

A Typology of Canadian Open Data Apps

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Abstract

Applications based on open (government) data raise questions on the nature of contemporary and future public services, the appropriateness of distribution models, and the general effectiveness of open data in achieving its goals of both economic and societal empowerment. Users of open data have multiple roles when using these apps, resulting in familiar processes of public participation and coproduction. The Web 2.0 paradigm, however, also means that relationships between government, citizens, and the private sector have the potential to be changed through open data. The project aims to understand data flows and the production and utilisation of open data, and how the various influences on open data through its production/dissemination cycle affect it as a public service. In this way, we can examine the changing interactions between citizens and modern government. As a first step in investigating this, we started with a typology of open data apps, in order to inform our sampling of case studies to focus qualitative inquiry. The typology was based on directionality of data flows and citizen-government interaction, with separations required between different roles of citizens as well as types of interaction (political or market-based). This typology will then be used in sampling and further qualitative inquiry.

Background and Relevance

Data that “can be freely used, modified, and shared by anyone for any purpose” (Open Knowledge Foundation, 2012), is increasing in prominence, having been incorporated into official discourse at national levels of government over recent years. Across Canada, open data initiatives have been adopted by various levels of government, especially at the municipal level. Through software applications (mobile or desktop-based), open data has become increasingly apparent in the geospatial web (geoweb). Data is being released by Canadian governments in increasing volume and the majority of open data is geospatial (Baculi & Rinner, 2014; Baculi, 2014). Geoweb apps (such as web maps), which are an “integrative, discoverable collection of geographically related web services and data that spans multiple jurisdictions and geographic regions” (Lake & Farley, 2007, p.15), are therefore well suited to incorporating (geospatial) open data. Apps have developed through local hackathons and other activities such as public consultations. A cursory glance through the City of Toronto’s open data website reveals a listing of 51 apps (October 2014).

Since data distribution is now being treated as an official government function, questions arise on the efficacy of providing open data as a public service. Open data, promoted as a subcategory of open government, is viewed (especially in the mainstream) to have benefits in two general areas: economy, and democracy (Dekkers, Polman, Velde, & Vries, 2006; European Commission, 2011; Government of Canada, 2012; Janssen, Charalabidis, & Zuiderwijk, 2012; Manyika et al., 2013).

Unfortunately, open data initiatives and current governance paradigms may be at odds with one another. New public management (NPM) and, more recently, governance

literature have both emphasised the increased role of the market and private-sector management practices in the running of the state, such as the framing of individuals as customers of the state (Aberbach & Christensen, 2005; Peters & Pierre, 1998). However, recipients of public services have two main roles: political (citizen) and market (consumer). The question is whether open data allows for individuals to operate as both consumers *and* citizens when using open data, or whether their political role is being ignored. We are skeptical on the supposed democratising effect of increasing the availability of data (Janssen et al., 2012; Yu & Robinson, 2012). In fact, open data may just be a continuation of e-government themes.

For geospatial open data, the geoweb is relevant as a delivery mechanism (such as APIs, web-maps), presentation/analysis tool (web-mapping platforms and digital earths), and in the creation and storage of data itself (data formats and frameworks). Rather than being merely a tool for service delivery, a geoweb has influence in the delivery process and in government processes further upstream of any citizen-government transaction. Elwood & Leszczynski (2011, 2013); Leszczynski, 2012) have already begun situating the geoweb within a political context, and have raised concerns regarding the production and dissemination of geospatial information, which has shifted from a traditional sales-based model, towards crowdsourcing and open data – open data is creating structural changes in the market for geospatial data, opening up demand to smaller businesses and individuals. The use of spatial information has traditionally been viewed as “inherently implicated in practices of securing and exercising power” (Leszczynski, 2012, p.26), and the wholesale releasing of geospatial government data is now a new point of contention on this front, with researchers skeptical on the substance of data being released (Bates, 2012; Peled, 2011; Yu & Robinson, 2012). The larger implications of this research relate to the dissemination of geospatial data and our ability to access and use (geospatial) open data in the future. To this end, we are asking questions such as, “what is the role of stakeholders in the flow path of open data?” Our investigation is directed at examining the effect open data has on the relationship between governments and those they serve.

Methods and Data

As this is a work in progress, only partial methods and results are available.

The overall aim of the study is to investigate the changing relationship between citizen and government through open data. What shapes the framing of data as a public service? To do this, we will investigate the output of users of open data – the applications they create. We will create a typology of open data app, to identify ideal types of app, taking applications as the most likely nexus for citizen-government interaction in the case of open data. From these ideal types, we will identify case studies to pursue.

To create a descriptive typology we focused on the interactions afforded by apps, rather than the content they are based on. Inspiration for our dimensions came from literature on coproduction¹ of government services and e-government (Bovaird, 2007; Linders,

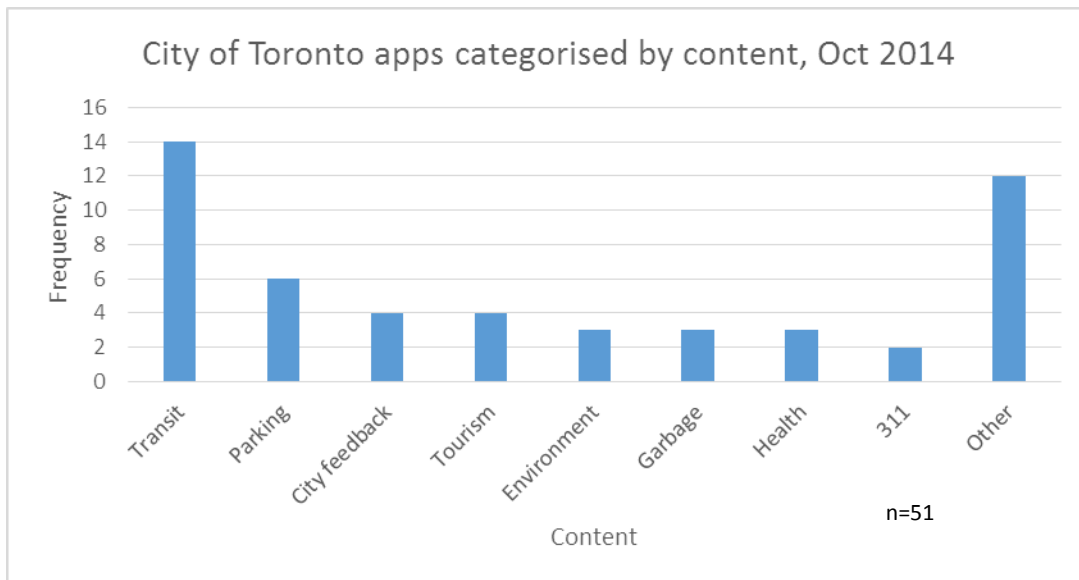
¹ is “the process through which inputs used to provide a good or service are contributed by individuals who are not in the same organization” (Ostrom, 1996 p.1073)

2011, 2012), citizen science (Haklay, 2013), and participation (Arnstein, 1969). The resulting matrix was based on two main dimensions, to allow the typology to be a broad and relevant descriptor at the conceptual level (Collier, LaPorte, & Seawright, 2011). Typologies such as Desouza & Bhagwatwar's (2012) are useful in classifying what apps are available, but are restricted due to their reliance on set categories of content based on currently available data.

We identified two main dimensions to follow: *data flows* (directionality of data flow) and *coproduction* (and participation). Both help to inform the type of interaction (between citizen and government) and participation occurring in apps. As the themes of participation and coproduction were prevalent in literature, we rely heavily on Arnstein's ladder of participation, as well as Linders' work on coproduction in e-government services. Since we could not adequately separate the aforementioned dual role of individuals utilising open data as well as the activities of labour and participation within apps, coproduction itself was deemed too multidimensional (Linders, 2011) a concept to serve as an effective dimension for a typology. Instead, we expanded this concept to be a dimension covering the 'role of the individual'. 'Individual role' concerns the two types of individuals using public services: political and consumer.

Preliminary Results

In this section, we outline the resulting typology, and give examples of some types.



As part of the formulation of the typology, we initially explored apps from across the G4 network of Canadian cities² (the current leaders in municipal open data) and identified transportation, public utilities/services and 'points of interest' (such as tourism) as the main content categories. From a list of 51 City of Toronto apps, we found 14 related to transit (public transport, route planning navigation), by far the largest focus of app developers. The definition of an 'app' was also in need of clarification, as those listed by City websites were quite varied. We chose a broader definition of the term 'app', to

² Edmonton, Ottawa, Toronto, Vancouver

include software that facilitates some interaction with data or interactive creation of data. This means a map must be more than a simple PDF, but at the same time, it is not necessarily defined by the complexity of the software. Websites with data visualisations were included, as long as they were not static, while web forms from public consultations were also considered legitimate.

The resulting matrix contains two dimensions: data flow, and role of the individual. Data flow is broken down according to (predominant) directionality of flow. The role of the individual is broken down into the realm of politics and market. From here, we can identify five potential types of application. These types are a reflection of the participation and coproduction aspects of apps. The typology allows for some minimal ordering of types, based on the data flow dimension. If we view data flow in terms of Arnstein’s ladder of participation, we can posit that there is increasing citizen control over public service delivery as we move down the table – with increasing data flow to and from citizen, citizens are more able to exert control in governance. A one-way data flow from government to individuals does not (within the context of the app) result in any public participation, whereas any flows from citizen to government are considered feedback to government services.

Typology of open data apps based on data flow and interactions

		Role of the Individual	
		Citizen (Political)	Client (Economic)
Data flow	Government → Citizen	<i>Political action</i>	<i>Service provision</i>
	Citizen → Government	<i>Political input</i>	<i>Service enhancement</i>
	Government ↔ Citizen	<i>Dialogue & Feedback</i>	

Political action: These apps involve simple one-way communication of data directed to the citizens and their political activity, such as the City of Ottawa’s Ottawa Elections app³. Such apps revolve around enabling or facilitating explicitly political actions, such as voting.

Service provision: These apps are by far the most common, and involve one-way communication of data from government to citizen to provide a variety of services such as navigation apps for mass transit. Transportation related apps are available in all our Canadian G4 cities.

Political input: At the moment, these apps are the least common, since they involve data collection by government. Online forms, such as Toronto’s casino consultation⁴, come close to fulfilling this role, where the majority of data flow is from citizen to government.

³ <http://ottawa.ca/en/city-hall/your-city-government/elections/ottawa-vote-mobile-app>

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<http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=771fc512b94c3410VgnVCM10000071d60f89RCRD&vgnextchannel=f312acb640c21410VgnVCM10000071d60f89RCRD>

Service enhancement: Here, government collects data from individuals to enhance their existing public services, such as the City of Toronto's bike path app⁵ that is being used to capture cycling routes to inform the City's Cycling Plan⁶ for 2015.

Dialogue and Feedback: This type involves a steady sharing of data between government and the public, as well as the inclusion of both the political and market-based roles of users. There is data flowing from the public to the government (such as Volunteered Geographic Information) that pertains to public service enhancement, political action (influencing government decision making), or both.

Even though the typology acknowledges the possibility for individuals to use open data apps as political activity or as economic activity, the reality is that cases are not mutually exclusive. At the moment, apps tend to be singular in both purpose and features. Open data navigation apps are simple interfaces for data querying, and 311 service apps are simple interfaces for reporting of information. Very few cases have been found that blur the lines between our data flow categories and between our citizen-client categories. ReCollect⁷, for example, is utilised by the City of Vancouver to push out garbage collection data to residents, as well as collect feedback on service delivery (of both garbage collection and data dissemination) within the same app. Apps that involve two-way data flows of this nature are currently very rare, especially since most applications do not come from government. Still, the typology allows us to comment somewhat on the nature of coproduction, as well as the level of participation and control (Arnstein's ladder of participation) found in open data apps, where two-way flows of data may result in the most citizen participation *and* control over government processes (and therefore be the most empowering to users).

Conclusions and Future Research

From here, we will be using our conceptual types to select case studies. To investigate the influence of various stakeholders upstream in the chain of production of open data, we will be interviewing actors (beginning with app developers of chosen cases) found through snowball sampling (Lo, 2009; Preston, 2009). This will allow us to trace the flow of data from initial conception, to production and dissemination, and any processes it undergoes (such as geocoding or formatting by a third party). Tracing data flow will reveal exactly how much influence producers (government) have over the production of geospatial data as opposed to non-public, intermediary actors.

References

Aberbach, J. D., & Christensen, T. (2005). Citizens and Consumers. *Public Management Review*, 7(2), 225–246. doi:10.1080/14719030500091319

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<http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=5c555cb1e7506410VgnVCM10000071d6of89RCRD&vgnextchannel=6f65970aa08c1410VgnVCM10000071d6of89RCRD&appInstanceName=default>

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<http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=2685970aa08c1410VgnVCM10000071d6of89RCRD>

⁷ <http://vancouver.ca/home-property-development/garbage-and-recycling-collection-schedules.aspx>

- Arnstein, S. R. (1969). A Ladder Of Citizen Participation. *Journal of the American Institute of Planners*, 35(4), 216–224. doi:10.1080/01944366908977225
- Baculi, E. (2014). Content and Growth of Municipal Open Data Catalogues. Retrieved October 24, 2014, from <http://www.gogeomatics.ca/magazine/content-and-growth-of-municipal-open-data-catalogues.htm>
- Baculi, E., & Rinner, C. (2014). *A Geographic Content Analysis of Municipal Open Data Catalogues across Canada*. Canadian Cartographic Association.
- Bates, J. (2012, February 4). “This is what modern deregulation looks like” : co-optation and contestation in the shaping of the UK’s Open Government Data Initiative. *The Journal of Community Informatics*. Retrieved from <http://www.ci-journal.net/index.php/ciej/article/view/845/916>
- Bovaird, T. (2007). Beyond Engagement and Participation: User and Community Coproduction of Public Services. *Public Administration Review*, 67(5), 846–860. doi:10.1111/j.1540-6210.2007.00773.x
- Collier, D., LaPorte, J., & Seawright, J. (2011). Putting Typologies to Work: Concept Formation, Measurement, and Analytic Rigor. Retrieved from <http://papers.ssrn.com/abstract=1735695>
- Dekkers, M., Polman, F., Velde, R. te, & Vries, M. de. (2006). *Measuring European Public Sector Information Resources (MEPSIR)*. European Commission. Retrieved from http://ec.europa.eu/information_society/policy/psi/actions_eu/policy_actions/mepsir/index_en.htm
- Desouza, K. C., & Bhagwatwar, A. (2012). Citizen Apps to Solve Complex Urban Problems. *Journal of Urban Technology*, 19(3), 107–136. doi:10.1080/10630732.2012.673056
- Elwood, S., & Leszczynski, A. (2011). Privacy, reconsidered: New representations, data practices, and the geoweb. *Geoforum*, 42(1), 6–15.
- Elwood, S., & Leszczynski, A. (2013). New spatial media, new knowledge politics. *Transactions of the Institute of British Geographers*, 38(4), 544–559. doi:10.1111/j.1475-5661.2012.00543.x
- European Commission. (2011). Open Data: An engine for innovation, growth and transparent governance. Brussels: EU. Retrieved from <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0882:FIN:EN:PDF>
- Government of Canada. (2012). Canada’s Action Plan on Open Government. Retrieved from <http://www.open.gc.ca/open-ouvert/ap-patb-eng.asp>
- Haklay, M. (2013). Citizen Science and Volunteered Geographic Information: Overview and Typology of Participation. In D. Sui, S. Elwood, & M. F. Goodchild (Eds.), *Crowdsourcing Geographic Knowledge* (pp. 105–122). Springer Netherlands. Retrieved from http://link.springer.com/chapter/10.1007/978-94-007-4587-2_7

- Janssen, M., Charalabidis, Y., & Zuiderwijk, A. (2012). Benefits, Adoption Barriers and Myths of Open Data and Open Government. *Information Systems Management*, 29(4), 258–268. doi:10.1080/10580530.2012.716740
- Lake, R., & Farley, J. (2007). Infrastructure for the geospatial web. In A. Scharl & K. Tochtermann (Eds.), *The Geospatial Web* (pp. 15–26). Springer.
- Leszczynski, A. (2012). Situating the geoweb in political economy. *Progress in Human Geography*, 36(1), 72–89.
- Linders, D. (2011). We-Government: an anatomy of citizen coproduction in the information age. In *Proceedings of the 12th Annual International Digital Government Research Conference: Digital Government Innovation in Challenging Times* (pp. 167–176). ACM.
- Linders, D. (2012). From e-government to we-government: Defining a typology for citizen coproduction in the age of social media. *Government Information Quarterly*, 29(4), 446–454. doi:10.1016/j.giq.2012.06.003
- Lo, L. (2009). *International Encyclopedia of Human Geography. International Encyclopedia of Human Geography* (pp. 1–10). Elsevier. doi:10.1016/B978-008044910-4.00510-1
- Manyika, J., Chui, M., Groves, P., Farrell, D., Kuiken, S. Van, & Doshi, E. A. (2013). *Open data: Unlocking innovation and performance with liquid information*. Retrieved from http://www.mckinsey.com/insights/business_technology/open_data_unlocking_innovation_and_performance_with_liquid_information
- Open Knowledge Foundation. (2012). OpenDefinition. Retrieved December 04, 2013, from <http://opendefinition.org/>
- Ostrom, E. (1996). Crossing the great divide: Coproduction, synergy, and development. *World Development*, 24(6), 1073–1087. doi:10.1016/0305-750X(96)00023-X
- Peled, A. (2011). When transparency and collaboration collide: The USA Open Data program. *Journal of the American Society for Information Science and Technology*, 62(11), 2085–2094. doi:10.1002/asi.21622
- Peters, B. G., & Pierre, J. (1998). Governance Without Government? Rethinking Public Administration. *Journal of Public Administration Research and Theory*, 8(2), 223–243. doi:10.1093/oxfordjournals.jpart.a024379
- Preston, V. (2009). *International Encyclopedia of Human Geography. International Encyclopedia of Human Geography* (pp. 46–52). Elsevier. doi:10.1016/B978-008044910-4.00504-6
- Yu, H., & Robinson, D. G. (2012). The New Ambiguity of “Open Government.” *SSRN Electronic Journal*. doi:10.2139/ssrn.2012489