The Openness Challenge: Why Some Cities Take It On and Others Don’t

Research-in-Progress

Deepti Agrawal  
University of Memphis  
dagrawal@memphis.edu

William J. Kettinger  
University of Memphis  
wjkttngr@memphis.edu

Chen Zhang  
University of Memphis  
czhang12@memphis.edu

Abstract

Open data is an important trend being considered by many municipalities globally. Open data in cities refers to making public data generated by municipal transactions and sources available to parties outside the government. Open data in the government sector can be beneficial both to governments as well as to their citizens as open data can help improve transparency, accountability and spurs economic growth. However, there is a lack of wide adoption of open data initiatives across cities both in the United States and in other countries. This study aims to examine the factors that influence the adoption of open data initiative and highlight the role of the IT capabilities and the information management capabilities of the government in influencing the rate of adoption.

Keywords

Open data, IT capability, Information management capability, e-government

Introduction

Governments in different countries are recognizing the benefits of open data and are engaging in open data movement with the goal of increasing transparency and efficiency of government works (Janssen et al. 2012; Jetzek et al. 2013). According to a recent McKinsey Global Institute report, there is a potential of economic value creation worth $3 trillion per year just by opening the data in seven sectors including education, transportation, consumer products, electricity, oil and gas, health care and consumer finance (Manyika 2013).

The concept of open data is not new but, in modern sense, open data stands for the “data that can be freely used, reused and redistributed by anyone - subject only, at most, to the requirement to attribute and/or share-alike” (http://opendefinition.org/). The scope of open data is not limited to public data. Open data could be private corporate data, social data generated through community interactions on social networking websites such as Facebook or Twitter. However, the government sector is definitely the main target of open data with both significant benefits and challenges (Janssen 2011).

In his memorandum, President Barack Obama wrote that the government should be transparent, it should be participatory, and it should be collaborative (Kimpton 2013). On one hand, open data brings the enormous opportunities and chances for improvement of government function, better service to the public, increased trust and interest among voters and citizens (Janssen et al. 2012; Jetzek et al. 2013). On the other hand, there are some challenges in implementing and sustaining the open data initiatives (Martin et al. 2013). Also making relevant information available to citizens in a form that is easily accessible and comprehensible may reduce the number of inquiry calls in public offices. Presence of relevant data in a centralized location also helps government employees to quickly answer citizens’ questions, leading to reduced workload, increased efficiency, and improved customer satisfaction.
Previous research has shown value of open data adoption and use (Davies 2010; Domingo et al. 2013; Manyika 2013). Despite its proclaimed benefits, a wider deployment of open data in governments across US cities is still lacking and there is a divide in the approaches taken by different city governments towards opening the public data. This study aims to understand the cause for such a disparity and find the key factors that influence the decision making process for open data adoption and implementation in the context of city governments in United States from both the supply side (government) and the demand side (citizens).

Existing research about adoption of implementation of e-government initiatives on the demand side have taken a citizen satisfaction and technology acceptance approach to explain citizen’s use of e-government platforms (Venkatesh et al. 2012). Most studies on the supply side, assume the government’s readiness in terms of capability to adopt and have looked at the phenomenon with the perspectives of institutional theory or systems theory (Janssen et al. 2012). However, not every government agency may possess the resources and capability to fully meet the requirements of openness. This study takes the perspective that citizen demand and the responsiveness of the government officials and administrators directly influences openness of a government data sharing initiative. Taking the Resource-Based View and Information Orientation perspective we also argue that it is important to assess the role of the IT capabilities and information management capabilities of the government as this will moderate the extent to which citizen demand and government responsiveness can be realized.

The remainder of this paper is structured as follows: the next section presents a literature review of open data initiatives in the government. The subsequent sections briefly describe our research model, hypotheses and research method and conclusion.

Literature Review

Open Data

In recent years, open data has gained a lot of interest in the e-government and it is seen as a means to achieve openness in government (Jetzek et al. 2013). Use of open data at the city-level started in cities such as San Francisco and Washington DC. Major stakeholders of open data include the government or public employees, decision makers and policy makers, local businesses, and, importantly, citizens. Opening data is considered as an effective way to disseminate information to these stakeholders, making them participants in the government (Peled 2011). Many advocate the benefits of making public data more accessible by making it open. According to Mark Headd, Philadelphia’s first chief data officer (Miller 2012), every city should publish transit data, crime data and financial data. The financial data helps keep people informed about the city government’s budget related decisions and hence supports the goal of a transparent government. This also helps in creating people’s trust towards the government. Overall, open data is shown to generate value through transparency of government, citizen participation/collaboration, efficiency and innovation (Jetzek et al. 2013). Advocates suggest that great value will be generated by linking the public data with, business data, social data and public data (Kalampokis et al. 2013; Shadbolt et al. 2012).

A body of research has investigated the maturity models and life cycles of open data implementation and suggested technological designs to implement the open data platform (Solar et al. 2013; Zuiderwijk et al. 2013). Studies suggests the importance of complementary components of the open data ecosystem such as data, hackers and apps help in deriving value (Harrison et al. 2012; Kuk 2011).

However, open data is not free of potential risks, concerns and uncertainty related to its adoption and implementation. By opening the data, government organizations will go through the shifting of traditional organizational boundaries and experience some loss of control. There are also some security and privacy concerns regarding who can use the data and in what way. Recognizing that open data implementation is often subject to a number of risks associated with its governance, economic issues, licenses and legal framework, data characteristics, metadata, access, and skill of users, previous research (Janssen et al. 2012; Martin et al. 2013; Zuiderwijk et al. 2013) suggests that new types of governance mechanisms and policies are needed to implement open data in a successful manner. Mere access to data is not enough; improving information quality of government data (Nicolaou and McKnight 2006) and getting feedback from users is needed to ensure continued use.
Previous literature suggests that the conceptual research on open data implementation has taken a rather simplistic view. Most of the studies on open data have focused on the implementation aspect of open data from the government’s perspective. They often assume the government has already decided to open up its data. However, a wide deployment of open data initiatives in governments across U.S. cities and in other countries is still lacking and we need a better understanding of the factors that drive or inhibit the adoption of open data. Given that the open data decision not only involves whether or not to open up data, but also how much data to make available and to what extent, our study attempts to empirically investigate the factors that influence the degree of data openness.

Specifically, given that implementation of open data initiatives relies on IT intensively and that very little research has examined the role of IT in open data movement, we focus on not only the internal and the external drivers of open data including citizen demand and government responsiveness but also the moderating role of IT and information management capabilities of governments.

**Theory and Research Model**

The research model in Figure 1 illustrates the factors that influence the degree of data openness in the government sector. The model depicts not only the direct antecedents – citizen demand for information and government responsiveness – but also the moderating factors such as the IT capability and the information management capability of the government.

**Degree of Data Openness**

By making government data available for public use and allowing citizens and firms to participate in government functions, governments transform a closed system to an open system (Janssen et al. 2012). Publishing the government data online in a machine readable and easily interpretable format for consumption by citizens and firms helps increase transparency and accountability in the government. Openness is not just a binary state of availability. Rather, it is a continuum with various levels of openness (Cole 2012) depending upon how much data is available and in what formats, how accessible the data is, and how restricted the use and license policies are (Davies 2010). Following the work of Jetzek et al. (2013), we conceptualize openness as a construct with four dimensions (a) use of open licenses (b) extent of the OGD initiative (c) availability of various types of data, and (d) usability and accessibility of available data-sources.

**Citizen Demand for Information**

The government around the world is increasingly interested in the e-Government and adopting tools to provide informational and transactional services through digital means (Coursey and Norris 2008). In the digital era, an average citizen is more likely to use the government resources to access information than to use transaction services (Thomas and Streib 2003). Providing information to people using open data platforms make it possible for citizens to get involved in the processes of the government and create value for both themselves and the government. With the presence of ubiquitous technology, citizens are becoming more proficient in interacting with the government through digital means (Reddick 2005). Previously accessing and making sense of government data was not as easy as it can be today with tools such as mobile apps and visualization. There is an increasing interest of citizens to find the information about the government activities, register their complaints and communicate their opinions online rather than calling the government offices seeking such information. Furthermore, the presence of interested developers who are able to present the open data in easily understandable visual forms to an average citizen increases citizens’ demand for open data or information from the government.

In the context of open data, the government benefits from citizen participation by making the data openly accessible. When citizen get the information in a convenient manner they can validate and give feedback on the activities of the government, thus help the government meet the goals of accountability and democracy (Jetzek et al. 2013). Previous studies have noted that the success of an open data initiative is not possible without the support of citizens and tech-savvy developers (Streib and Navarro 2006). In the presence of citizens’ increasing demand for timely and accurate information, it is more likely for the government to make its data more openly accessible.

Hence we propose:
H1: Citizen demand for information is positively related to the degree of data openness.

**Government Responsiveness**

In a democracy, the governments are expected to respond to the issues raised by the citizens. Responsiveness in general denotes the speed and accuracy with which a service provider responds to an action or information (Vigoda 2002). Government responsiveness refers to the extent to which the government or administration responds to the citizens’ demand or needs (Hero and Tolbert 2004).

Citizen engagement and participation are important aspects of e-government. In the public sector adoption of IT related innovations, the focus is now shifting from a government centered perspective towards citizen-centric perspective (Wang et al. 2005). So government agencies which are more responsive to citizens’ demands are likely to introduce IT innovations in a manner which allows for more citizen engagement and openness (Bonsón et al. 2012). A responsive government is “reactive, sympathetic, sensitive and capable of feeling the public’s needs and opinions” (Vigoda 2002) hence, it is more likely to respond to citizens’ need, if not directly to citizens, at least through legislatures and politicians. Hence we propose:

H2: Government responsiveness is positively related to the degree of data openness.

**IT Capability and Information Management Capability**

Bharadwaj (2000) define IT capabilities as a firm’s “ability to mobilize and deploy IT-based resources in combination or co-present with other resources and capabilities” (p. 171). The ease of use and access of adequate equipment in the organization is a major determinant of adoption of new technologies (Kamal 2006). The IT capability, which includes not only technical resources but also personnel IT knowledge, is a major factor that influences organizations’ adoption of innovations (Agarwal and Prasad 1998).

Another important capability of firms related to information and information technology is the information management capability. The value of information management has been emphasized by previous literature by (Marchand et al. 2000) who gave a framework of information orientation and suggested that organizations need to develop information technology capability, information management capability, and instill good values and beliefs about information in their employees in order to achieve competitive advantage. As (Kohli and Grover 2008) pointed out, information based capabilities are inherently different from the IT capabilities as defined in the literature and so should be distinctly considered in addition to the IT capabilities. We call this ability of the government organization to appropriately manage information so that it can get the right information to the right person at the right time as information management capability that highlights the importance of information.

**IT Capability**

IT capability of an organization includes the physical IT infrastructure as well as the human IT resources (Bharadwaj 2000). In the context of open data, to make the data available for open access, there is a need for supporting technical infrastructure. Jensen (2011) notes technical barriers such as lack of infrastructure and central portal as a challenge for open data implementation. Such an infrastructure not only facilitates collecting the necessary information but also enables storing, analyzing, and sharing the information. The existing IT capability of the government can support and handle publishing large amounts of data in a user friendly manner. With higher quality IT infrastructure in place, a faster, better and more user friendly platform can be designed with software tools for processing the data. Such an infrastructure will allow collection, analysis and access of data. A government organization which already has a higher level of IT capability is more likely to open its data and in a more efficient manner compared to one with poor level of IT capability, where development of IT infrastructure for open access may require additional time and cost and may limit the degree of openness.

Available skillset of human resources has also been identified as a constraint to any IT adoption in government sector (Kamal 2006). If the government employees lack expertise on the technologies required to collect, manage, or share the data effectively, it would limit the degree to which data can be made openly available. Also government employees might perceive the additional work required to open the data as unnecessary addition to their responsibility and thus resist the opening effort, which might act
as a barrier for implementation (Janssen et al. 2012). Open data initiative is an ongoing process and needs the support and skills of human IT resources to be successful.

Hence the government's decision to open its data in response to citizen demands will be influenced by the presence of IT capabilities possessed by the government, such that government with higher level of IT capability in terms of IT infrastructure and IT personnel skills is more likely to have a higher degree to openness in its data sharing initiative.

Hence, we propose:

H3a: Government IT capability positively moderates the relationship between citizen demand for information and degree of data openness.

H3b: Government IT capability positively moderates the relationship between government responsiveness and degree of data openness.

Information Management Capability

The core of open data is to make certain data is freely and publicly available to everyone to use. While this idea is laudable in theory, in order to completely harness the potential of open data in economic terms, the government needs to integrate public data from different sources. This requires not just collecting the data for government use, but also once the data has been collected and standardized in a usable format it must be maintained on an ongoing basis and made available to decision-makers within the government agency and published for citizens. This all needs effective information management.

In the context of open data, some of the previously identified challenges faced during the implementation include original data in different, often incompatible, formats, incomplete or inaccurate rate, or data without proper context or metadata (Janssen et al. 2012; Martin et al. 2013), all of which compromise the quality of data to be disseminated. This may limit the openness of platform by limiting the amount of sharable information. Furthermore, poor information management practices may lead to information getting lost in the huge pool of data. However, governments with stronger information management capability are more likely to have better information sharing and maintaining practices as well as better infrastructure enabling open data.

Hence we propose:

H4a: Government information management capability positively moderates the relationship between citizen demand for information and degree of data openness.

H4b: Government information management capability positively moderates the relationship between government responsiveness and degree of data openness.

Research Methods

The next step of this study will be to design and conduct a survey with city governments as the unit of analysis. As basis for establishing the strength of our survey constructs and measures, we will conduct interviews with city officials from several cities that are considered leaders in openness and several cities that have not moved to open their data. In addition, we will conduct interviews with several of the third party data software and service companies offering support to cities as they open their data. We plan to survey city governments in the United States that are either considering adopting or have already adopted open data. Survey respondents will be the Chief Information Officer or Chief Data Officer in a city. Questionnaire will constitute items pertaining to IT capability and information management capability, and degree of openness, cost, perceived citizen demand for information, perceived risks and top management support. Previous studies have shown cost of implementation, lack of top management's support, and perceived risk in implementation as barriers for implementing IT innovations (Cole 2012; Martin et al. 2013), which will be controlled for in our study. In addition, we will collect secondary data to measure government responsiveness. The data collected will be analyzed using OLS regression model and will be checked for presence of endogeneity. If any evidence of endogeneity is found, it will be treated using instrument variables such as citizen's use of technology or average education level in the city.
Conclusion

Opening up its data to citizens is seen as an overall beneficial move for the government, despite the associated risks in the implementation. However, the open e-government initiatives are unevenly developed across the cities in the United States. The authors propose a research model from the perspective of the IT capability and information management capability of the government organization, that will help in developing an understanding of open data programs and help the decision makers within the government while making the decision about open data adoption and implementation strategies.

The contributions of this study are threefold. First, extending previous studies that examine the adoption of open data initiatives from the demand side (citizens consuming the information) or the supply side (government supplying the information), our study focuses on both the demand side and supply side by investigating the impact of citizen demand for information and the role of government responsiveness. Second, our study highlights the role of governments' IT capabilities in open data initiatives, which has largely been under-investigated in the existing open data literature. Finally, open data sharing is an information service and it is different from most transaction services provided as part of e-government. Taking an information orientation perspective, we highlight the role of information management capability of the government in the effective sharing of information with the citizens.

Perceived risks associated with the implementation of open data might be a factor in influencing the degree of data openness. This study controls for perceived risks; however, in future it might be interesting to see if the perceived risks interact with other antecedents.

REFERENCES


