experiment and iterate on programs relatively quickly. In the case of open data, this means that as each MODI matures, cities will continue to take different approaches to solving the problems that arise in relation to their own programs. Cities starting new ODIs and those that expand or evolve their existing programs will be able to examine the successes and failures of other City programs and learn from those cases in order to move forward with their own ODIs.

Interpreting Data

The provision of raw data alone is not enough to affect how people understand policy and the municipal environment. There is a need for data to be filtered through the skilled hands of technological interpreters (Davies, 2010). There are two ways that this can be accomplished. First, city governments need to provide data in open data formats, but also in human readable formats such as PDF documents and reports that are digestible to the audiences that need the information. Cities like Regina are adopting this framework in their open information program. Other cities like Toronto and Mississauga also see the importance of this secondary aspect of data provision and are starting to provide human readable analogues to their open data.

The second method for presenting data is through digital tools that allow for individual or multiple interpretations of the data. Government built tools like Edmonton’s Dashboard and Toronto’s Wellbeing Toronto show that these services can be provided by cities themselves. Far more common, however, are applications and visualizations built by 3rd parties. The existence of a great deal of geospatial information in city datasets means that mapping applications that combine and contextualize data are extremely common and useful. The democratization of what
were traditionally very specialized GIS tools has given rise to a large number of location specific, spatially-contextualized interpretations of data by neogeographers working outside of the academy, often with little or no technical training (Wilson & Graham, 2013). While they may not label themselves as such, many of the developers working with open data are acting within the neogeography realm to produce meaning and value through digital mapping tools.

The ways in which data are presented can be as simple as taking a complex set of data and making it more easily absorbed, for instance with a budget visualization (Figure 5-1). It can also be a much more complex and individually interpretive system like Wellbeing Toronto. The tools can also help with more functional, day-to-day services for citizens such as visualizing road construction projects or even understanding a city’s zoning bylaws in a more intuitive manner (Figure 5-2).
Figure 5-1: Ottawa’s 2013 Expenditure and Revenue Summary (Source: Openspending.ca\textsuperscript{56})

Figure 5-2: Chicago’s Zoning Visualized by 2nd City Zoning\textsuperscript{57}


\textsuperscript{57} An Open City app by Derek Enor, and Juan Pablo Velez.
These tools need not be unidirectional only, with the creators presenting the data and the users consuming it. The growth of sensor technology and large collections of citizen-created data means that these tools could host data from many actors. These actors include official government data alongside many other sources ranging from academic and non-profit organizations (as we’re starting to see with Wellbeing Toronto) to individualized data from GPS units embedded into people’s mobile phones or even more qualitative data like geotagged Twitter messages. There is also room for the public to adjust and add content to existing city data. As one city staff member explained to me (Nov, 2012):

*The folly of open data is that it’s been primarily a one way street, and that needs to change... what the public does with the data in terms of apps and what the public does to add value to the data doesn’t necessarily come back to the City, not because they don’t want to, but because there are no mechanisms at the City to receive that data and filters to determine the quality and value of that data.*

It is entirely possible to use these tools along with city data to provide new participatory mechanisms for processes like urban planning through more accessible and inclusive iterations of PPGIS. For example, to help expand public consultation around a proposed light rail transit (LRT) line expansion in Edmonton, Matt Dance, a graduate student at the University of Alberta, helped create a proof of concept application called Wiserpath\(^58\) (Figure 5-3). The website provides a platform for users to sign up and draw their own preferred LRT lines, propose stations, and add multimedia comments to the collaborative map. City officials have not yet embraced this system but there is a growing interest by many planning professionals to adapt these types of

\(^{57}\) [http://secondcityzoning.org](http://secondcityzoning.org)

\(^{58}\) [http://wiserpath.bus.ualberta.ca/](http://wiserpath.bus.ualberta.ca/)
systems in the future (cf. Evans-Cowley & Hollander, 2010; Foth et al., 2009; Mansourian et al., 2011). The provision of open data and the internal data management and sharing changes that come with it are creating the infrastructure so that new kinds of participatory mechanisms like this can be established and function correctly.

Figure 5-3: Wiserpath Online LRT Planning in Edmonton (Source: University of Alberta)59

Digital Divides

There is an overlap between scholars writing about open data and those writing about the emergence of neogeography with regards to the potential for democratic engagement. Haklay (2013) provides a particularly useful way of thinking about the audience for neogeographic tools which can just as easily be applied to the audience for open data initiatives. His ‘hierarchy of hacking’ presented in Figure 5-4 describes “the ability [of users] to stretch the functionality and capabilities of a given system beyond those that are provided by its creators” (Haklay, 2013: 63). The hierarchy deals with the ability of users to take direct control over the tools and information

59 http://wiserpath.bus.ualberta.ca/
in order to provide their own alternatives meaning and values. The level of control available to the population is broken down into four levels, with each higher level of control available only to a smaller subset of the population. While originally used to describe the control of users over neogeographic tools such as geotagging, mapping mashups, and geographic systems like OpenStreetMaps, the hierarchy can easily be adapted to an open government data context in which the ‘system’ in question is the data provided as well as the platforms that host it, and the ‘creators’ are municipal governments.

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<th>Type</th>
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<td>Significant skills, negotiation and translation of knowledge, structural changes</td>
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<td>Shallow technical</td>
<td></td>
<td>Skills, user/programmer, control over/creation of applications</td>
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<td>Use</td>
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<td>Knowledge of web apps, legitimacy of outputs, access to data and software</td>
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</table>

Figure 5-4: Levels of Hacking (based on Haklay, 2013)

Haklay’s first level of control is called ‘meaning hacking’ and is available to the largest number of people. The users at this level do not make any change to the system or need to create/alter any technical code. Instead the change takes place through the provision of new context and meaning. For example, a user who downloads information about crime statistics and uses them as part of a campaign to mobilize support for improved affordable housing would meet this lowest level of ‘hacking’ by altering the original meaning of the information. This is easy to accomplish and only requires enough technical skills to find and interpret the data online.
The second level of hacking is ‘use hacking’. This involves the user taking some functionality of the system and appropriating it for a new purpose. Haklay uses the example of uploading Google’s satellite photos to Flickr and using the annotation tools provided by the site to add personal context to the photos. The user takes the photo and marks locations where significant events occurred in their own lives, thus altering meaning by the use of existing functions. In the case of open data an example of this would be the cross-referencing of multiple datasets to show connections that were not visible in the original datasets. This level of hacking requires some technical knowhow with regards to utilizing certain types of software, but these skills are usually available to many different groups.

The third level is ‘shallow technical hacking’. This is the building and reconfiguration of systems to provide new uses and meaning to the data. Data mashups using the Google Maps API and applications development are common examples of this. When discussing open data, this is the level of hacking that is usually understood. This type of hacking requires a higher level of technical understanding along with the ability to write code which greatly reduces the number of people who are able to engage with the data in this way.

The fourth level is ‘deep technical hacking’. This relates to the changing of code and the creation of new systems. Haklay gives the example of the creation of OpenStreetMap as an instance of deep technical hacking in the realm of neogeography. For open data a similar example could be the integration of Open311\textsuperscript{60} into municipal service provision as it provides access to new tools and new ways of accessing municipal data and services. This level of

\textsuperscript{60} Open311 is an extension of the original 311 call center to include online technologies. It allows for users to report and exchange information about issues that concern public space and public services. It offers a free web API that allows for applications such as SeeClickFix to integrate directly with a city’s 311 system. Many cities in North America including Toronto have begun to utilize this system.
hacking requires a significant level of skill and resources that are only available to a small technical elite within society.

At this time the primary audience that is engaging with municipal open data are those with relatively high skill levels; audiences able to engage in the second and third level of the hacking hierarchy. This is evident not only in the description of users given by city employees, but also in the composition of open data advocacy groups and the types of events that bring together people around open data. Hackathons and apps contests are commonly used to build engagement between citizens and government but these events by their very nature cater to a more technologically sophisticated and skilled audience. While it is true that there is a real digital divide in the level of access to technology and the internet (Norris, 2001), the exclusion of those who do not have the skills to actively engage with these technologies, what is sometimes called the secondary digital divide (Hargittai, 2002), is a more pervasive issue in the realm of open data. Michael Gurstein (2011) raises this point in worrying about the future role of open data and whether it might only serve to “empower the empowered”.

While there are certainly a relatively large number of people who are capable of understanding and manipulating these systems and data at a low level (i.e. meaning and use hacking), the higher levels are only available to a small group who have the necessary skills. This group is overrepresented by well-educated males that are affluent enough to engage voluntarily in these projects (Budhathoki, 2010; Davies, 2010; Bates, 2012; Wilson & Graham, 2013). There is not a lot of room for marginalized groups or even for the organizations that represent them.

While this exclusionary tendency is inherent in the technical nature of open data itself and is a real concern, it is not an overwhelming one. At this time, open data is still very new, and
just like all new technologies it is attracting a small subset of the population who are willing to spend their time playing around with new tools without necessarily having any serious commercial or social goals. The datasets being provided by most municipalities, with the exception of transit, waste disposal, and other service delivery data, offer little at this time that would be worth devoting time and resources to using for the majority of the population. Of the applications developed using city data, there are some success stories such as ReCollect.net\textsuperscript{61} and a few transit applications that have gained modest commercial success, but the majority are still mostly the experiments of technically proficient hobbyists.

**New Civic Actors**

One of the valuable aspects of open data in its current state is its ability to create a real engagement and collaboration between some city staff and some of the young, tech-savvy population of those cities. This population, while being praised as a driver of urban innovation and economic growth, has not traditionally been seen as a civically engaged group with a strong attachment to place (Florida, 2002; Nevarez, 2002). Open data and the events that surround it provides a way for this group, what Beth Noveck (2012) calls ‘civic-coders’, to play some role in governance. These individuals express interest in using their own skills to help improve local government and services, a sentiment that others have found within the cohort of open data users (Davies, 2010; Socrata, 2010).

Along with individuals and smaller, less-organized groups, the presence of open data is also attracting some groups that are much more focused on specific policy issues. For example

\textsuperscript{61} https://recollect.net is a service that local governments can contract to handle their waste collection scheduling. It also offers an application for citizens that keeps track of pickup schedules and sends reminders of dates and changes that affect them individually. The program started in Vancouver as an application called Vantrash using open data. It is run by two programmers: Luke Closs and Kevin Jones, and an open data advocate, David Eaves.
OpenNorth, a Canadian non-profit that creates digital tools to empower citizens, has been actively involved in the open data realm in Canada at all levels of government. They have built tools that utilized municipal open data to track health inspection violations\(^{62}\), scrape public documents (PDFs) to extract usable data in order for users to explore and analyze city contract expenditures\(^{63}\), and are building a platform for tracking and analyzing activities of City Councils\(^{64}\). One of the problems with earlier e-government programs was that services were only delivered in a one-way manner, with the government acting as a monopoly on the provision of the services (Ahn, 2012). By allowing technologically skilled civic actors into these new governance spaces, alternative approaches and perspectives can be created alongside those created and sanctioned by the government itself.

There is some concern that the presence of this group of volunteer labour may be exploited by private firms or even government itself (Ritzer & Jurgenson, 2010). Veljkovic et al., (2012) describe the possibility for growing connections between citizens and government through web 2.0 tools to start to blur the lines between citizens and public servants. This observation may have some salience with regard to some of the relationships between civic actors and government in the open data space. There is some reliance on the community to take on what may have traditionally been the work of government, such as organizing events, error-checking datasets, and even developing public services with that data. It is a fine line though. In order to maintain a meaningful level of collaboration between advocates and city staff, there has to be room for

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\(^{62}\) [http://resto-net.ca/](http://resto-net.ca/) This project has recently been discontinued. Interestingly, OpenNorth now encourages users to petition the city of Montreal and the Quebec government to provide the data in the standardized format that Yelp! (a crowdsourced review site) uses.

\(^{63}\) [http://documents.montrealgazette.com/](http://documents.montrealgazette.com/) built for the Montreal Gazette. This does not use “open data”, but does use public documents to extract usable data.

\(^{64}\) [http://mycityhall.ca/](http://mycityhall.ca/) The first iteration for Toronto is currently being crowdfunded and is in development.
independent activities and joint operations. Over-reliance on the public to sustain open data programs could backfire and lead to burnout, while at the same time, under-reliance may lead to a feeling of disconnect between the community and the staff operating the program. It should be kept in mind that all of the community members are volunteers and are in no way under any obligation to continue their efforts. If they are not receiving some benefit from their actions, then the high levels of engagement seen in some cities will likely come to an end.

Privatizing Data Services

There are some commentators that are concerned about the potential role of what Tom Slee (2012) calls the “open government data doppelganger—the shadow of commercial interests that follow civic hackers wherever they go; the new markets that spring up inevitably from the ruins of the old” (pp. 4). Slee and others (Bates, 2012; Gurstein, 2012; Longo, 2012) worry that the development of open data will be co-opted by large private firms interested in open data for profit, while at the same time offloading provision of many current and future public services onto the private sector. While there were certainly some signs of corporate involvement in Canadian MODIs (e.g. the Apps4Ottawa contest is sponsored by many private companies), none of the participants in my research raised any concerns of this possibility.

This does not mean, however, that privatization is not a valid concern. There is a tendency for those involved in technology and open source communities to lean toward a ‘cyberlibertarian’ perspective which emphasizes radical individualism, the role of market forces, and a distrust of government programs (Borsook, 2001). This perspective is evident to a greater or lesser degree in many of the discussions around open data (e.g. Robinson et al., 2009; Shirky,
where it is seen as “the rare partnership where corporate interests and the public good are well-aligned” (Lee, 2012: 39). This may end up being true in many instances as business interests take public data, reuse and repackage it into useful applications and provide better solutions than city governments can provide. The case of OCTranspo in Ottawa is a good example of this concept in action, where provision of transit applications is now left exclusively to private developers since they are able to create better products than OCTranspo itself.

Where this is less likely to occur is around data that is not easily monetizable. It is not obviously evident how a private developer might earn a profit on an application that keeps track of Councilor voting and expenditure records. It could be argued, therefore, that the role of providing that service should fall upon the city government, but it seems unlikely that this will occur. Many municipalities in Canada already provide this type of information in the form of non-machine readable documents, but none of these municipalities have moved to providing this data in an open format except for Edmonton. The data that Edmonton does provide, however, is not used by the City in any applications; instead it is only available on their open data portal in a raw format. Perhaps tellingly, as of this time, no 3rd party has created any applications with this data either. This raises the question of who is responsible for creating the products that translate and make use of less monetarily valuable data.

There is room for optimism. Non-profit groups like OpenNorth are springing up to take on some of these tasks that private developers and city governments are ignoring. It is also possible that given a strong internal push, city governments could easily leverage the developer community to create applications around this type of data through incentives such as contests or, as was suggested by a couple of participants in this study, through small independent contracts with developers who are able to create valuable but non-commercial applications. For example,
Edmonton could create a competition to see who could develop the best application that uses their City Council data. The winner of that competition (whether a single person or a company) would be granted a short-term contract to continue to develop and maintain the application which the City would host and provide as an official service. This type of system could serve to both continually engage local developers (and avoid problems of vendor lock-in) as well as generating well-functioning e-government tools without the inherent high initial costs.

**Open Government Principles**

It is difficult to say whether Canadian MODIs are manifesting the principles of open government. This is partly due to the variation between programs and partly because these programs are still very immature. Some MODIs are clearly operating like traditional e-government programs, providing a platform delivering data services in a new and more efficient manner. Others are explicitly working under open government frameworks that emphasize the role of open data for improving accountability, collaboration, and service delivery. All of the participants in my study, whether open data advocates or city staff, were cognizant of open government ideals and felt that open data plays some part in moving towards this within local government.

Unfortunately, many of the programs examined in this research are not actively providing much, if any, data that could be considered to improve public transparency or accountability. It is worth noting though that most municipalities are also not providing a great deal of service-type data such as transit or other city services data. So while scholars like Yu and Robinson (2012) are concerned that governments will tend to only provide service data, this evaluation saw no
clear bias toward this tendency. Cities do try to publish data that the current audience of developers are interested in but at this time most of the datasets that are available are the ones that have been easy to distribute: geospatial data that does not contain personal information. As the programs mature and more potentially sensitive datasets become available, it is conceivable that this will become a problem. As Clay Shirky (2012: 23) points out, “we got the APIs. We got the bus schedules. The politicians, however, have yet to lose much sleep over open data”.

One area where MODIs have touched on open government principles is in the collaborative aspect of some programs. Spaces of governance are usually created by the state, with citizens/communities invited to participate to some degree (Taylor, 2007). The cities that have fostered a strong community engagement are interesting examples of how this system is altered. Advocacy groups are creating their own spaces such as hackathons and other events, and inviting government actors to come to them. These events create a mutually beneficial environment where dialogue and collaboration can occur, with citizens playing at least some role in how open data programs develop over time. The advocacy groups put pressure on the City to publish data and get involved in events and in many cases the City willingly participates, sometimes even providing the physical meeting space. By participating, the City is able to leverage the community’s efforts to bring citizens together and create products with the data. Citizens can provide event organization, data error checking, service provision (in terms of applications), and public promotion for the City’s open data initiative all at no additional cost.

Other e-government programs have not been successful at creating any form of real citizen engagement. This generated a number of problems in maintaining resources and political incentives for those programs (Scott, 2006; Ahn, 2012). What appears to be unique about open data programs is that some of them have been successful in bringing in civic engagement with at
least one type of citizen. This engagement, along with the tangible outputs generated in the form of applications means that those programs can be seen as cost saving, innovation driving, and publically supported. The programs are cheap to maintain, and given the benefits that fit within the predominant neoliberal framework of municipal governments, this means that they should be sustainable and expand over time. This general trend is evident in the programs examined in this study. Many participants were optimistic that the ODIs that they were involved in are slowly altering the culture and practices within local governments to create an environment more amenable to open government principles. It is this slow movement that is perhaps the most important aspect of open data in a larger open government context. Wildly overblown rhetoric and unrealistic expectations about radical democratic change surrounded previous e-government programs that did not deliver on those promises. It is important to maintain realistic expectations about the scope and power of open data to generate important government changes, as too much hype can lead to burnout among advocates and make long-term support harder to maintain (Nijkamp & Cohen-Blankshtain, 2011).

5.3 Recommendations

Several factors regarding the successes or difficulties faced by MODIs arose through examination of the programs and discussions with individuals involved from both the administrative and user perspectives. I will now outline some of those factors in the form of recommendations for municipalities that are interested in starting an open data program, or those that wish to improve and existing one.

1. **Look for local support.** Without community support the value of the program will be limited. Open data relies on users to create value out of the data provided; on its
own, the data is inert and not particularly useful. Given the nature of open data, the demographic that is naturally going to become involved beyond a superficial level is the developer/computer science community. Most cities will have some active hacker or IT community already in place which can become an important partner in showcasing the program, as well as forming the core of local meetups and discussion. Another location for finding support is in the higher education setting. Computer science, GIS, or even economics students (given the right data) may be happy to have access to interesting and local data to work with for school projects, or just for personal interest.

2. **Make the program organization-wide.** While open data initiatives that are run out of a single department such as IT or GIS may be successful, they tend to be more narrowly focused and less integrated into the local community. The data provided in these programs can be very one dimensional (e.g. all geospatial or all planning related), whereas programs that include many departments can make a greater variety of datasets available. There may also be less risk of stagnation or failure for the program if it is not reliant on one department and/or one person or group of persons to continue operations.

3. **Create a formal open data policy.** One of the major impediments to creating a robust, organization-wide open data program is the challenge of bringing multiple departments on board. While a policy may have no legal force, it can act as a tool to remind managers of their role in the corporate open data strategy.

4. **Experiment and iterate.** The program will not be perfect. It is important to put up data and to get feedback from the users in order to constantly improve the program.
A tech-savvy audience will understand the importance of trial and error with regard
to developing programs; use this to your advantage and solicit the community to do
error checking, make recommendations, and experiment with events. The added
advantage of this approach can be the creation of a stronger relationship between the
users and the administrators of open data initiatives, as the users begin to feel a sense
of ownership and connection to the program.

5. **Create a community liaison.** In order for a strong community connection to
develop there needs to be an active municipal employee for users to communicate
with. The MODIs with the best local community involvement tend to have a person
officially or unofficially taking this on this role. The liaison should be comfortable
with the technical side of development and data, and have strong connections with
the team that runs the MODI. They need to be able to speak with data users and data
stewards to try to bring together the concerns of each group. Without this
communication there is often a sense of frustration as to why certain actions are taken
or why some types of data cannot be provided. A good liaison will utilize social
media, be present at as many local events as possible, and act as an ambassador for
both the city and the users. As much communication as possible should be done
publically to reduce duplicate questions and suggestions, as well as to show that there
is an active dialogue in progress. Online message boards, blogs, social media
accounts, and other systems should be prominently linked on the open data portal.

6. **Gear the program to developers and technical users.** Given the limited resources
available for new programs, the resources that are available should be put to the best
use. Because the core audience and the people most likely to create value out of
government data are developers and technical users, the program should initially be geared toward their needs. The focus should be on providing interesting data in useable formats, with good metadata, and preferably an API for developers. While built-in visualizations and other tools can sound useful for attracting a wider audience to open data, the reality is that 3rd party visualizations and applications are almost always more useful and better designed. The goal should be to make the creation of 3rd party applications as easy as possible to encourage their development.

7. **If possible, host other data.** While it may not be feasible for the city to host data from a wide variety of sources due to the need for quality control and data standards, there is a place for city-related data from trusted sources. It can be useful to host data from other levels of government, government agencies, or trusted organizations (e.g. data generated by a consultant for a government project, or a large non-profit organization). This data may or may not be available elsewhere for public consumption but providing it in one location can improve access and may encourage other organizations to participate in sharing their own data with the public.

**5.4 Conclusions**

This thesis sought to answer four main questions about the development and implementation of municipal open data initiatives in Canada. The first question asked what types of data are available on Canadian municipal open data catalogues, with the goal of determining what type of data actually exists and what purposes it might serve. This inquiry is informed by Yu and Robinson’s (2012) discussion of the potential roles of different kinds of data provision
and what it might mean in terms of the open government principles in which open data is often
couched. The results show a relatively large variation in terms of type, quantity, and quality of
data available in Canadian municipal ODIs. None of the cities are providing a great deal of data
yet, and the data that does exist is mostly simple geospatial data that focuses on infrastructure,
sports and culture, and planning and development. Most cities are not providing much financial,
administrative, or legislative data. There is little in the way of data that provides a service
function (e.g. bus schedules, garbage collection zones, etc.) and even less data that provides for
government accountability (e.g. budgets, councilor spending records, service statistics, etc.). The
vast majority of MODIs are very basic programs in their early stages. There are a few standout
programs that offer higher quality data (e.g. District of North Vancouver), more accountability
data (e.g. Toronto), or better interfaces for developer access (e.g. Edmonton, Regina, and just
recently Ottawa). There is constant growth for many of the programs and over time the number
and diversity of data provided continues to expand.

The second research question asked what the reasons were for starting MODIs in
different Canadian cities. I was able to examine ten (of the existing 23) programs across the
country. I discovered a number of different motivations and strategies for developing open data
initiatives. There does appear to be two main forms of ODI, often started for different reasons
and with different goals. The smaller department-level programs are usually taken on by a small
number of people within a city department that already provides data to the public. In the cases
examined, this meant GIS or GIS related departments. These programs are able to start easily and
exist to provide more efficient and cost-effective service to an existing group of consumers. I
found that those involved in these programs were often interested in open government and
increased public participation but were unable to expand the programs themselves. The second
type of program is the larger cross-organization type. There is more variation in how these programs are run and the goals they have, but in general they are more interested in public participation (at least rhetorically) and the delivery of open government.

The third research question asked what role citizen and local institutions play in MODIs. The evidence from the ten case study cities shows that local institutions are not actively engaged with the ODIs. There is some interaction with local educational institutions that use city data for courses and analysis but they act mainly as data consumers. The real interaction is between the staff who work on the ODIs and technically savvy local users and advocacy groups. This is only the case in the minority of cities, and only in those that operate cross-organization open data programs. Where this interaction does exist however, it is often a productive and collaborative two-way engagement. There are concerns that the audience for open data is a niche, privileged demographic, though this is exactly the audience that is able to leverage city data to make it valuable for other groups.

The fourth and final major research question asked what some of the major challenges facing MODIs are. The purpose was to try to understand why some programs are moving more slowly than others and to determine if there are any large underlying obstacles to improving open data and open government initiatives in Canadian cities. The research found that like other e-government programs, there are many technical and institutional challenges to developing ODIs such as old data management systems and legal obligations in need of updating. These challenges were usually understood to be temporary and solvable with time and resources. The larger challenges are those related to government culture around information sharing and internal digital divides between different public servants. These challenges are understood to be longer-term problems that need to be addressed slowly through cross-organizational education. One
benefit that many see for their ODIs is that they are creating opportunities to push many of these cultural changes in ways that are non-threatening and that offer tangible public benefits.

Limitations of Research and Future Research Directions

The research conducted for this study was purposefully broad in order to explore a topic which has received very little attention in Canada (open government data in general) or worldwide (municipal open data specifically). It would be worth examining the role of open data within one individual city to further expand on some of the themes that arose in this research, particularly the effects that open data is or is not having on policy decisions and the functioning of public services (e.g. transit or waste collection), and the relationship between data producers and consumers.

The evaluation scheme that was developed for analyzing the data catalogues of each city is not optimal and could be modified to suit more focused analysis. At the time that it was created there was a manageable number of datasets for manual inspection. This will quickly become unmanageable as the number of cities offering open data and the number of datasets provided by each city increase. It may be valuable to keep track of how the catalogues progress over time and a more complete evaluation might take into account many variables that this one ignored. To accomplish this, however, the process will almost certainly need to be automated; a task well beyond my own technical skills.

Geographers have largely been absent from the discussion about open government data except in terms of the provision of government GIS data. The intersection between GIS, neogeography, urban governance, and urban planning offers a fruitful area of potential research. The development of new geographically aware sensor technology, both governmental (e.g. “smart cities” programs) and privately contributed (e.g. through GPS enabled smart phones) will raise
numerous questions about the role of data in understanding place and planning urban spaces. Geographers interested in capitalist development and the role of the state may also be interested in how these technologies are changing the roles of citizens and private actors with relation to the functions of government. For instance, questions about whose role it is to provide digital services, who is excluded from the processes, and how this drives development are ripe for exploration.

The research conducted for this study lays out some of the early processes underway in Canadian cities. It provides a base for which to begin to examine many of these other questions that exist now or will exist in the future. My hope is that geographers begin to pay more attention to the world of urban data and technology as they are in an ideal position to do so. The multiple tracts in the discipline allow them to approach these multifaceted issues in a way that many more narrowly focused disciplines may be less adept at following.

In sum, this research has added to the debates around the role(s) of open data at a local level by illuminating the different types of MODIs in Canada and the connections that exist between government and civic actors. It has provided some evidence that open data may provide an avenue for improving open government at the municipal level in a way that prior e-government programs have not. It is important to keep in mind, however, that this evidence is mostly anecdotal and these programs are still in their very early stages. Future work will be needed to determine whether or not MODIs actually fulfill this function or if the early enthusiasm wanes and the programs fade into the business as usual pattern that some commentators see.
References


Gurstein, M. (2011). Open data: Empowering the empowered or effective data use for everyone?. *First Monday, 16*(2).


Appendix A – Examples of Municipal Open Data Applications

Chicago Lobbyists (http://www.chicagolobbyists.org/)

“ChicagoLobbyists.org is an open data, open government, and open source project intended to improve the transparency of interactions between the City of Chicago and lobbyists and their clients. All data comes from the City of Chicago Data Portal.”65

This application was developed by Open City66, a volunteer group that creates applications with open data to improve transparency and citizen understanding of government. They are based in Chicago, Illinois.

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65 http://www.chicagolobbyists.org/about
66 http://opencityapps.org/

Figure 5-5: Chicago Lobbyist Data Main Page
2nd City Zoning (http://secondcityzoning.org/)

2nd City Zoning is another application created by Open City that provides users a simple interface based off of Maxis Software's SimCity2000 video game. The purpose is to provide zoning information for the City of Chicago, Illinois in an easy and usable manner. It has a search feature and provides simple information on its mapping interface. It also provides more detailed information about the zoning requirements for each zoning classification when users choose “more information” about a location (see Figure 5-8).
Figure 5-7: 2nd City Zoning Main Page

**Table 5.5: Zoning Districts for Residential用途**

<table>
<thead>
<tr>
<th>Name</th>
<th>Floor area ratio</th>
<th>Lot area per unit</th>
<th>Maximum height</th>
<th>Front yard setback</th>
<th>Side yard setback</th>
<th>Back yard setback</th>
</tr>
</thead>
<tbody>
<tr>
<td>RT-3.5</td>
<td>1.05</td>
<td>1250</td>
<td>35 ft for detached houses, none for schools and churches.</td>
<td>15 ft, or 12% of lot depth, whichever is less. Alternatively, setback can be the average front yard depth of nearest 2 lots.</td>
<td>Townhouses: complicated as hell, see 17-2-0500. All other buildings: Combined width of side setbacks must equal 30% of lot width, and neither setback can be less than 2 feet or 8% of lot width (whichever is greater). But no setback is required to be wider than 5 feet.</td>
<td>For detached homes: 50 ft or 24% of lot depth, whichever is less. For buildings with under 20 dwelling units, of which at least 33% are &quot;accessible&quot;: 60 ft or 24% of lot depth, whichever is less.</td>
</tr>
<tr>
<td>RT-4</td>
<td>1.2</td>
<td>1000 sq ft/dueling unit, 1000 sq ft/efficiency unit, 500 sq ft/SRO unit</td>
<td>35 ft for detached houses, none for schools and churches.</td>
<td>15 ft, or 12% of lot depth, whichever is less. Alternatively, setback can be the average front yard depth of nearest 2 lots.</td>
<td>Townhouses: complicated as hell, see 17-2-0500. All other buildings: Combined width of side setbacks must equal 30% of lot width, and neither setback can be less than 2 feet or 8% of lot width (whichever is greater). But no setback is required to be wider than 5 feet.</td>
<td>For buildings with under 20 dwelling units, of which at least 33% are &quot;accessible&quot;: 60 ft or 24% of lot depth, whichever is less. For other buildings: 50 ft or 24% of lot depth, whichever is less.</td>
</tr>
<tr>
<td>RT-4a</td>
<td>1.5</td>
<td>1000 sq ft/dueling unit, 1000 sq ft/efficiency unit, 500 sq ft/SRO unit</td>
<td>42 ft for buildings with less than 20 dwelling units, of which at least 33% are &quot;accessible.&quot; None for schools and churches.</td>
<td>15 ft, or 12% of lot depth, whichever is less. Alternatively, setback can be the average front yard depth of nearest 2 lots.</td>
<td>Townhouses: complicated as hell, see 17-2-0500. All other buildings: Combined width of side setbacks must equal 30% of lot width, and neither setback can be less than 2 feet or 8% of lot width (whichever is greater). But no setback is required to be wider than 5 feet.</td>
<td>For buildings with under 20 dwelling units, of which at least 33% are &quot;accessible&quot;: 60 ft or 24% of lot depth, whichever is less. For other buildings: 50 ft or 24% of lot depth, whichever is less.</td>
</tr>
</tbody>
</table>

Figure 5-8: One Portion of 2nd City Zoning’s Details Page
6.3 Moovit (http://www.moovitapp.com/)

Moovit is a for-profit mobile transit application that uses open transit data to provide detailed trip planning using public transportation. Along with this data, the application utilizes crowdsourced data from its users to add details and refine its routing options. For instance, it automatically gathers data from riders about their location and velocity to determine where buses/trains are and whether they are running on time. It also allows users to input additional information such as how crowded the bus/train is that they are on board. It is currently available for major cities around the world including Toronto, Vancouver, and Ottawa.

![Moovit Screenshots](image)

**Figure 5-9: Moovit Trip Option and Rider Report Screens**

Dinesafe Toronto (http://dinesafe.to)

Dinesafe Toronto is a for-profit mobile application that uses open data to provide restaurant health inspection data both current and historical for Toronto restaurants including details about each infraction.
Ottawa Recreation Guide (http://ottawarec.ca/)

The Ottawa Recreation Guide is a free website that provides an alternative, more-functional interface for finding programs featured in the City’s Recreation Guide\(^6\). It includes a search and filters along with a clear listing of upcoming activities in the City. It was developed by a local technology company called The Blue Factor\(^7\).

\(^6\) https://itunes.apple.com/us/app/dinesafe-toronto-restaurant/id602002198?ls=1&mt=8
\(^7\) http://ottawa.ca/en/node/267514/index.html
\(^7\) http://thebluefactor.com/
**Figure 5-11: Ottawa Recreation Guide Main Page**

**Line Dancing**

Line Dancing activities in the spring at the St-Laurent Complex with first class starts between May 12 and May 18.

**Practice Line Dancing**

Come and enjoy an afternoon of line dancing. The instructors will be there to lead you. Bring a friend and enjoy a social and healthy activity.

**Figure 5-12: Ottawa Recreation Guide Details Page**
TABS Toronto (http://tabstoronto.com)

From the website: “The Transparent Accessible Bulletin System (TABS) is a tool for monitoring issues and actions in the City of Toronto.

TABS makes searching through government records easy. Search for keywords, add filters, discover related information, and sign up to receive email alerts. If you're an engaged resident, policy expert, journalist or busy bureaucrat, this is the tool for you. In its current incarnation, TABS will send you an email alert whenever a new agenda item is introduced that is related to your registered search query.

TABS was created in response to a growing demand for Web applications supporting the discovery and tracking of government activity. Its core function is to scan public records and present findings in a way that is easy to follow and understand. Government affairs are often complicated, involving many steps and multiple sources of information. TABS helps simplify government's complexity and helps to keep citizens aware of its activities.

This tool was conceptualized by the Toronto Public Space Initiative (TPSI) and developed by a group of volunteers, including TPSI staff, at Random Hacks of Kindness (RHOK) Hackathon hosted at Mozilla Foundation's Toronto headquarters Dec 12 2012.”

70 http://tabstoronto.com/about/
Figure 5-13: TABS Toronto Main Search Page

Figure 5-14: TABS Toronto Search Results (note that this also links to the Toronto Meeting Management Information System [TMMIS] 71, which provides much more details about the results)

71 http://app.toronto.ca/tmmis/
Appendix B – City Data Catalogue Contents

- This Appendix provides a table of the data found on data catalogues of each of the 23 cities examined in this study. The data is from November of 2012. The appendix was created on May 8, 2013 and each of the catalogues was revisited to note and changes made since the initial data collection. This information is described in the “Activity” portion of the summaries.
- The presence of a (?) indicates that this information is approximate or could not be verified and should be taken understood as such.
- The “metadata” in question here refers to descriptive metadata and not structural metadata.
Burlington, Ontario

Website: http://cms.burlington.ca/Page7429.aspx
Start Date: September, 2011 (?)
Format: HTML direct downloads
Metadata Provided: Yes
Activity (Changes between November 2012 and May 2012): None
API Available: No
Communications: Nothing dedicated to open data.
Notes: This is a pilot program: “The purpose of this pilot is to better understand all aspects of open data including effort, costs and benefits. The pilot is expected to run to at least the end of 2011.”
Calgary, Alberta

Website: https://cityonline.calgary.ca/Pages/Category.aspx?cat=CITYonlineDefault&category=PublicData

Start Date: August, 2010 (?)

Format: Categorized data sales site.

Metadata Provided: Minimal – Non-descriptive.

Activity (Changes between November 2012 and May 2012): 16 sets added.

API Available: No

Communications: The City is hosting a suggestions page. Nothing specific beyond that.

Notes: (1) Retrieving the data is cumbersome. The public data uses the same system as other (not free) data, and therefore requires users to add the datasets they want to a cart and "purchase" them (for zero cost) before they can download them. (2) When downloading a .zip file, the website instead makes you download a .exe file which runs to unzip the file itself. (3) Many of the formats listed for the datasets are wrong or not available (e.g. DWG files are actually SHP files, or CSV files are listed, but not actually available). (4) Many of the KMZ files were evaluated, and while geographic data is present, any extra information was usually difficult to understand if it was present at all (e.g. no names used, codes were used but no metadata explained them).
## Edmonton, Alberta

**Website:** [https://data.edmonton.ca/](https://data.edmonton.ca/)

**Start Date:** January, 2010

**Format:** Socrata platform

**Metadata Provided:** Yes

**Activity (Changes between November 2012 and May 2012):** 35 datasets added. A number of these are all for the citizen dashboard which is being focused on. These include a number of accountability-type datasets such as ridership numbers, attendance statistics, and city purchase orders.

**API Available:** Yes

**Communications:** Comments section for each dataset and visualization. Prominent “Suggest Data” button. Specific open data email contact.

**Notes:**

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Fredericton, New Brunswick

Website: http://www.fredericton.ca/en/citygovernment/Catalogue.asp
Start Date: July, 2011
Format: HTML – Direct download
Metadata Provided: Yes
Activity (Changes between November 2012 and May 2012): No new datasets. 2 updated datasets.
API Available: No
Communications: Generic support email address.
Notes: Program is on hold for now due to municipal restructuring.
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**Website:** [http://webdev.guelph.ca/services.cfm?itemid=78870&smocid=1550](http://webdev.guelph.ca/services.cfm?itemid=78870&smocid=1550)

**Start Date:** April, 2010

**Format:** HTML – Direct download

**Metadata Provided:** No

**Activity (Changes between November 2012 and May 2012):** None

**API Available:** No

**Communications:** Nothing specific

**Notes:** Pilot project. Abandoned at this time.
Hamilton, Ontario

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Website: [http://www.hamilton.ca/ProjectsInitiatives/OpenData/](http://www.hamilton.ca/ProjectsInitiatives/OpenData/)

Start Date: Early 2010 (?)

Format: HTML – Direct download

Metadata Provided: No

Activity (Changes between November 2012 and May 2012): None

API Available: No

Communications: None

Notes: Only provides the GTFS data in a Zip file.
Langley, British Columbia

Website: http://www.tol.ca/Services-Contact/Open-Data
Start Date: April, 2011 (?)
Format: HTML – Direct download
Metadata Provided: Yes
Activity (Changes between November 2012 and May 2012): 3 links added: News, Job Opportunities, and Development Activity. These are all RSS feeds and links to relevant sections of the City’s website. Geospatial data appears to have been updated and now includes additional annotation (e.g. pipe material, owner, lifecycle status, etc.)
API Available: No
Communications: Open data feedback form.
Notes: (1) Mostly infrastructure GIS datasets. Metadata contains details about coding in the files.
London, Ontario

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Website: [http://www.london.ca/d.aspx?s=/Open_Data/default.htm](http://www.london.ca/d.aspx?s=/Open_Data/default.htm)
Start Date: July, 2010 (?)
Format: HTML – Direct download
Metadata Provided: No
Activity (Changes between November 2012 and May 2012): None
API Available: No
Communications: Specific open data email address.
Notes: (1) Site is labeled as being in Beta testing. (2) Contains 22 budget datasets dating back to 2002 as well as water quality sampling data from 2006-2011.
### Medicine Hat, Alberta

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**Website:** [http://data.medicinehat.ca/](http://data.medicinehat.ca/)

**Start Date:** Spring 2011 (?)

**Format:** Microsoft OGDI

**Metadata Provided:** Yes

**Activity (Changes between November 2012 and May 2012):** None

**API Available:** Yes

**Communications:** Open data twitter account displayed on sidebar. It has been inactive for over a year.

**Notes:** (1) “The catalogue is currently in Community Preview. As a result, it may be unavailable for extended periods and may contain errors. URLs and the structure of the site may change without warning.” (2) Site appears to be inactive. No updated datasets have replaced the original out of date ones (e.g. the “Available Classes” data is for 2012 only).
Mississauga, Ontario

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Website: [http://www.mississauga.ca/portal/residents/publicationsopendatacatalogue](http://www.mississauga.ca/portal/residents/publicationsopendatacatalogue)

Start Date: March, 2010

Format: HTML – Direct download

Metadata Provided: No

Activity (Changes between November 2012 and May 2012): 32 datasets added (this includes multiple versions of single datasets)

API Available: No

Communications: Email and contact information for the Planning Information Unit (which hosts the open data site). They also have a Twitter feed that provides information about new datasets and research.

Notes: (1) The number of datasets listed may be slightly exaggerated since the site hosts different formats of a single dataset as separate files. There are often differences in these files though (e.g. office centres vs. office structures) so they are listed as separate datasets. Where the files contain identical data, they are listed as one dataset with multiple formats. There will be some errors involved in this. (2) The site hosts many reports in PDF format. 242 of them are not included in this evaluation because they have not associated open data attached to them and only exist as historic documents that have been digitized and are hosted on the open data page.
Montreal, Quebec

Website: http://donnees.ville.montreal.qc.ca/

Start Date: October, 2011

Format: Custom HTML – categorized direct downloads

Metadata Provided: Yes

Activity (Changes between November 2012 and May 2012): At least 23 new datasets including video archive of council meetings, council minutes, councilor compensation, etc. Many updated datasets as well.

API Available: No

Communications: Open data suggestion link. Active twitter feed displayed on main page. RSS feed and Newsletter also available. Link to Google Groups discussion forum (https://groups.google.com/forum/?fromgroups#!forum/open-data-montreal).

Notes: (1) The site contains a page that highlights applications made with the city’s data. (2) The site hosts many documents about the open data initiative including usage statistics.
Nanaimo, British Columbia

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**Website:** [http://data.nanaimo.ca/](http://data.nanaimo.ca/)

**Start Date:** November, 2009

**Format:** Open Data Publisher (an open source fork of Microsoft’s OGDI platform)

**Metadata Provided:** Minimal – Non-descriptive, very basic.

**Activity (Changes between November 2012 and May 2012):** 5 datasets added. APIs added for additional files.

**API Available:** Available for 8 files.

**Communications:** email address for the City’s webmaster is posted.

**Notes:**

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Niagara Falls, Ontario

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Website: [http://www.niagarafalls.ca/services/open/default.aspx](http://www.niagarafalls.ca/services/open/default.aspx)

Start Date: Spring 2012 (?)

Format: HTML – Direct download

Metadata Provided: Minimal – Non-descriptive

Activity (Changes between November 2012 and May 2012): None (there may be updates but it is difficult to determine).

API Available: No

Communications: Site requests user feedback to an open data email address. Also hosts a UserVoice site (not specifically related to open data and requires signup).

Notes: (1) Files are accessible through a dropdown list and not a direct link meaning that it is difficult to copy the link location to use in online services like Google Maps. (2) All of the files appear to be geospatial or RSS feeds. There are a large number of datasets, but when testing the KML files, none of them seem to have the data that they claim. Only polygons exist with no attached data. (3) The currency of the data is also an open question as most do not list (or list obviously incorrect; e.g. dates in the future) creation/update dates. (4) The site is quite clunky and not pleasant to use.
District of North Vancouver, British Columbia

Website: http://geoweb.dnv.org

Start Date: Fall 2009

Format: Custom HTML – Direct download

Metadata Provided: Yes (very detailed, includes information about accuracy and history of data)

Activity (Changes between November 2012 and May 2012): None

API Available: No

Communications: Detailed feedback form on site. Direct email and contact information for open data administrator.

Notes: (1) Site contains additional services: hardcopy maps, engineering drawings, legal plans, built-in mapping application, and basic dashboard.
### Ottawa, Ontario


**Start Date:** June, 2010

**Format:** Available on 2 platforms: HTML – Direct download & CKAN open data platform

**Metadata Provided:** Yes

**Activity (Changes between November 2012 and May 2012):** 17 new datasets added. Additional CKAN platform added.

**API Available:** yes (on CKAN platform)

**Communications:** Data request feature, open data email address and feedback form, mailing list/RSS feed, Twitter feed, and open data Google Group forum.

**Notes:**
1. The site now features an apps gallery that features applications built with city data. Users can submit apps for consideration to add to the site.
2. The second apps4ottawa contest is running this summer (2013).

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Prince George, British Columbia

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Website: [http://princegeorge.ca/cityservices/online/odc/Pages/default.aspx](http://princegeorge.ca/cityservices/online/odc/Pages/default.aspx)
Start Date: Unknown. 2010 (?)
Format: HTML – Direct download
Metadata Provided: No
Activity (Changes between November 2012 and May 2012): 2 new datasets added. Many files have been updated.
API Available: No
Communications: Nothing specific
Notes: (1) Ortho Photography is available for free in MrSID format on a separate but linked page: [http://princegeorge.ca/cityservices/online/odc/Pages/Orthophotos.aspx](http://princegeorge.ca/cityservices/online/odc/Pages/Orthophotos.aspx)  (2) Many of the datasets available in KML format have a direct “view in Google Maps” link which when tested on May 8, 2013 were not functioning correctly.
Quebec City, Quebec

Website: http://donnees.ville.quebec.qc.ca/
Start Date: 2012 (?)
Format: Custom HTML – Direct downloads and API (must request API key)
Metadata Provided: Yes
Activity (Changes between November 2012 and May 2012): 15 new datasets added. Many updated. Added a direct link to Google and Bing maps for KML data. Added API function (I can’t determine if this was available prior but may have been difficult to access due to language issues).
API Available: Yes
Communications: Open data Twitter feed on sidebar, comments/suggestions page (publicly listed suggestions),
Notes: (1) Site has an apps gallery (2) There may be some errors in my evaluation due to relying on Google Translate to convert to English from French.

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(1) Site has an apps gallery
(2) There may be some errors in my evaluation due to relying on Google Translate to convert to English from French.
### Regina, Saskatchewan

#### Website:
http://www.regina.ca/residents/open-government/

#### Start Date:
Feb, 2012

#### Format:
Microsoft OGDI

#### Metadata Provided:
Yes

#### Activity (Changes between November 2012 and May 2012):
No changes to the open data catalogue. Additions have been made to the open information portal.

#### API Available:
Yes

#### Communications:
Open Government email address (linked to by a “request data” link), Twitter feed (not maintained by the City, but by individual employee).

#### Notes:
(1) Site has an apps gallery

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Surrey, British Columbia

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Website: [http://www.surrey.ca/city-services/658.aspx](http://www.surrey.ca/city-services/658.aspx)

Start Date: 2011 (?)

Format: HTML – Direct download

Metadata Provided: No (?)

Activity (Changes between November 2012 and May 2012): Added REST API access. No new datasets.

API Available: Yes

Communications: Email and Twitter for the GIS department.

Notes: (1) Surrey’s open data site is only for the GIS department. The file sizes are in proprietary formats and are very large (e.g. 500mb).
Toronto, Ontario

Website: http://www.toronto.ca/open
Start Date: November, 2009
Format: HTML – Direct Download
Metadata Provided: Yes

Activity (Changes between November 2012 and May 2012): (1) 11 new datasets added, including FOI request summaries, consulting expenditures, dangerous chemical use locations, and other accountability/transparency data. (2) Numerous updates of existing datasets. (3) Changed the catalogue; added categories for easier searching.

API Available: No

Communications: Open data email link prominently displayed, DATA eh? Blog, Open data twitter account, link to G4 twitter account, open data Google Groups forum.

Notes: (1) Good layout with many obviously links to connect with city staff and other interested parties. (2) An active apps gallery is available that hosts mobile apps, web apps, and visualizations made with city data. (3) Many of the datasets are not available in open formats yet. The City does offer some different formats not found elsewhere though, such as SPSS for some statistical data and Google Fusion tables (which make data mashups very easy). (4) The new datasets that have been added over the past several months have been unique and interesting, for example the consulting services expenditures data and the real-
time Bixi bike share data. These came after the evaluation done for this study and would have added to Toronto’s prominence as a leader in providing valuable open data in Canada.
Vancouver, British Columbia


**Start Date:** September, 2009

**Format:** HTML – Direct Download

**Metadata Provided:** Yes – good attribute descriptions

**Activity (Changes between November 2012 and May 2012):** 31 datasets added.

**Communications:** Open data Twitter account, open data email address for requests/comments, online survey form for the open data catalogue.

**Notes:** (1) The catalogue hosts many individual datasets that are available in packages or are renamed datasets (e.g. the “Sanitary Mains” dataset just links directly to the “Sewer Networks Package” dataset. This means that the number of different datasets available is less than the number of datasets listed. In the evaluation these duplicate sets were not counted, therefore only 117 datasets are registered instead of the 138 that appear to exist. (2) Vancouver’s site has working links for their KML/KMZ shapefiles that link directly to Google and Bing Maps for easy viewing online. Other cities have begun to follow this example.
## Waterloo (Region), Ontario

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**Start Date:** Early 2010 (?)

**Format:** HTML – Direct Download

**Metadata Provided:** Yes

**Activity (Changes between November 2012 and May 2012):** 6 datasets added.

**API Available:** No

**Communications:** Open data email address.

**Notes:** (1) When conducting this study only the Region of Waterloo had an open data initiative. As of the end of 2012, the City of Waterloo has also started an open data initiative. Only the Region’s program is included here.
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Website: [http://www.citywindsor.ca/opendata/Pages/Open-Data-Catalogue.aspx](http://www.citywindsor.ca/opendata/Pages/Open-Data-Catalogue.aspx)

Start Date: November, 2009 (?)

Format: HTML – Direct download

Metadata Provided: Yes

Activity (Changes between November 2012 and May 2012): 4 datasets added. All but 3 datasets are now available in at least one open format.

API Available: No

Communications: Open data email address.

Notes:
Appendix C – Letter of Information

Letter of Information
“The Regional Dynamics of Open Government Data Implementation in Five Canadian Cities”

This research is being conducted by Liam Currie under the supervision of Dr. Betsy Donald, in the Department of Geography at Queen’s University in Kingston, Ontario.

What is this study about? The purpose of this research is to help understand the differences in Canadian municipal open data initiatives and how local institutions have influenced their development. The study will require one interview lasting one to one and a half hours, with the possibility of a short follow-up interview later if the need for clarification arises. There are no known physical or psychological risks associated with this study.

Is my participation voluntary? Yes. Although it be would be greatly appreciated if you would answer all material as frankly as possible, you should not feel obliged to answer any material that you find objectionable, makes you feel uncomfortable, or may jeopardize your employment or social status. You may also withdraw at any time and any information that you have given will be destroyed.

Are there any risks involved? Please keep in mind that there is always the possibility that your responses may be linked back to you by other knowledgeable individuals involved in local open data initiatives. If you are a city employee, other staff—including management—may see your responses, potentially leading to economic or social repercussions. The option is available for different levels of anonymity (located in the Consent Form) depending on your level of comfort.

What will happen to my responses? If you choose to remain anonymous, we will keep your identifying information confidential. Only Liam Currie and his supervisor, Dr. Betsy Donald will have access to this information. The data may be published in professional journals or presented at scientific conferences, but any such presentations will never breach individual confidentiality. Should you be interested, you are entitled to a copy of the findings.

What if I have concerns? Any questions about study participation may be directed to Liam Currie: 11lc26@queensu.ca or 613-329-2240. Any ethical concerns about the study may be directed to the Chair of the General Research Ethics Board at chair.GREB@queensu.ca or 613-533-6081.

Again, thank you. Your interest in participating in this research study is greatly appreciated.

This study has been granted clearance according to the recommended principles of Canadian ethics guidelines, and Queen’s policies.
Appendix D – Ethics Consent Form

Consent Form
“The Regional Dynamics of Open Government Data Implementation in Five Canadian Cities”

Name (please print clearly): ________________________________________

1. I have read the Letter of Information and have had any questions answered to my satisfaction.

2. I understand that I will be participating in the study called The Regional Dynamics of Open Government Data Implementation in Five Canadian Cities. I understand that this means that I will be asked to partake in a telephone interview.

3. You have a choice about what level of anonymity you feel comfortable with:

3.1. You agree to be quoted and identified by name.
3.2. You agree to be quoted but only identified by organization and/or role.
3.3. You agree to be quoted but with no identification of name, organization, or role.
3.4. You agree to be interviewed but cannot be quoted or identified in any way.

Choice: ________ Other Conditions (if applicable):
__________________________________________________________

4. I understand that my participation in this study is voluntary and I may withdraw at any time.

I understand that every effort will be made to maintain the confidentiality of the data now and in the future. Only Liam Currie and Dr. Betsy Donald will have access to collected information. The data may also be published in professional journals or presented at scientific conferences, but any such presentations will be of general findings and will never breach individual confidentiality. Should you be interested, you are entitled to a copy of the findings.

5. I am aware that if I have any questions, concerns, or complaints, I may contact Liam Currie, (613)329-2240, 111c26@queensu.ca; project supervisor, Dr. Betsy Donald, betsy.donald@queensu.ca; or the Chair of the General Research Ethics Board (613-533-6081) at Queen’s University.

If you wish to withdraw any information from the study after it has been collected please contact Liam Currie directly and your information will be destroyed.

I have read the above statements and freely consent to participate in this research:

Signature: _____________________________________ Date: _______________________

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Appendix E – Recruitment Letter

Recruitment letter
The Regional Dynamics of Open Government Data Implementation in Five Canadian Cities

My name is Liam Currie, a graduate student from the Department of Geography at Queen’s University. I would like to invite you to participate in my research project which is exploring the regional differences in Canadian municipal open data initiatives. Participation will involve one telephone/Skype interview lasting one to one and a half hours, with the possibility of a short follow-up interview later if the need for clarification arises.

If you think you would like to participate in this project, please contact me and I will send you a letter of information and consent form, and we can arrange a date and time to do an interview over the telephone or Skype, depending on your preference.

Thank you,
Liam Currie, M.A. Candidate - Dept. of Geography, Queen’s University
11lc26@queensu.ca (613)329-2240
Appendix F – GREB Approval

May 30, 2012

Mr. Liam Currie Master’s
Student Department of
Geography Queen’s
University Kingston, ON
K7L 3N6

GREB Ref #: G GEO-135-12; Romeo # 6007018
Title: "G GEO-135-12 The Regional Dynamics of Open Government Data Implementation in Five Canadian Cities"

Dear Mr. Currie:

The General Research Ethics Board (GREB), by means of a delegated board review, has cleared your proposal entitled "G GEO-135-12 The Regional Dynamics of Open Government Data Implementation in Five Canadian Cities" for ethical compliance with the Tri-Council Guidelines (TCPS) and Queen's ethics policies. In accordance with the Tri-Council Guidelines (article D.1.6) and Senate Terms of Reference (article G), your project has been cleared for one year. At the end of each year, the GREB will ask if your project has been completed and if not, what changes have occurred or will occur in the next year.

You are reminded of your obligation to advise the GREB, with a copy to your unit REB, of any adverse event(s) that occur during this one year period (access this form at https://eservices.queensu.ca/romeo_researcher/ and click Events - GREB Adverse Event Report). An adverse event includes, but is not limited to, a complaint, a change or unexpected event that alters the level of risk for the researcher or participants or situation that requires a substantial change in approach to a participant(s). You are also advised that all adverse events must be reported to the GREB within 48 hours.

You are also reminded that all changes that might affect human participants must be cleared by the GREB. For example you must report changes to the level of risk, applicant characteristics, and implementations of new procedures. To make an amendment, access the application at https://eservices.queensu.ca/romeo_researcher/ and click Events - GREB Amendment to Approved Study Form. These changes will automatically be sent to the Ethics Coordinator, Gail Irving, at the Office of Research Services or irvingg@queensu.ca for further review and clearance by the GREB or GREB Chair.

On behalf of the General Research Ethics Board, I wish you continued success in your research. Yours sincerely,

Joan Stevenson, Ph.D.
Professor and Chair
General Research Ethics Board