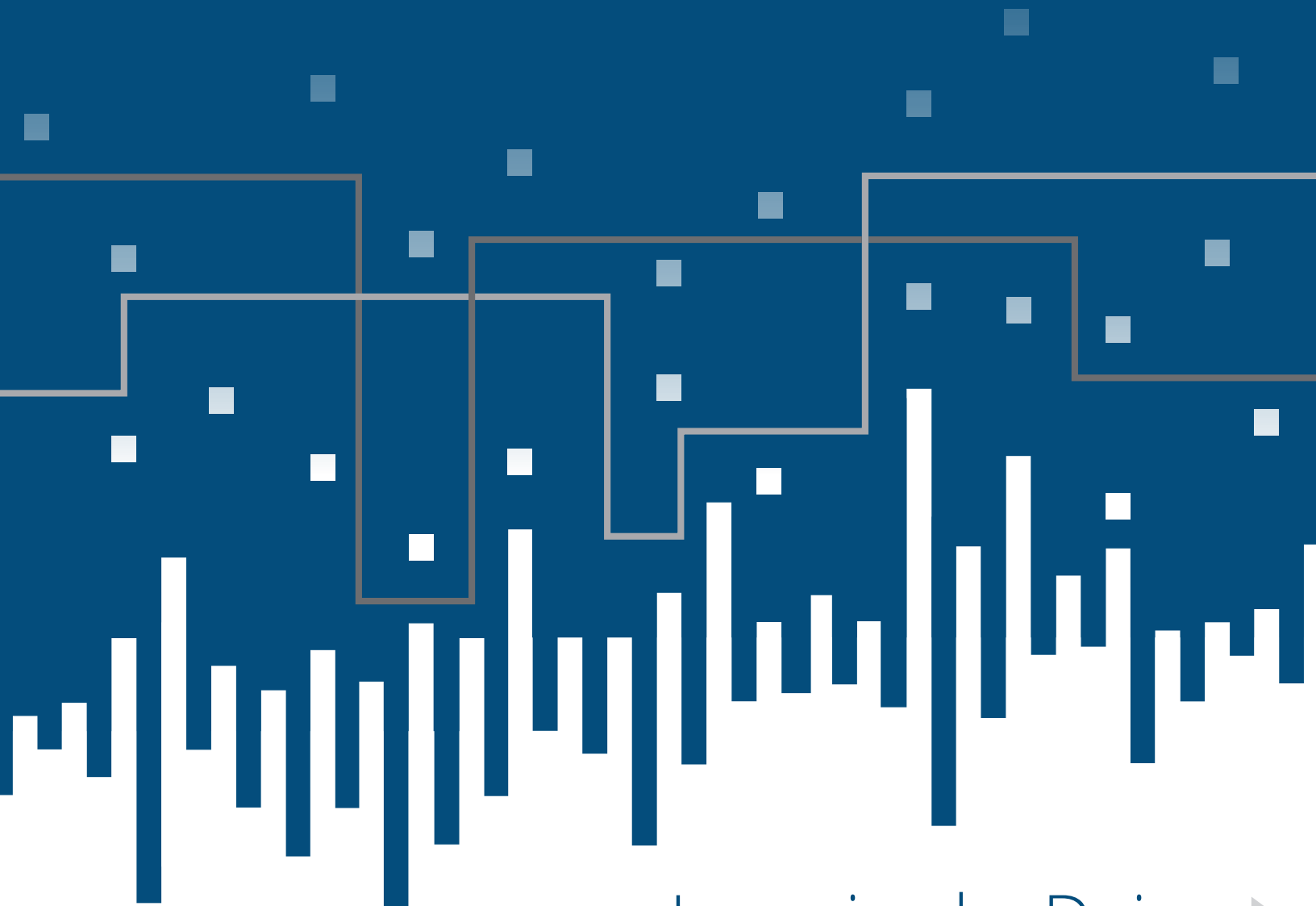


CITY

OPEN DATA POLICIES



Learning by Doing ►



ABOUT THE NATIONAL LEAGUE OF CITIES

The National League of Cities (NLC) is the nation's leading advocacy organization devoted to strengthening and promoting cities as centers of opportunity, leadership and governance. Through its membership and partnerships with state municipal leagues, NLC serves as a resource and advocate for more than 19,000 cities and towns and more than 218 million Americans. NLC's Center for City Solutions and Applied Research provides research and analysis on key topics and trends important to cities, creative solutions to improve the quality of life in communities, inspiration and ideas for local officials to use in tackling tough issues and opportunities for city leaders to connect with peers, share experiences and learn about innovative approaches in cities.

CITY OPEN DATA POLICIES





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FOREWORD

The 21st Century is the century of data. Increasingly data defines who we are, what we do, where we go, and how we get there. As with a whole range of leading issues, cities are at the vanguard of this shifting environment. Through increased measurement, analysis, engagement, and economic activity open data will further solidify the centrality of cities in this urban century.

The Open Data Handbook defines open data as data that can be freely used, reused, and redistributed by anyone. This freedom of use is a lens into the city that creates transparency and engagement opportunities with citizens. It also provides a resource for the city to function more efficiently, and generates economic development opportunities for new companies to incubate and expand.

Open data provides a previously untapped resource for cities and creates opportunities that will only continue to grow into the future. By opening data, cities are developing an unprecedented portal into the operations and functioning of government for the use of and to the benefit of community members and open government advocates.

In every community across the country, large and small, city leaders are intently focused on improving the quality of life. The fundamental underpinning for a thriving community is a strong financial and economic base, a sense of safety and well-being, and the tools to react to and anticipate important public issues.

The National League of Cities Center for City Solutions and Applied Research strives to strengthen communities, transform and improve cities, and assist city leaders. We do this by knowing and learning about cities, identifying and sharing promising city practices, fostering effective solutions and innovation, and challenging city leaders to lead.

Working together with our partners at American University's Department of Public Administration and Policy, this guidebook is meant to be a resource for cities developing open data policies that create efficiencies in government operations, promote transparency, and support economic development.

Brooks Rainwater

Director, Center for City Solutions and Applied Research
National League of Cities

EXECUTIVE SUMMARY

In the information age, citizens are demanding higher levels of transparency from their governments. According to a survey conducted by Lake Research Partners and The Topos Partnership (2009), making U.S. government more accountable (83%) and more open (79%) are among the greatest concerns of the citizens. Governments are responding by proactively publishing their information in the so called open data movement. In this environment, several large- and medium-sized cities across the US have implemented open data programs and many are considering doing so in the future. The open data movement is a new phenomenon in local government and most cities are still learning by doing. It is, therefore, important that the cities considering open data initiatives learn from the example of those taking the lead, to avoid problems or mistakes that other cities have encountered along the way. This is the aim of this document. The National League of Cities (NLC) is committed to helping city leaders build better communities and showing how different cities are managing their open data policies will undoubtedly contribute to this aim. We expect that this document will provide insight about approaches, successes, and challenges that will help cities to achieve their own openness goals.

SUMMARY OF RECOMMENDATIONS

- 1. Leadership:** Political support stands out as one of the key requirements to implementing a successful open data project. The benefits of strong leadership are most evident as new initiatives attempt to overcome internal and external barriers to the project. This has been the case in Chicago, IL where the city's open data initiative has thrived, in part, due to the strong support by the Mayor, Rahm Emanuel.
- 2. Appropriate Legislation:** Enacting legislation or formal policies is a crucial step toward ensuring the growth and sustainability of open data portals. Some cities, such as Austin, TX, enacted legislation when their programs were launched in order to facilitate the implementation process. Other cities, such as Chicago, have legislated at later stages so as to guarantee the sustainability of their initiatives.
- 3. Funding:** Open data initiatives do not require high levels of funding. It is, however, important that the programs have their own budget line items where resources are specifically allocated. Most of the projects studied in this report are led by an open data manager and a small group of existing city staff, which helps keep costs down.
- 4. Technical Approach:** Leading U.S. cities rely on commercial platforms that facilitate the implementation of open data initiatives, provide technical expertise, and ensure 24/7 customer support, often at a lower cost than providing these services in-house.

5. **Stakeholder Involvement:** Open data is a two-way process. Governments publish the data and society enriches and uses the data. It is, therefore, essential to encourage participation and engagement among multiple stakeholders including: community members; non-profits; universities; the press; businesses; city departments; and other levels of government. Many cities adopt a flexible, and usually informal, approach to interact with the stakeholders.
6. **Measuring Success:** An important limitation found in most of the existing open data policies is the lack of formal tools or methods of evaluation to measure the benefits and outcomes achieved. Developing evaluation tools should be an integral part of any future open data policies. Such tools would increase open data accountability and serve to catalyze support among groups, within local government, that are less committed to open data.

INTRODUCTION

Open data is defined as *data that can be freely used, reused, and redistributed by anyone* (Open Data Handbook, 2010-2012). The most important principles of this definition are:

- **Availability and access:** Open data should be available and easily accessible, preferably by electronic means. There should be no prohibitive costs or exclusions to using or reproducing the data. Additionally, open data should be provided in a convenient and modifiable format.
- **Reuse and Redistribution:** Open data should be provided without restrictive licensing or terms of use that would prohibit its use or reuse, including intermixing with other datasets.
- **Universal Participation:** Open data should be accessible to everyone. No discriminatory practices should be used, including the placement of restrictions on the use of open data for commercial and educational purposes.

(Open Data Handbook, 2010-2012)

In the information age, citizens are increasingly accessing government websites for services and information (Smith, 2010). Literature in public administration theorizes that transparency through online sources could improve citizens' confidence in government (Tolbert, 2006). The White House launched its Open Government Initiative in 2013,

including its Data.gov website, thus beginning the process of making government data more readily available. In the wake of this federal initiative, in partnership with communities, private companies, advocates, and the technology sector, cities have been begun to innovatively pursue open data. As the primary providers of government services, cities collect and hold massive amounts of data about crimes, waste management, transportation, education, housing, consumption, and more. Until recently, much of the inherent potential in this data has been untapped. By making city data freely accessible, governments have not only improved their transparency, but have begun to use open data as a means to improve services and gather more information about communities.

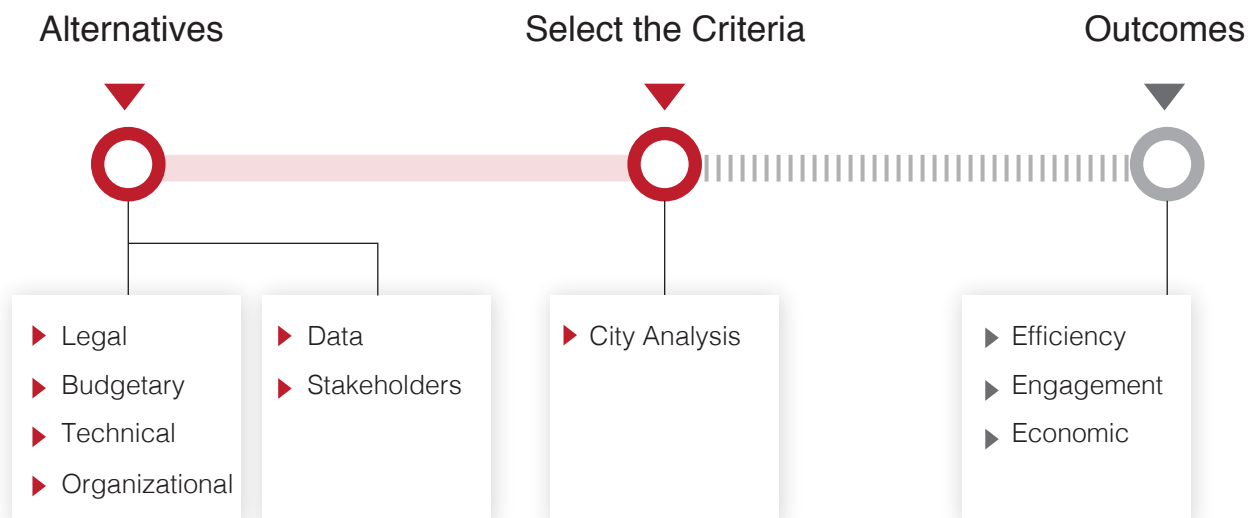
Open data is still a new concept to governments and practice models for implementation and design are lacking. The National League of Cities seeks to assist city leaders in developing and pursuing open data policies by outlining implementation processes and pointing to best practices. The following analysis will help to shed light on some important aspects of open data. The analysis will include an exploration of important themes in open data as outlined by the Sunlight Foundation and other open data advocacy groups. Not only that, through five case studies of four U.S. cities (Chicago, Austin, Seattle, and Boston), and one international example (Amsterdam), this analysis will provide insight into a variety of successes, challenges, and approaches to implementing open data initiatives in city governments.

POLICY ANALYSIS

There are two groups of factors to consider when evaluating an open data policy: those factors that must be defined when launching the policy (background factors); and those factors that will be defined along the way (the on-going factors). Careful consideration of the background factors provides the legal, budgetary, technical and organizational foundation of an open data analysis on which to build effective policy. Consideration of the other on-going factors, such as stakeholder engagement and the selection and release of available data, will contribute to increasing the social and economic value of the policy. Figure 1 illustrates this analytical framework. While background and on-going factors constitute one set of criteria that officials and politicians

can use to assess their alternatives, open data is a new field of study within public administration. Literature on open data policy analysis is scarce, therefore, the best way to better understand the inherent opportunities and challenges involved may be to analyze the real life successes of cities that have instituted open data programs. Through the analysis of case examples, different alternatives may be compared, trade-offs may be confronted, and useful insights may be gleaned by decision-makers. Not surprisingly, the quality of outcomes from an open data initiative is directly dependent upon the investment made in policy analysis and development. In this study, the authors examine the goals and eventual outcomes associated with a group of cities' open data initiatives.

Figure 1: Open Data Policy Analysis



BACKGROUND FACTORS

Legal Framework

The most central and well-known law related to government transparency is the Freedom of Information Act (FOIA). Enacted in 1974, FOIA provides a mechanism for the public to access certain information held by the national government (Blaton, 2014). Since its enactment, FOIA has been changed through executive order and legislative amendments. Some of these changes have clarified, the type of information that should be made public, making exclusions for maintaining individual privacy and protecting national security. Many state and local governments have passed their own FOIA legislation or have public records laws that cover information held at the local level (FOIA Advocates, 2014). Laws vary from state to state, but many use the federal FOIA law as a guideline and have similar provisions, such as a formal process to request information, and restrictions on the release of private information (FOIA Advocates, 2014). These legal bases frame the type of information that state and local governments release through open data portals.

In contrast to the principles of open data, current law regarding public access to information reflects a policy approach that is reactive. When the release of data must be prompted by a request, as opposed to other more transparent and voluntary releases of information, distrust and the belief that government is withholding information may be fostered among the public. Open data policy is more proactive in its approach, and eliminates many of the administrative steps required for a FOIA request.

Creating Policy at the State and Local Level

Existing open data programs have been created in a variety of ways. In many instances, the state legislature will pass a bill that outlines the structure of an open data initiative. Structuring open data policy in this way has the advantage of designating

money for programing, mandating the release of specific types of information, and the designation of quality standards, data formats, and timelines for implementation (Wood, 2013).

In the absence of action by the state legislature, some cities have opted to pass ordinances that mandate open data. In Honolulu, Hawaii, the mayor signed an ordinance requiring all city departments to adhere to an open data policy and instructed departmental leaders to make the city's information available (Honolulu City Council Ordinance 13-39, 53(2013), CD2, FD1.). The ordinance also established privacy and licensing guidelines for Honolulu's Department of Information Technology to use when making data available. This approach prioritizes local control and preference in implementing open data policy for a particular city.

Many open data initiatives also originate from within the executive office. Both Illinois' and Honolulu's open data initiatives began inside the governor's office with an executive order issued to state agencies. In Chicago and New York, Mayors Emanuel and Bloomberg made open data a priority of their administrations and their leadership is often cited as being a catalyst for the success of the open data programs in each city. Many advocates encourage action by the executive branch because it allows for open data to be implemented more informally and does not require the enactment of any legislation or ordinance. At the 2014 Data Innovation Day Policy Conference in Washington, DC, Ian Kalin (Director of Open Data for Socrata) and Michael Flowers (Former Chief Analytics Officer, City of New York) both encouraged mayors across the country to lead in implementing open data programs in their communities.

Privacy and Ownership: Legal Areas for Consideration

Cities must respect and safeguard the identities and privacy rights of citizens when sensitive information is contained in open data releases.

Many cities already have such protections in place. When making a decision about what data to share, a city should consider the ways in which an individual might be identified by the information that is provided. Actions should then be taken to ensure that citizens' identities and privacy rights are protected in accordance with the law (Goldstein, 2013).

Open data advocates also grapple with the important issue of data ownership. Who owns the information contained in open data releases? Excluding the personal identifiers of private citizens, open data advocates point out that any data that a government holds is factual, and facts are not protected under copyright laws. Furthermore, 17 United States Code (USC) 105 states, "content and data created by government employees within the scope of their employment is not subject to domestic copyright protection." This effectively bars any government employee, that collects or formats information for a release, from claiming ownership rights to the information being shared.

Budgetary Framework

Funding is an integral aspect of open data initiatives. In the same way that effective leadership catalyzes the structuring and implementation of open data initiatives, leadership may also assist in securing project funding through a city's annual budget process. In the absence of available funding, several organizations have begun to provide grants for the implementation of open data programs.

Funding Sources

Open data projects are funded in several ways. The federal government's open data initiative, Data.gov, is financed by the Electronic Government Fund (EGF), as outlined in Section 101 of the E-Government Act (44 §3604). Funding from the EGF can be distributed to federal agencies to assist with incentivizing partners' participation in data collection, which may include states (Executive Office of the President, 2014). The federal

government, however, does not have a dedicated fund set aside for the exclusive purpose of funding open data projects in cities.

States have begun to pass legislation that allocates money for open data initiatives through the annual budget process. Illinois recently passed a bill, including a funding appropriation that directed the heads of agencies to implement open data initiatives. Since open data is a new area of government, funding sources are non-uniform among cities. New and creative sources and mechanisms for funding open data projects are needed.

In addition to federal and state funding, some states have financed their open data programs through the use of grant funds from the not for profit community. The Sunlight Foundation is a major supporter and advocate for open data projects. As a 501(c)(3) nonprofit organization focused on technological innovation in public policy, The Sunlight Foundation has donated millions of dollars to these projects since 2006 (Sunlight Foundation, 2014). The organization distributes assistance in amounts between \$5,000 and \$10,000, called OpenGov Grants (Sunlight Foundation, 2014). Other foundations, such as the Knight Foundation and the MacArthur Foundation disburse grants to promote open data and government transparency (McCann, 2013).

Challenges

Open data programs are relatively inexpensive to operate. Much of the required data exists in an electronic format which help may reduce administrative costs when fulfilling information requests. There are, however, still challenges. Upfront costs may be higher, during the initial implementation of an open data program, than those incurred for its ongoing operation. Other costs include paying for staff and any contract work provided by private companies assisting with the project.

Technical Framework

There are different technical approaches to providing open data services. The most common is to rely on existing technical platforms that are already integrated with the city's information technology infrastructure. The integration, development, and maintenance of the system can be carried out by staff teams of IT professionals or draw upon the technical expertise of third parties. A mixed approach may also be used. It is, therefore important to assess the technical platforms that cities are using, along with the ways that cities are organized to perform the technical and administrative duties associated with open data projects.

Technical platforms

There are two leading types of open data platforms: open source and proprietary. Both platforms have their own advantages and disadvantages. Open source platforms avoid vendor lock-in and are considered to conform more closely to open format and standards, be more transparent, and more innovative (Hoppin, Byrnes, & Couch, 2013). On the other hand, proprietary options are usually easier to implement, have lower learning curves, and better established technical support. Among the most notable platform options are: CKAN, a leading open source data portal platform (CKAN, 2014); DKAN, a DRUPAL based open data platform (DKAN, 2014); and OGPL an open government platform developed through a collaboration between India and the U.S (OGPL, 2014). There are several proprietary platforms, such as Socrata (Socrata, 2014) and Junar (Junar, 2014). When launching an open data initiative, cities have to decide which platform best suits their needs based on their technical capabilities, previous experience, volume of information, and short and long-term goals.

Technical organization

Complex and challenging technical issues may underlie open data initiatives. Local U.S.

jurisdictions, particularly small and medium cities, might lack the required human and technical resources to properly address such challenges. A survey by the Public Technology Institute, on the IT issues that impact local government, found that in-house IT staffing is perceived as being very inadequate or inadequate for 63.1% of the US local jurisdictions (Public Technology Institute, 2013). The lack of technical staff in US cities is one of the problems that can hinder the effective implementation of open data projects. Increased staff demands, fluid staff roles, lack of expertise, and insufficient infrastructure (Justice, Melitski, & Smith, 2006) are among the challenges facing local governments with smaller budgets. To overcome these problems, cities must carefully craft their project's development strategy by supplementing their internal technical resources with outside expertise. In later sections, this report analyzes how different cities have organized their IT departments and how they have balanced internal teams with external assistance. It is expected that the analysis will provide useful insights for those cities that are in the process of building their own open data initiatives.

Organizational Framework

The structure and organization of open data initiatives varies from city to city. Often the organizational structure depends on whether power is centralized in the mayor's office or held by the city council. This city dynamic can impact the organization of personnel, implementation, financing, and quality measures. It is clear, however, that a strong leadership role is necessary to serve as a liaison between city departments and overlapping jurisdictions. Oversight of program implementation and coordination is often given to an existing employee such as a Chief Information Officer, information technology staff, or the city manager (Sunlight Foundation, 2014). Some cities have created new departments and management positions for oversight of their open data initiatives. Titles of these positions includes: Chief Innovation

Officers; Chief Digital Officers; Chief Data Officers; Chief Technology Officers; and Chief Analytics Officers. The responsibilities of each of these positions vary widely, but often cover large areas (Sunlight Foundation, 2014).

Certain issues may arise when responsibility for implementing a new open data initiative is allocated to existing technical staff. For example, new initiatives may place a significant additional workload on existing technical resources. Unless the staff is dedicated to the goals of the open data project, open data policy may be implemented in a less than optimal way. One way to avoid this would be to structure open data implementation using multiple 'data coordinators' to distribute the associated responsibilities throughout the technical organization. The data coordinators would serve as the points of contact and authority for the required departments, agencies, or units within the local government.

Some advocates of open data suggest the appointment of an Open Data Ombudsman as an authority to represent the best interests and needs of the public. Advocates claim that having an administrator, who has no other duty than to be responsible for being transparent to the public, is the best way to meet the goals of open data transparency (Sunlight Foundation, 2014). Other best practices include: creating a process to ensure data quality; creating or exploring potential partnerships for the distribution of work; creating a central location devoted to data publication and policies; appropriately safeguarding information; and specifying the methods of prioritizing data releases (Sunlight Foundation, 2014).

Administratively, the handling of public data should be considered carefully. Before releasing datasets, questions should be raised regarding what information to release, when to release it, and the kinds of sensitive material that need to be protected. Internal policies should be crafted to address quality control, financing of additional expenses for

continued operation, and training of employees on best practices and privacy. Organizational barriers can put the successful implementation of an open data program at risk. Each case should be handled independently, using the examples of other cities' implementation efforts as a guide (Marienfeld, 2012).

ON-GOING FACTORS

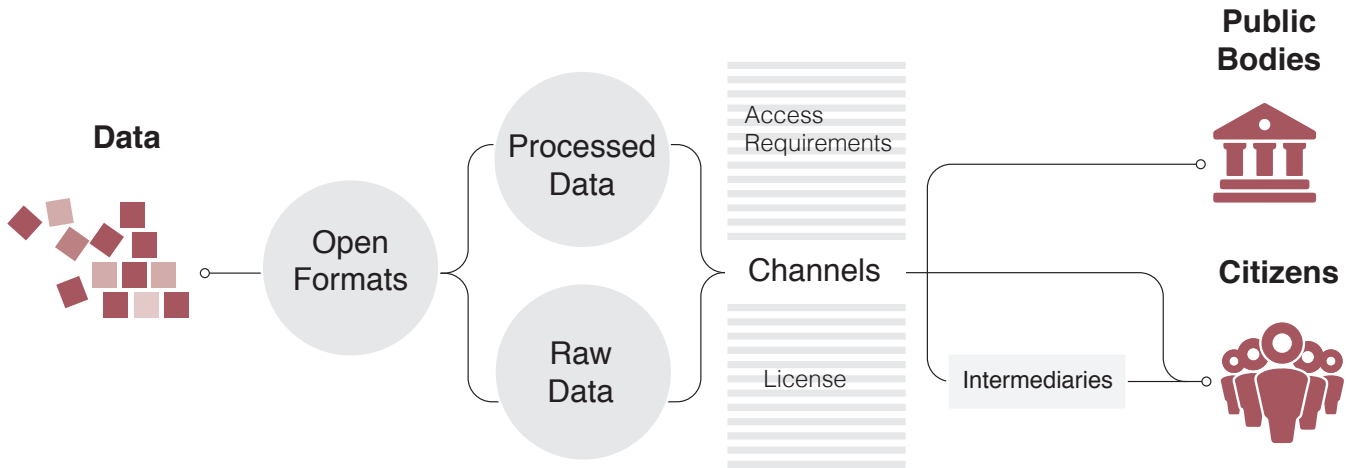
Data Management

Carefully considering what data is released and how the data is provided to the public guarantees the usability of the information and helps to overcome access barriers (Deloitte, 2013, p. 24).

Open data content is provided to the public as datasets. A dataset is a group of cohesive information that is usually delivered as a file. Open datasets should be machine readable, free or negligible in cost, and with minimal limitations on their use (Manyika et al., 2013, p. 3). These characteristics are further detailed in the eight principles of government data (opengovdata, 2007). The principles require datasets to be: (1) complete – the entire dataset can be acquired; (2) primary – with the highest possible level of granularity; (3) timely – available as quickly as possible; (4) accessible – available to the widest range of users; (5) machine readable – reasonably structured to allow automated processing; (6) non-discriminatory – available to anyone, with no requirement of registration; (7) non-proprietary – in a format over which no entity has exclusive control; and (8) license free – not subject to any copyright, patent, trademark or trade secret regulation except for the reasonable protection of privacy and security.

Figure 2 illustrates the open data principles and characteristics discussed above. The criteria used to assess the management of data are: access restrictions or licenses; data formats; data value; quality control; and access channels. The following sections discuss how assessment criteria should be applied.

FIGURE 2: How the data is produced and released



Access Restrictions

By keeping access restrictions to a minimum, citizens can more easily use and benefit from open data. Open access to data should only be restricted when issues, such as national security or privacy concerns warrant it. The proper safeguarding of sensitive information should conform to pre-existing legislation and directives. Deviations from a policy of open access to data should be based upon sound, rational reasons, and balanced with the public’s interest in having the information available. An analysis about how to protect sensitive information through aggregation or generalization should be included in such reasoning.

Free-Licensing to Reuse the Data

Licensing criteria can be a key factor in fostering, or hindering the wide use of open data (Deloitte, 2013, p. 26). Providing data under license at no cost and free of any copyright, patent, trademark, or other restrictions in its use fosters entrepreneurial

and social activity (Sunlight Foundation, 2013, p. 10). For instance, the Open Government License (OGL) in the UK was introduced in 2010 to facilitate the reuse of public information by imposing as few restrictions as possible on users. Users can use combine and reuse the information for commercial purposes without having to register or pay for it. Users have to acknowledge the source of the information without suggesting official status, misleading others, or breaching the data protection act. The OLG may help maximize the use of public information by third parties, generating added-value in the supply chain, enabling intermediaries to fully exploit the potential of the information available.

Open Structured Data Formats

Datasets can be provided in different formats depending on whether the target audiences are, end users (citizens), intermediaries (interest groups, journalists, nonprofits, academic institutions), or firms. Citizens prefer readily accessible data in everyday readable formats. Intermediaries rely upon

raw data that can be easily computed and linked to other data. Raw data formats are generally preferred because they allow further enrichment of the information by applying analytical and statistical methods (Manyika et al., 2013, p. 2). The datasets should include metadata, information about the structure, scope and description of the primary data, in structured open formats. Structured data means that the information has been separated into fields, and open format means that the information may be used independent of any prescribed commercial interests and tools. Open formats permit third parties to create software packages and services without depending on commercial software or file format license holders. Structured open data formats can increase the value of the information by providing readily accessible, consistent, and known standards for the data and the metadata. Specific structured open data formats include JSON, RDF, CSV, and XML (for data sets), and non-structured data formats include HTML and plain text. Proprietary formats include commercial spreadsheets, word processing programs, and other dedicated formats.

Assessing the Value of the Data

Several factors affect the value of public datasets including: the content themes; the flexibility of the dataset and its accuracy; the comprehensiveness and speed of updates; and the ability to link the data (Deloitte, 2013, p. 17). The first datasets to be released should be those that yield the highest value, instead of those that are more easily available in the beginning (Manyika et al., 2013, p. 12). In addition to data, the code used to create public sites and tools often has as much value as the data itself (Sunlight Foundation, 2013, p. 6).

Guaranteeing the Quality of the Data

Quality refers to the consistency in content, identifiers, and format of the data. Quality also refers to the information being permanent and updated periodically in an orderly manner. It is

difficult for users to rely on information made available through open data projects if there is no guarantee that the data will be available in the future. The quality of open data should be guaranteed to the users through an explicit public statement. For instance, the Information Fair Trader Scheme (IFTS) accreditation system of the UK is an effort to guarantee that consumers of public sector information are treated fairly. Consistent quality in open data helps governments and stakeholders get the most value out of the information available.

A Flexible Multi-Channel Strategy

All datasets should be made available on the internet in a timely fashion through delivery channels selected to fit the needs and requirements of a variety of users (Sunlight Foundation, 2013, p. 8). Governments should be flexible by adding new channels and modifying existing channels as technology, users, datasets and devices change. The open data portal is the main entry point and it should include search tools, along with lists and descriptions of the available datasets. Mobile applications (apps) are increasingly becoming a preferred method of accessing information. The government should provide mobile apps that allow access to datasets. In general, open data portals are a good tool for the public distribution of open data because portals serve as a searchable hub of information. Portals are not, however, the best choice for managing bulk data or automatic processing. Other channels should complement the open data portal to allow computer to computer searching, filtering, and downloading of raw information. This bulk data should be accessible through direct downloads and through public Web Application Programming Interfaces (APIs) for more specific needs.

Stakeholder Engagement

A major aspect of implementing an open data initiative is considering how it will affect the various parties involved. Stakeholder engagement is an

inclusive and continuous dialogue and process between an organization and those who are potentially impacted by, or have an interest in its work. Stakeholder engagement should span the entire life of an implemented project (International Finance Corporation, 2007). In the case of cities' open data initiatives, stakeholders fall into two groups: the government (producer) and consumers.

PRODUCER

Government

In 2009, President Obama pledged an, “unprecedented level of openness in government” stating that such a commitment would, “strengthen our democracy and promote effectiveness” (The White House, 2014). The purpose of making public data open and freely accessible is to promote government transparency and accountability (Li, 2014). Giving the public free and open access to data can build confidence in government agencies and improve services.

Implementation of an open data initiative requires a team of government staff-level participants. In its *Introduction to the Open Data Field Guide*, Socrata points out several key roles that are required to make an open data initiative successful. Among the participants listed in, “Chapter Three: How to Assemble a Winning Team” are bureaucrats at the state and local levels, IT professionals, and program managers. Each category of participants has a different interest in the project and plays a diverse role in contributing to the success and usefulness of an open data initiative (Socrata, 2014).

CONSUMERS

IT Application Developers and Geographic Information Systems Professionals

IT Application Developers can be found on both sides of an open data initiative. On the receiving end, developers use the data provided to make

innovative applications (Socrata, 2014). For the majority of the population, these apps are the most useful format for the data. For example, the public release of weather data from government satellites and ground stations made it possible to provide services like agricultural advisories for farmers and generate new insurance options (The White House, 2014).

Geographic information systems (GIS) professionals are similarly able to provide useful tools for the public due to open data initiatives. Users can view datasets in various formats for manipulation. Using datasets to make maps has proved useful at multiple levels.

The decision to make global positioning system (GPS) data available to civilians, as opposed to strictly military uses, has revolutionized transportation and the vehicle industry (The White House, 2014). Additionally, Oregon's open data initiative provided a platform where data could be uploaded to make maps for boaters. More detailed information has been provided over time, as developers have layered and added data as the information became available (Socrata, 2014).

Companies/Business Owners and Entrepreneurs

Having data readily available has invigorated the private sector. People with innovative and creative ideas now have access to large amounts of information that they can use to introduce new products and services to the market (The White House, 2013). Private sector companies can develop strategies to influence others to make valuable data more available, finding innovative ways to combine data from different sources and gaining access to markets that were not previously available (McKinsey Global Institute, 2013).

Open data initiatives also provide a way to improve service delivery in already established markets. New sources of data can show patterns that allow a company's management to identify

sources of inefficiency, or refine product and service offerings. Companies may also choose to share their data to create, “benchmarks that can improve the overall industry performance” (McKinsey Global Institute, 2013).

Nonprofits and NGOs

Having data readily available on the location of resources and on the quality of services can assist non-governmental organizations (NGOs) in their efforts to address a variety of needs. For instance, knowing the location of hospitals or the quality of healthcare and educational systems can be used to identify areas of greatest need and be helpful to organizations developing strategies to meet those needs (McKinsey Global Institute, 2013). Open data initiatives that make this information available assist these organizations in carrying out their missions of bringing relief to areas that lack basic supplies and services.

Additionally, nonprofits can mobilize volunteers and provide a collaborative platform where people with different skills can work together, using the data to create useful tools. For example, Code for America recruits web developers and entrepreneurs for a year of service that includes using open data to make cities more efficient (McKinsey Global Institute, 2013).

Academic Institutions

By some estimates, using open data in education could generate from \$890 billion to \$1.2 trillion (McKinsey Global Institute, 2013). This increase would be largely attributed to the benefits of using open data to improve instruction by giving educators information that allows them to identify more effective strategies and tools for teaching in-demand skills. Students who acquire in-demand skills are more marketable and can be expected to have higher lifetime earnings.

Data on student performance can also be used by parents to make better-informed choices of schools. District of Columbia Public Schools (DCPS)

has launched an open data site that helps parents find zone schools and better navigate lotteries for popular charter schools in the area. By clicking on a particular region, parents can learn which schools service their neighborhood and view ratings for each, allowing them to be better informed when selecting schools for their children (Code for DC, 2014). In D.C., open data is also being used to take on projects in other areas such as: defibrillator mapping; automating the application process for affordable housing; and maintaining metrics about the DC Metrorail System.

How to Engage Consumers

Aside from government employees who play an active role in the implementation of open data initiatives in their cities, there are other interested groups that should be considered. It is highly recommended that these groups be included in the process of forming and implementing open data policy in cities. Participation may have a positive impact on the initiative’s success, as consumers can provide key details that inform design and execution (Sunlight Foundation, 2013). Stakeholders outside of government add value to planning and implementation processes by offering new perspectives and highlighting challenges that may not be obvious to other participants (Sunlight Foundation, 2013). Participation can be fostered through a number of means. One way to engage stakeholders is through mapping workshops. These sessions are used to map populations and data that allow providers to see any overlap in community interests and needs. Initiatives can then be tailored to address opportunities where possible. Maps also allow providers to see patterns as well as gaps in the data, which can highlight areas for improvement and lead to more targeted campaigns for the use of open data.

Hosting public forums are another way to encourage participation from stakeholders who are on the receiving end of the data. In public forums or meetings, users can request data in particular formats, address issues of communication between providers and the public, and suggest improvements (Li, 2014). Although forums often prove useful throughout a public process, some cities may find

forums to be cumbersome in the early stages. Local leaders, when convening a public meeting, may find the large number of ideas that are offered to be overwhelming. However, forums are useful because they allow users to provide more targeted feedback about the improvements that could be made within the scope of a project.

Additionally, cities must provide a way for the general public to assess the data and provide feedback. This is usually done through a link on the city’s open data website, where users make suggestions for datasets that are not yet available. In many jurisdictions, however, the open government and open data operations are informal, allowing citizens to email or call a staff member who is directly involved with the open data initiative.

The Digital Divide

The benefits of open data policies are fully achieved when everyone has the opportunity to make the most of the available data. Many segments of the population, however, are not positioned to realize

the benefits of open data initiatives. A “data divide” exists between those who are able to access and effectively use data and those who are not (Gurstein, 2011). These populations may not have access to open data due to a lack of economic resources, technological knowledge, language barriers, or because they reside in areas without internet access. Some demographic groups, such as senior citizens, minorities, rural residents, low income citizens, and poorly educated persons are less likely to interact with government using online communication channels. Although the increased use of internet enabled mobile devices has partially closed the digital divide, a substantial gap still persists at the household level. Only 64% of African-Americans and 53% of Hispanics have internet access at home.

Some scholars also suggest that it may be more difficult for disadvantaged groups to use open data in meaningful ways. Helbig et al. (2009) contends that it is likely that disadvantaged social groups cannot meaningfully obtain value from electronic services or participatory activities because there

Table 1: Citizen Uses of the Internet to Interact with Government

	<i>I look for info about officials online</i>	<i>I look for web information</i>	<i>I email government</i>	<i>I look for information about public policy</i>	<i>I look for official documents or statistics</i>	<i>I look for data</i>	<i>I look for campaign info</i>	<i>I look for legislation</i>
Education (1-7)	0.055 (0.010)***	0.054 (0.010)***	0.075 (0.010)***	0.059 (0.009)***	0.071 (0.009)***	0.040 (0.005)***	0.019 (0.005)***	0.058 (0.007)***
Income (1-9)	0.027 (0.007)**	0.029 (0.007)**	0.014 (0.007)**	0.025 (0.006)**	0.018 (0.006)**	0.015 (0.005)**	0.014 (0.005)**	0.018 (0.005)**
Age (18 - 95)	-0.004 (0.001)**	-0.001 (-0.001)	0.002 (0.001)**	-0.008 (0.001)**	-0.003 (0.001)**	-0.001 (0.001)**	-0.002 (0.001)**	-0.001 (-0.001)
Minority (1/0)	-0.03 (0.037)	-0.012 (0.039)	-0.052 (0.036)*	0.004 (0.035)	-0.067 (0.033)	0.008 (0.025)	-0.023 (0.023)	-0.085 (0.025)**
Constant	0.345 (0.062)***	0.135 (0.052)**	-0.216 (0.054)***	0.137 (0.056)**	0.043 (0.052)	-0.05 (0.039)	0.053 (0.040)	-0.088 (0.041)**
Observations	1204	1178	1057	1380	1385	1378	1386	1386
R-squared	0.082	0.073	0.093	0.078	0.009	0.047	0.024	0.079

is a significant relationship between the socio-economic characteristics of internet users and the way those users interact with the government using the internet. By performing a regression analysis using data from the Pew Internet Research Center (Smith, 2010), the authors of this report found a strong relationship between socio-demographic characteristics of Internet users and the way they use the Internet to relate to the government as shown in Table 1. Interestingly, these findings strongly support the theory that the access divide is turning into a use divide.

Conventional strategies used to tackle the digital divide may no longer be enough in the age of open data. A solution may be found in not only providing digital infrastructure, but ensuring that open data empowers everyone. Local governments should redefine and redesign their digital divide policies to ensure that every group in society can fully leverage the available data in ways that are meaningful and beneficial for them. Inequalities arise not only by lacking access to the data but by not being able to properly use it.

BENEFITS OF OPEN DATA

There are different types of benefits that stem from open data policies and accrue to a variety of stakeholders, either directly or indirectly. The following chapter summarizes some of the most compelling advantages of implementing open data policies.

Transparency and Accountability

Public transparency refers to the disclosure of actions taken by public actors and institutions (Fox, 2007). Transparency is increased and accountability is promoted when governments make their data publically available. Once governmental information is made public, the data can be carefully scrutinized by third parties, such as journalists, city agencies, researchers, nonprofits, and academic institutions. Higher levels of public scrutiny may help to reduce corruption (Ubaldi,

2013). For example, the British project, “Where Does My Money Go?” shows how the government spends (Open Knowledge Foundation, 2012). The non-profit organization, Chicago Lobbyists intends to improve the transparency of interactions between the City of Chicago, lobbyists, and their clients (chicagolobbyists.org, 2014).

Government Efficiency

Open data has the potential to increase governmental efficiency including reductions in bureaucratic red tape, workload, and paperwork thus reducing transactional costs (Ubaldi, 2013). While open data policies may initially increase the number of inquiries received by local governments, open data may significantly reduce the number of questions posed to public authorities in the long run. Open data empowers consumers to use public information to find answers to their own questions. Citizens may be more inclined to find answers on their own when information is published proactively, especially when those datasets are likely to be subject to public scrutiny (Ubaldi, 2013). In the Netherlands, after publishing their education-related data online, the number of questions received by the government decreased dramatically, thereby reducing the overall workload and costs (Open Knowledge Foundation, 2012). The city of Chicago estimates that their open data portal has reduced the number of requests by 50%. Additionally, civil servants are able to answer questions more effectively once information is widely available. In fact, some observers claim that open data raises compliance levels, as well as government efficiency (Access Info Europe, 2013).

Citizen Empowerment and Engagement

Open data empowers citizens to make well informed decisions. For example, the American Health and Consumer Service Department has pushed for the disclosure of data on flights operated by national airlines, to enable travelers to more effectively choose among competing carriers.

Citizens have also expressed their desire to play a role in policy making. The Internet and Civic Engagement Survey (Smith, 2009) shows the level of citizens' disaffection with politicians. Only 42% of the respondents believe that, "most elected officials care about what people like me think." Higher levels of trust in government may be achieved by increasing citizens' awareness of public activities and by encouraging the participation of constituents in the policy-making process. The survey also reveals that citizens have a strong interest in using the internet as a channel to get more involved in public affairs, as shown in Table 2. Open data initiatives provide large amounts of new information on the internet, precisely where citizens are searching for it.

Economic Development

The diffusion of public data may aid in the development of new products, software, and services (Market Assessment UK, 2013). When information is provided to the public, free of charge or at very low cost, private companies, including start-ups, are more likely to take the information

and create value-added products (Ubaldi, 2013). According to a survey from the European Commission in 2006, open data was estimated to have an impact of \$32 million on the European economy (Capgemini Consulting, 2013). In the U.S., in 2012 alone, more than two hundred new open data requests for health information were submitted to the US Health Data Initiative Forum.

A California start-up, BrightScope, has used public data to develop an application that helps consumers understand the fees associated with their retirement accounts (Capgemini Consulting, 2013). In the U.S. health sector, more than \$300 million a year in value could be generated from open data (McKinsey Global Institute, 2013). Furthermore, the value of using open data in seven key areas of the global economy, such as education, health, transportation, electricity, oil and gas, consumer products, and consumer finances is estimated to be more than \$3 trillion annually including: \$1.1 trillion of economic potential created in the U.S.; \$900 billion in Europe; and \$1.7 trillion in other countries around the world (McKinsey Global Institute, 2013).

Table 2: Percentage of users that interact with government in different ways

	Yes	No
<i>Internet users look for information about politics on the world wide web</i>	59%	41%
<i>Internet users use on-line tools to discuss political issues</i>	30%	70%
<i>Internet users have used email to contact a government official</i>	20%	80%
<i>Social-network users follow a government official</i>	20%	80%
<i>Social-network users use internet to post comments on political issues</i>	64%	36%

Chicago:

Success through
Leadership



Chicago:

Success through Leadership

Chicago's Data Portal is an example of a successful open data initiative, thanks to the strong, on-going support of the mayor, Rahm Emanuel. While some open data projects were established before Mayor Emanuel was elected, open data as a function of government was greatly expanded under his leadership. Mayor Emanuel's support, "laid the foundation that allowed open data in Chicago to become what it is today" (Goldstein & Dyson, 2013). As Tom Schenk, Director of Analytics and Performance for the City of Chicago said, "The key thing is you need to have your absolute senior leadership from the Mayor down really be behind open data. If the mayor isn't involved, it's going to be very hard to implement." In 2012, Mayor Emanuel signed an open data executive order which formalized the city's open data initiative and ensured the sustainability of the program.

Another key factor in the success of Chicago's open data initiative was the city's robust stakeholder engagement process. In Chicago, there is a very strong open-government community, including both research institutions and business, with which the city enjoys rich cooperative relations. Public entities have also been formally engaged in the process through the appointment of open data coordinators within city agencies.

Chicago Data Portal

The city of Chicago has a long history of open data. An open data portal, although limited in the early days, has existed in Chicago since February

2010, under the administration of former Mayor Richard M. Daley. The first annual open data compliance report was published in February 2014 (Chicago, 2014a).

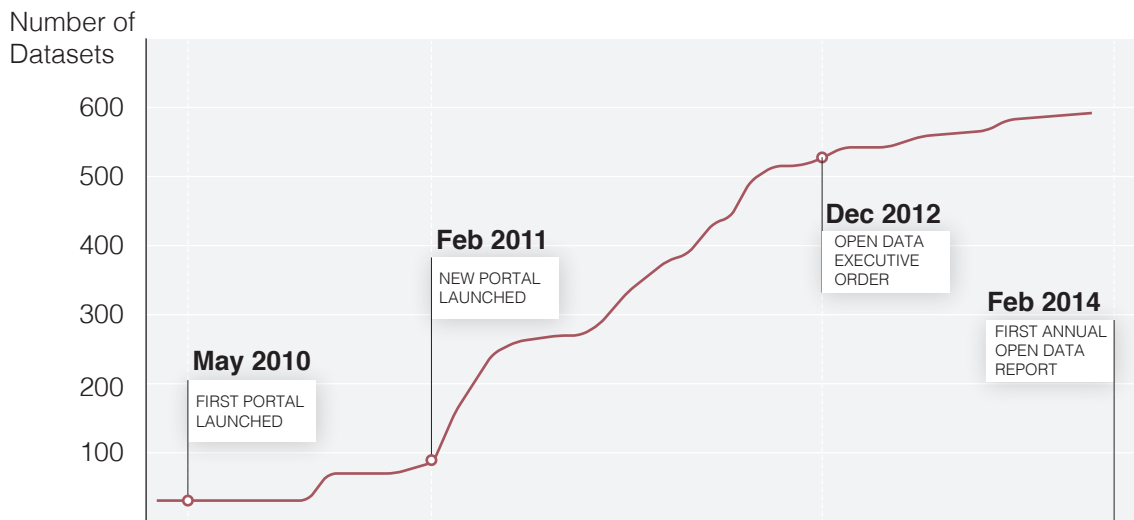
Chicago's open data portal has grown quickly over the last four years and now boasts 600 datasets on dozens of different topics, as can be seen in Figure 3. There have been almost 2.9 million page views from May 2011 through October 2013 (City of Chicago, 2014).

Legal Framework

Mayor Emanuel issued his Open Data Executive Order (Emanuel, 2012) to guarantee that city agencies proactively provide datasets to the public. The executive order established an open data advisory group to oversee the writing of an annual compliance report. The executive order also established the office of the Chief Data Officer, along with open data coordinators in each city agency. Not only that, the executive order designated the Chicago Open Data Portal as the City's main open data communication channel. These actions have resulted in the formalization of a historically informal process, which has helped to safeguard the sustainability of the City's open data initiative and secure the commitment of the city agencies.

Mayor Emanuel's Open Data Executive Order was issued after the city's open data initiative had been launched. City officials believed that it was, "critical to create a viable program before becoming

Figure 3: Chicago Data Portal Timeline



Note: Compiled by the authors based on ChicagoHub, 2014.

overly prescriptive about its functions” (Goldstein & Dyson, 2013). In other cities, however, executive orders may be required to facilitate the implementation process. Nevertheless, it is necessary to have a legal framework in place to guide the implementation process and ensure the continuity of an open data program beyond the administration that initiated it.

Funding

The main source of funding for Chicago’s open data initiative is the city’s IT budget. City leaders consider it critical to have funding specifically committed to the open data initiative (Goldstein & Dyson, 2013). The majority of spending funds personnel costs. The second largest expense is incurred from the city’s contract with its open data platform supplier.

Technical Strategy

The city of Chicago uses Socrata as its open data platform supplier. Chicago’s decision to use Socrata was based in part on the city’s belief that the company’s offering was a more established

product when the open data initiative launched four years ago. The City also believed that a commercial platform, as opposed to other open source options, would be better able to support the 24/7 requirements of its open data program. When problems arise, Socrata provides technical support to address issues around the clock. Larger organizations, such as the federal government, are better equipped to support their own 24/7 system requirements and fully exploit the benefits of open source platforms like CKAN.

Organizational Analysis

In May of 2011, Chicago was the first large city to appoint a Chief Data Officer (Goldstein & Dyson, 2013). Today the open data program is located within the City’s IT department. There are two full time employees in charge of the project: a program manager; and the Director of Analytics and Performance. A part-time contract worker has also been hired to tackle some of the programming requirements. To supplement these efforts, policy associates from the mayor’s office help formulate ordinances and other strategies to maximize the impact of the program.

Data Management

The city of Chicago has two types of user licenses. The general user license allows the public to access data via the city's web portal. Under the terms of the general user license, the data belongs to the city of Chicago, which reserves the right to remove data from the portal or ask people not to use the data in certain ways. The general user license also includes a disclaimer of liability. The city of Chicago also provides some of its datasets in a Github platform under a second, more business-friendly license, which is the most permissive open source license available (Initiative, 2014).

The city of Chicago provides data in several proprietary and open formats through the Socrata platform. Raw data is provided in machine-readable formats that any developer may access for whatever purpose they imagine. The city does not intend to develop its own mobile apps because that would require strong programming skill sets, on-going financial support, and hinder private entrepreneurship. The city, instead, encourages third parties to develop apps that are compatible with the open data initiative. As a result, Chicago's data portal has become a platform that supports innovations arising from a diverse base of communities (Goldstein & Dyson, 2013).

Chicago does not guarantee the accuracy of its data. Information is made available and accessed on an "as is" basis. Although the city does not make an effort to clean its data, the information is used by the city on a daily basis, which suggests that internal users have a high degree of confidence in its quality.

The city's data dictionary, launched with the support of the University of Chicago's Chapin Hall and The MacArthur Foundation, shows metadata for each dataset made available on the portal. The aim is to promote full transparency and help internal city staff and external stakeholders analyze the enormous amounts of data being produced.

Although it is difficult to capture the true value of open data, the city tries to prioritize the datasets that are released based on their expected value to third parties. Considerations include the speed with which the data can be released and the expected benefits that the data would provide to communities and businesses.

Stakeholder Engagement

Stakeholder engagement in Chicago is very robust. Chicago considers it essential to, "develop a strong relationship with your open government community" (Goldstein & Dyson, 2013). As a result, the city and the open government community meet on a regular basis. By avoiding the frictions of a formal process, the city of Chicago and the community are building an extremely flexible, rich, and fluid working environment.

The value of a city's data is contained not only within the data itself, but in the meaning and knowledge added to the data by third parties including, nonprofits, news organizations, researchers, and businesses. Several local and national organizations such as the Smart Chicago Collaborative, the Metro Chicago Information Center, Chapin Hall at the University of Chicago, Code for America, the MacArthur Foundation, and the Sunlight Foundation are engaged in this process by providing applications, services, and expertise (Kassen, 2013). News organizations, such as the Chicago Tribune, and the Sun Times, also rely on the information made available through Chicago's open data portal. In fact, strategic media attention is considered to be one of the key components of the project's success (Goldstein & Dyson, 2013).

The academic and the business communities are key open data stakeholders in Chicago. Open data unlocks the door to new areas of research by making valuable datasets available to the public. Along the way, the city has cultivated good relationships with businesses and entrepreneurs, so as to understand how private enterprises build new products and services using open data.

City departments have a clear interest in the success of Chicago’s open data program. In fact, collaboration on open data projects, between agencies, has been formally established by executive order. This includes the designation of an open data coordinator in each department. For civil servants, a major benefit of Chicago’s open data initiative is a reduced workload due to fewer incoming FOIA requests.

The city of Chicago is also seeking to partner with other local jurisdictions within the metropolitan area to realize economies of scale by combining technologies and approaches. Nonprofit organizations such as the Smart Chicago Collaborative at the Chicago Community Trust are helping the city achieve this aim. One of the initiatives for 2014 is to improve City/County coordination to, “streamline the public’s access to city and county data and identify opportunities to coordinate more closely in the release of related datasets” (City of Chicago, 2014).

Digital Divide

The city of Chicago has an established digital outreach program, Connect Chicago, which features several initiatives designed to tackle the digital divide. Chicago’s open data officials are particularly concerned with the usability of third party applications that are created using data from the city’s initiative. The non-profit, Smart Chicago Collaborative convenes civic user testing groups to examine the usability of these applications. Citizens can volunteer to be civic user testers, and coordinate with Connect Chicago to review applications at a nearby computer center. The Smart Chicago Collaborative covers transportation costs for testers who must travel to the testing location. Developers then receive feedback that can be used to improve their applications.

Benefits

Several of the benefits associated with Chicago’s open data initiative are public in nature and

Figure 4: Stakeholders engagement in Chicago



ChicagoLobbyists.org

Chicagolobbyists.org is an open data app launched in 2011 by Open City, a group of developers and designers based in Chicago, to improve the transparency of interactions between the City of Chicago and lobbyists and their clients. This app was possible thanks to the effort of Mayor Emanuel “to make more lobbyist data available as part of my administration’s commitment to transparency” (Chicago, 2011). It benefits different stakeholders: citizens that can know how their local government works and the role that lobbyists play in, the City of Chicago itself as a tool to comply with their lobbyist ethics ordinance, journalists that have an easy access to valuable information, firms looking for effective lobbyists, and lobbyists themselves by benchmarking their own performance (chicagolobbyists.org, 2014).

difficult to monetize. These benefits include the new civic initiatives that get started when open data helps galvanize a community around important issues. Several community projects that make use of the open data portal, such as Chicago Works, chicagolobbyists.org, sweeparound.us, wasmycartowed.com, ifindIt, and others are examples of promoting civic engagement through open data (Chicago, 2014b). According to one account, “these applications range from browsing 311 requests, to reminding residents of street cleanings, to informing residents of the location and nuances of zoning laws. The data portal has also encouraged developers to meet weekly at civic hack nights and help Chicago host over a dozen hack-a-thons this past summer” (Chicago, 2014a).

The press has benefited from the greater openness and transparency in government that open data enables. For example, traditional print media organizations are increasingly looking for new ways to stay relevant in the digital era. Outlets such as the Chicago Tribune and the Sun Times are doing a great job of keeping pace with technology by using data to create infographics and other visualizations to accompany their articles.

Some companies are even building entire businesses around open data. One such business is DataMade,

a civic technology company that works on projects that make data (and people) more powerful.

An added benefit of the city’s open data initiative is the reduction in administrative burden on staff. The city has noted a 50% reduction in FOIA requests.

Open data initiatives are an increasingly popular component of governance. At the national level, Chicago’s open data initiative has been held up as a model for cities that are seeking to start their own open data programs.

Challenges for the future

One of Chicago’s main challenges in operating its open data initiative is the sheer size of the project. Although the city has published a large quantity of existing information, officials regularly release new information as it becomes available. New releases of information have become crucial for the development of many new services and applications.

Austin:

Grassroots
Innovation



Austin:

Grassroots Innovation

Austin, Texas has a long history of support for open data. The movement to bring open data to Austin began in 2007, during a highly visible city website re-design project. Open Austin, a local group, began to engage the city in discussions about how to overcome the challenges that were encountered during the project. What began as a mildly adversarial relationship soon flourished. Open Austin encouraged the city to use crowdsourcing to create a high quality, user friendly government website. Following the website re-design project, Open Austin engaged with candidates running for office in the upcoming city election. The candidates were asked to express their views about open data policy in a survey. After the election, the group followed up with those who were elected to hold them accountable for the positions that they expressed in the survey. In response, the City Council approved the use of left-over funding, from the city website re-design project, to launch Austin's open data program. In early 2011, Socrata was selected to become Austin's open data platform provider. Later that year, in December, Austin's open data portal went live (City of Austin Data Portal, 2014).

The story of the relationship between the City of Austin and Open Austin illustrates the effectiveness of using a grassroots approach to initiating a dialogue about open data at the city level. Instead of a top-down approach, with directives originating from the government, the residents of Austin were able to guide their elected officials toward an open data policy that fit their city. As

an advocacy organization, Open Austin was able to build upon partnerships that were established during the website redesign, and use the election as a tool to hold elected officials accountable to citizens' interests. Nearly three years after the launch of Austin's open data portal, the site boasts approximately 355 data sets and sixteen different applications (City of Austin Data Portal, 2014).

Legislative

While Austin's open data program was initiated through grassroots efforts, it does not currently operate without an institutionalized directive. Before the portal launched in October 2011, the city council passed Resolution Number 20111208-074 (City of Austin, 2011), directing the city manager to implement open data in all municipal departments. There was nothing included regarding timelines for full implementation, an annual budget, nor did the resolution establish a new department or positions within the government to implement open data. The resolution did, however, establish the support for open data among city council members and gave Open Austin, the community, and other civic organizations a written document with which to hold the city council accountable for increased governmental transparency through open data.

Stakeholder Engagement

Austin's open data initiative began when community stakeholders engaged their government. To keep the community involved as the open data portal

Benefits of Austin's Open Data

Austin has seen many benefits resulting from their open data program. The primary benefit has been the engagement of the community, and the creative and innovative ideas that have come from events such as hack-a-thons. Through these community events the city has been able to show people the value of data, and provided another way for residents to engage with the city government. Community involvement has led to the creation of different apps that created efficiencies for government departments. StrayMapper.com was created using data from the Austin Animal Services Department. By using the information about animals coming into the city shelters, the app reunites lost pets with their owners. The app has been so successful that it has significantly reduced the number of animals being sheltered by the city, reducing a resource strain in the department.

Thorenson, K. (2013). Open data opens new doors: Hack-a-thons generate new community service apps. *Public Management*, 95(9), 27-28.

continued to develop, the city's IT department hosted two hack-a-thons. Not surprisingly, the hack-a-thons have proved to be particularly effective in mobilizing the academic community. In fact, Austin's 2012 event was conducted in partnership with St. Edwards University. These events have spurred ideas for new technologies, such as Prepared.ly, an application that provides wildfire prevention tools and tips. Prepared.ly was designed using weather and environmental data from the Austin fire department, as well as other agencies in the state of Texas. To build upon the success of the hack-a-thon events, the city hosted a Data Jam in May 2014 (M. Esquibel, personal communication, April 1, 2014).

Austin has been a leader in the region and in the state of Texas in modeling open data. The city has begun to partner with the state and Travis County, where Austin is located, on a project related to public transit. Capital Metro, the public transit system in Austin, is a regional partnership. Any data regarding transit in the city is held by government departments outside the city, resulting in the need for partnerships with other governments. As innovation around open data expands in Austin, the need for these regional and state partnerships in open data have become more apparent. These

partnerships have resulted in Travis County and the State of Texas looking to the city of Austin for guidance on releasing their data. In the last legislative session, the Texas Senate passed SB279, which directed state agencies to provide data in an open format to the government website (Texas Act, 2013). This kind of cooperation may potentially increase the use of inter-agency partnerships to further innovation in Austin.

Not only that, much of Austin's effort in engaging stakeholders has been inwardly focused. Staff members that work with the open data portal have spent a significant amount of time involving other city departments. This process has been slow, however, as there has been little enforcement for implementing open data from leadership within the civil service. For many department administrators, there is a need for supporters to demonstrate the value of open data, however, finding a project that appeals to each administrator can be challenging (M. Esquibel, personal communication, April 1, 2014). Encouraging open data among internal city departments should not lead to deficiencies in engaging other areas of the community, such as non-profits, the private sector, and the local universities. As Austin's open data initiative grows and becomes more institutionalized within the

city government, additional resources should be mobilized to enable continued emphasis to be placed on both internal and external stakeholder engagement.

Organizational Analysis

The structure of Austin's city government has proven to be an obstacle in the expansion and operation of Austin's open data initiative. Though Austin's open data program started as a grassroots movement, the future growth of the initiative requires a top-down approach to ensure that a uniform policy permeates all city departments.

Austin has a council/ manager form of city government that limits the power of the council to direct the implementation of programs and initiatives. Much of the work that has been done to implement open data, thus far has been the result of a partnership between the city's information technology departments and the public information office. Staff from both departments have worked to ensure that the implementation continues. Following an audit of the open data resolution passed in 2011, the city hired a Chief Data Officer and a Data Architect to lead the continued implementation and growth of open data policy in Austin. Additionally, the city has formed a governing board of high-level executives to provide oversight of the implementation of the 2011 resolution (M. Esquibel, personal communication, April 1, 2014).

Data Management

Austin does not license or restrict the use of information accessed through the city's open data portal. In keeping with the principles of open data, the city of Austin considers its information to be free and open for all to use as they wish. Privacy concerns are addressed prior to releasing information to the public. The city also takes steps to ensure that individual citizens are not identified in the data.

Through the addition of two additional staff members, focused on implementing open data initiative, the city has established standards and internal policies for the implementation of open data in all city departments. Some department heads have needed to be convinced of the benefits of open data, prior to embracing it. The potential gains in departmental efficiency that are associated with open data have appealed to administrators and brought many of them on board with the initiative. Additionally, proponents of open data have been able to encourage participation by successfully equating the release of information, through the city's open data portal, to fulfilling a general information request through FOIA. This has given administrators an idea of the types of information that can and should be released.

Technology Strategy

Socrata supplies Austin's open data platform, which includes twenty- four hour customer service and relieves city departments of much of the technical burden in administering the program. Outsourcing the technology platform has allowed the city of Austin to focus on providing raw data in formats that can be downloaded into a variety of programs. Funding for the Socrata platform comes from the city's IT budget since Austin does not currently have a budget for open data.

Austin has faced some challenges in designating a consistent data format and appropriate quality standards for its open data program. Not long after open data was introduced, the city quickly realized that there was a lack of uniformity between departments, in the way that data was stored. Each department is now responsible for ensuring that the data they provide meets certain quality standards and is consistently updated. Some departments, particularly those that work with crime data and public arrest records, have an automated schedule of updates, while other departments update their data only sporadically. (M. Esquibel, personal communication, April 1, 2014).

The Future

Austin is moving into the next phase of ensuring that its open data initiative continues to grow and improve. With the hiring of full time staff, the city hopes to formalize what had previously been a disjointed implementation and administrative process. Finding ways to engaging city departments and leaders, along with setting and evaluating goals, may continue to be a challenge. The city intends to find additional ways to engage more of the community including start-ups, non-profits, and other private entities. Despite the challenges, the city of Austin's example demonstrates the power of using the community as a resource to catalyze new policies and initiatives like open data. While having the support of all levels of government may be useful in making new initiatives work, Austin's example shows that city leaders also respond to the promptings and demands of citizens.

Seattle:

A Perfect Storm



Seattle:

A Perfect Storm

President Obama's public commitment to transparency in 2009, sparked support for open data initiatives in Seattle. The city already had about 50 datasets on a small platform used to power a mapping application that allowed Seattle residents to locate services and track crime patterns in their neighborhoods (City of Seattle, 2014). Socrata, which is based in Seattle and also provides the platform for Seattle's open data initiative, approached city officials about a possible collaboration.

Exploring open data initiatives was high on then Mayor Michael McGinn's list of priorities. A keen public interest in open data, along with strong mayoral support made Seattle's partnership with Socrata an easy decision. Seattle's new open data initiative was launched in 2010.

Legal framework

While other cities have enacted legislation or ordinances to support their open data initiatives, Seattle's program has yet to be formalized. Since the official launch of the current data platform (supported by Socrata), no steps have been taken to solidify a concrete process. Thus far, the initiative's success has been largely attributed to strong support from the city council and the mayor. With this support already in place, it is not clear whether Seattle will need a formalized structure in order to expand and strengthen this initiative (B. Blood, personal communication, April 8, 2014).

Stakeholder engagement

Seattle's stakeholder engagement is not as strong as it could be. Without a promotional budget for the open data initiative, supporters are left to rely on word of mouth to notify community members of this resource. The city's partnership with Code for Seattle (Code for Seattle, 2014) has been particularly helpful with spreading the word. With the mandate to promote the use of technology around the city, Seattle's Citywide Web Team in the Department of Information Technology also helps to bridge the gap. Seattle also makes an effort to address inequalities and engage diverse populations. Seattle's Community Technology Program, "provides free public internet terminals in city buildings, a directory of computer learning centers, and grants to organizations for digital literacy access" (City of Seattle, 2014).

Engaging city agencies is another concern. Many government employees, having already grown accustomed to their workloads, do not see the value in adding more work by supporting this initiative. Because the program is not backed by any form of legislation, participation by government agencies is strictly voluntary. Some have warmed to the idea of providing data for the portal upon realizing that the return on investment, of time and energy, to agencies can be significant (B. Blood, personal communication, April 8, 2014).

Funding

Seattle's open data initiative is funded entirely through the city's Information Technology Department. The most costly aspect of the project has been the expense associated with having a full-time employee to maintain the portal. The second most costly expense is the city's service agreement with Socrata.

Organizational analysis

Seattle's open data program is housed within the city's Information Technology Department. The city employs one full-time staff member who is dedicated to the initiative and reviews all data before it is posted. The Web Team Manager, also devotes a sizeable amount of time to the project's management. Another twenty to forty city employees contribute to the initiative by providing data, but do not contribute directly to the initiative's management or maintenance.

Data Management

Seattle does not have any formal policies in place regarding the data it presents beyond a general statement that outlines the terms of use. Seattle takes the position that all information presented on the city's open data platform is the property of the public and therefore, should not be restricted by any barriers to access. The terms of use state that the data is not guaranteed to be completely accurate, but can be used by anyone for any purpose aside from illegal activity.

The terms of service also provide no guarantee of the validity of data hosted on the portal. While the city makes every effort to release accurate data, it is not possible to certify its veracity. Developers and entrepreneurs interested in building businesses using the data are cautioned to be mindful of the potential inaccuracies contained in the information. There is also a feedback loop on the website where users can ask questions, suggest improvements, and point out erroneous information.

Technical strategy

Socrata provides Seattle with its open data platform. Seattle paid close attention as the federal government's open data initiative unfolded. Although the city had previously maintained a small platform with a few datasets, Socrata approached city officials with a proposal to expand the city's open data initiative using a platform that Socrata would provide. With open data being high on the incoming mayor's list of priorities, the timing was right for a joint venture.

Benefits

Many benefits have been derived from Seattle's open data initiative including, most notably, an increase in citizen involvement with the program. Requests for new data sets come in regularly as citizens browse the portal and get ideas about the kinds of information they would like to see made available. The portal, which initially had around fifty datasets used for a mapping program, has now grown to about 300 datasets. Although some of the citizens' requests are for data outside the city's jurisdiction, such as marriage licenses which are handled by King County, the increase shows that residents' interest has been piqued by the open data initiative. Seattle forwards the requests that are outside of its purview to the appropriate governmental partners at the county or state level (B. Blood, personal communication, April 8, 2014).

In an effort to encourage the participation of various government agencies, web team manager Bruce Blood revealed that the Seattle open data initiative has begun to explain how releasing information through the data portal benefits city agencies and departments. While the users typically download data in spreadsheet format, developers may use visualizations to present the data in ways that are more useful to the general public (B. Blood, personal communication, April 8, 2014). There have already been 25-30 applications created using data provided on Seattle's open data platform.

Challenges for the future

With growing support for the city's open data initiative, from the administration and community, Seattle will continue to improve on its data offerings. The major short run challenge for the City is convincing various departments to get involved and educating citizens about the city's open data resources. The hope is that more applications and innovative solutions will be created from the data, encouraging various agencies to respond by contributing additional datasets and inspiring residents to make use of the portal.

CITY ANALYSIS

Boston:

At a Crossroads



Boston:

At a Crossroads

Boston's open data initiative began as a performance measurement system in 2006, under the administration of Mayor Thomas Menino (Wu, 2014). The system, called Boston about Results (BAR), collected information on goals and metrics for each department in Boston and compared them to the previous year's data. Beginning in 2010, the Boston about Results data began to be used to support regular performance reviews (Wu, 2014). That same year, the Open Government Strategy for the City of Boston was published by the Mayor's Office of New Urban Mechanics. The report outlined a rough plan for governmental transparency through an open data initiative (Goodspeed, 2010).

Legal Framework

Until recently, there were no policies, laws, or regulations mandating an open data initiative in Boston. In 2008, the Commonwealth of Massachusetts' IT Strategy for Fiscal Year 2009-2011 outlined a very rough vision for the Commonwealth that included open data and a strong dedication to transparency. Boston, however, had no legislation in place concerning open data until very recently. On April 7, 2014, Mayor Martin Walsh signed an executive order entitled, "An Order Relative to Open Data and Protected Data Sharing." In the document, Mayor Walsh requires the Chief Information Officer, in consultation with other city departments, to issue an open data policy (Executive Order, 2014). According to the order, the new policy must include guidance

on classifying data (public versus protected), developing management processes, issuing data in open formats, ensuring the usability of the public data, and providing security measures for protected information (Williams, 2014).

Stakeholder Engagement

According to Curt Savoie, Principal Data Scientist for the City of Boston, the most engaged stakeholders in Boston are in the academic community. Savoie contends that scholars are the most interested when it comes to the data and its use (C. Savoie, personal communication, April 7, 2014). Savoie also says that he reaches out frequently to businesses and corporations as a means to push community development for the open data initiatives. Savoie believes strongly in stakeholder engagement and says encouraging relationships with individuals who really want open data and those who will utilize the information is incredibly important (C. Savoie, personal communication, April 7, 2014). Additionally, "hacker" groups, such as Open Government Boston, cooperate with organizations like the Sunlight Foundation to improve governmental transparency and strengthen open data projects.

Funding

Boston's open data initiative is funded by city government. The City of Boston's Department of Innovation and Technology (DoIT) oversees the operation of the city's open data projects (Open

Government, 2014). The DoIT budget funds all public open data projects in Boston, including Boston about Results and Data Boston.

Organizational Analysis

The Department of Innovation and Technology is overseen by the Chief Information Officer, Justin Holmes. Officially, the only person involved in the operations of the open data initiative is Curt Savoie. Other city employees are tasked with some duties in support of the open data initiative, but these staff members are usually in other departments with other primary work responsibilities (C. Savoie, personal communication, April 7, 2014).

Data Management

The policy that guides Boston's open data is its licensing agreement for the data it provides. Boston owns the licenses for its shared data, but wants all users to have access as long as the information is responsibly used. Accordingly, Boston's open data licensing agreement does not allow for the data to be sold or marketed in any way (City of Boston Data License Agreement, 2014).

Technical Strategy

Socrata provides the technology platform for Boston's open data initiatives. The platform allows for the data to be available in any format as long as it is originally provided as a .csv or .xls file. While the quality of the data is not guaranteed, every effort is made to ensure its timeliness and the protection of sensitive information. There is a disclaimer on all of Boston's open data stating that the resources are provided for informational purposes. No guarantee is provided regarding the completeness and accuracy of the data (C. Savoie, personal communication, April 7, 2014).

Availability of Data

There is a perceived lack of availability of a variety of datasets in Boston. Much of this is because data

sets are usually only made available when someone asks for them. If a party requests a data set on a specific topic it will be provided, but only after the request has been made (C. Savoie, personal communication, April 7, 2014).

Benefits

There are multiple ways that Boston's open data initiative has been a benefit to city government and the public alike. Government transparency has improved, but as Curt Savoie pointed out, open data by itself may not be the best way to improve transparency. The average person cannot look at the data and know exactly what it means. Users often need someone to translate the data into actionable information for them (C. Savoie, personal communication, April 7, 2014).

Improved community engagement is another benefit of Boston's open data initiative. According to Savoie, citizens are excited and enthused about the data. However, the effectiveness of the open data effort could be improved by endeavoring to study, measure, and better understand the specific ways that the community engages with open data (C. Savoie, personal communication, April 7, 2014). At the present time, the city of Boston has not settled on a way to statistically evaluate the benefits of its open data initiative.

Challenges for the Future

There are three main challenges that Boston faces for the future. First, quality measures for the data are needed. There are currently no quality standards in place (C. Savoie, personal communication, April 7, 2014). To maintain the projected growth of Boston's open data project, it will be necessary to ensure quality. Secondly, it is necessary to have greater buy-in across the city agencies to support and understand the benefits of open data (C. Savoie, personal communication, April 7, 2014). Lastly, more can be done to engage the public in Boston's open data initiative.

Stakeholder engagement is a key aspect of the current success of the program, and continued outreach will help the program thrive (C. Savoie, personal communication, April 7, 2014).

Amsterdam:

Top-Down Funding



Amsterdam:

Top-Down Funding

Amsterdam's Data Portal was launched two years ago, in 2012, as part of a broader initiative called Amsterdam Smart City. This initiative addressed four themes: living, working, mobility and public facilities. Amsterdam Smart City's main objective is to stimulate growth and innovation in the city. The Economic Board has been responsible for launching the initiative and promoting open data throughout the government and the community. It is a partnership lead by businesses owners, public authorities, research institutions, as well as civil societies, and is chaired by the mayor, Eberhard van der Laan. This particular structure differentiates Amsterdam from the other four cities that have been discussed. Amsterdam's open data project is not driven by legislation, although the city council is currently working on producing a mandate or legislation that will shift the process from a bottom-up to a more top-down approach by 2015.

Stakeholder engagement

Efforts to engage stakeholders and interested organizations have been made primarily through a series of working breakfasts. The Amsterdam Economic Board has worked to engage fifty departments and more than 15,000 civil servants in Amsterdam's government. Additionally, many organizations around the city such as the Center for Budget Monitoring, who were early pioneers of open data in Amsterdam, were integral to the process of centralizing data and information held by each individual person, department, and organization.

Funding

Amsterdam's Data Portal is supported by three different type of funding: European, local and private. The European Union supports open data initiatives in several European cities through the EU's Seventh Framework Programme for research (FP7), an initiative funded by the European Commission (EC, 2013). While European resources represent the biggest part of funding, the local government and private companies involved in the Amsterdam Smart City program also contribute.

Organizational Analysis

The Amsterdam Economic Board is the institution responsible for managing the open data portal. Two program managers within the Amsterdam Economic Board are the principal points of contact for open data, and are responsible for promoting the program. Open data, however, is not the program managers' only responsibility. As part of an expansion of the program, a Chief Technology Officer has been hired to provide oversight of the open data program, ensuring its continuation and assisting with the transition of operational responsibility for the initiative from the Amsterdam Economic Board, to the city government.

In order to mobilize the fifty departments within the city government, six teams focused on sixteen topics (i.e. energy, mobility, and transparency). Within these teams, six to ten people discussed the kinds of information that would be shared.

The teams first worked with departments that were willing to participate voluntarily in the initiative, and then moved on to work with those that needed more persuading. According to Jasper Soetendal, an open data consultant with the Amsterdam Economic Board, the government departments most willing to share data have been the fire department and the infrastructure and traffic department.

Data Management and Technology Strategy

The city of Amsterdam uses CKAN, an open source data portal platform that is free and accessible for all. According to Soetendal using an open source platform is in line with the values of transparency and openness on which Amsterdam's open data policy is based. This type of platform allows users to use the data without signing any kind of licensing agreement. However, the CKAN platform limits the city's ability to follow up on the final use of the data. Additionally, CKAN does not provide any technical support to users or the Economic Board and the city is has yet to provide such services. At the moment, Amsterdam's open data portal contains 350 data sets. Some of the data sets are updated in real time, such as traffic and parking data, while others are reported more sporadically. As for confidentiality, Dutch privacy law is very strict and does not allow for the publication of any data with personal information.

Benefits

Since the open data project was launched, most of the benefits that Amsterdam has seen have been internal. Each of the city's fifty departments has its own IT staff and resources and, according to Soetendal, "the open data project has broken down walls between them." Amsterdam's open data project has also stimulated innovation and economic growth, through the development of over 100 applications. However, Soetendal admits that the city is limited in its ability to measure success and quantify the associated benefits since the initiative cannot follow up on the use of the data.

Challenges for the future

Acquiring suitable open data infrastructure remains one of the challenges for Amsterdam. At the moment each department uses a different data platform. The initiative also wrestles with ideas on how to involve those departments that are less willing to collaborate.

RECOMMENDATIONS

Open data policies at the local level are relatively new and most cities are still learning by doing. It is important that those cities considering open data initiatives learn from those cities that have implemented programs, so as to avoid the problems and mistakes that other cities have encountered along the way.

1. Leadership: Political support stands out as one of the key requirements to implementing a successful open data project. While most cities' initiatives were started using bottom-up approaches, strong top-down leadership may speed up the process by helping to overcome internal and external barriers to implementation. This has been the case in Chicago where the open data initiative has thrived thanks to the strong support by the Mayor, Rahm Emanuel.

2. Appropriate Legislation: In addition to political leadership, enacting policies and legislation might also help to enforce compliance by departments or agencies that are less inclined to voluntarily disclose data under their control. Most of the cities analyzed in this report have enacted, or intend to enact, some kind of legislation. Although many of these cities did not legislate at the beginning of the process, some cities enacted laws and policies at a later stage as part of the implementation strategy. Enacting legislation or formal policies is a crucial step in ensuring the growth and sustainability of open data portals.

3. Funding: Although open data initiatives do not require high levels of funding, it is important that the programs have dedicated budget lines where resources are specifically enumerated, even if the program is included within an IT department. Specific funding will facilitate the appointment of an open data coordinator and other staff to work on the initiative.

4. Technical approach: Leading U.S. cities rely on commercial platforms that facilitate the implementation process, provide technical expertise, and ensure 24/7 customer support, often at a lower cost than providing these services in house. The open source platforms favored by the federal government, Amsterdam or other big European cities, are free but have some limitations. First, open source platforms do not provide any technical support services. Second, open source platforms limit cities' ability to track which stakeholders are making use of the data sets to develop applications. This curtails the possibility of evaluating the economic, civic, and efficiency benefits of the program. Therefore the use of a commercial platform would be a much more cost effective decision.

5. Staff: Most of the projects studied in this report are led by a small group of existing city staff which helps to keep the cost down. Staffs in most of the studied cities remain small, with the exception of Amsterdam which uses private consultants. Despite

the small size of open data teams in cities, the appointment of at least one project coordinator remains essential.

6. Stakeholder involvement: Communities have an important role to play in life of open data initiatives. It is, therefore, essential to encourage citizens' participation during implementation and beyond. As a result, most of the studied cities have adopted a flexible and informal approach to interacting with stakeholders.

7. Measuring success: An important limitation found in most of the existing open data policies is the lack of formal tools or methods of evaluation to measure the benefits and outcomes achieved. Developing evaluation tools should be an integral part of any future open data policies. Such tools would increase open data accountability and serve to catalyze support among groups that are less committed to open data.

APPENDIX 1: METHODOLOGY

The methodology used in this analysis is shown in the following figure:



The cities were selected using Data.gov (2014) along with the following criteria:

- Representing different regions and sizes
- Number of results in Google using “open Data” AND “City_name”
- Number of datasets
- Year when the initiative was launched
- Number of results in Google Scholar using “Open Data” AND “City_name”

The policy analysis defined in chapter 3 provided a common framework that was applied to the different cities. The information for each of the cities was obtained through interviews with city officials in charge of the open data initiatives and through desk research.

APPENDIX 2: INTERVIEW QUESTIONNAIRE

What was your motivation for initiating an open data policy?

Legal framework

1. Why did your city choose to take the approach of (enacting legislation, ordinance, policy memo)? What factors contributed to this policy path (political, executive, existing laws, etc.)?
2. Were there public concerns for privacy? How did you address these concerns with the community?

Funding

1. How has the city funded this initiative? Are you responsible for obtaining funding from sources such as grants? What percentage of funding comes from public? From private? From grants?
2. Which aspect of the project has been the most expensive?

Technical approach

1. What is the technical platform that supports the open data service? It is a commercial or an open format platform? Why did the city choose that platform?
2. Are the technical services required to develop and support the open data initiative provided in house or by third parties? What are the main technical private companies involved in the initiative? Is there any public-private partnership to support the initiative?

Organizational analysis

1. Do you work with any other organizations, public or private, on your open data measures?
2. How many individual employees work on the open data project?
3. What different departments/areas of expertise do you have within your organization? What are the responsibilities of each?
4. What degree of oversight do you have in regard to what data is published/made available, how the project is run, etc.?

Data management

1. Is there a license to grant the right to use, download, and reproduce government data? Are there any restrictions imposed by the license? Are there any other usage requirements and do you see them as barriers to use?
2. What is the format of the data? Is the data provided in open formats? Is the data structured? Are metadata –formal description of the data– provided along with the data?
3. How is the quality of the data guaranteed, in terms of consistency, permanency, and updating? What are the processes to guarantee the quality of the data? Is there any explicitly stated quality agreement with the users?

4. What channels are provided for the users to access the information –i.e. portal, mobile apps, direct download, APIs, etc.? Can bulk and raw data be downloaded directly using machine-to-machine protocols?

Stakeholder Engagement

1. Are citizens, businesses, academia, nonprofits, and civil servants involved in the open data initiative? What actions were taken to involve them?

Inequalities

1. Can every citizen or organization in your city benefit from the open data program? Have you taken steps to make your initiative accessible to diverse populations (i.e. providing materials in languages other than English?)
2. What about those with disabilities, those who live in remote areas with little access to the internet or technology, those who cannot afford to pay for internet connection, or those who do not know how to use the internet?
3. Have you created secondary policies to include diverse groups of the population? If yes, which type of policies are you implementing or planning to implement?

Benefits

1. What are the main benefits your office has experienced as a result of the open data program? Have you conducted any evaluation of those benefits?
2. Some experts advise that government efficiency increases with data transparency. Do you feel that has been the case in your city? If yes, would you provide a concrete example?
3. Have citizens gotten more involved? Have you noticed an increase in the number of citizens' requests, letters, e-mails or complaints?
4. Are you aware of companies that use your datasets to develop new businesses? Have you received requests from the private sector to use those datasets? Would you provide details of a concrete case?
5. Did your office have established goals? How did you select these goals? How have you measured these goals? Did the benefits obtained match your expectations at the launching of the project? Why or why not?
6. How have you prioritized the information released?

Challenges

1. What have been the main challenges to implementing this project? How has your office tried to solve them?
2. Do you anticipate future challenges? How are you planning to address them?
3. What would be your recommendation for other cities trying to implement open data policies?

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ABOUT THIS PUBLICATION

Research for this guide and the original draft of the document were completed by graduate students at the American University Department of Public Administration and Policy. Contributors include Rushar Chin, Josie Mace, Rafael Rivera, Shannon Scully & Elena Villanueva. These students worked in partnership with Brooks Rainwater and Emily Robbins at the National League of Cities to conduct an analysis of open data policies. The final report was edited by Terrah Glenn at NLC.

The National League of Cities is the nation's oldest and largest organization devoted to strengthening and promoting cities as centers of opportunity, leadership and governance. NLC is a resource and advocate for more than 1,600 member cities and the 49 state municipal leagues, representing 19,000 cities and towns and more than 218 million Americans.

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ACKNOWLEDGEMENTS

Special thanks to the following individuals for their contributions to this project: Bruce Blood, Client Services Manager of the Citywide Web Team in the Seattle Department of Information Technology; Matthew Esquibel, Internet Services and IT Applications Manager for the City of Austin; Curt Savoie, Principal Data Scientist for the City of Boston; Tom Schenk, Director of Analytics and Performance Management for the City of Chicago; Jasper Soetendal, Partner at Braxwell.com and E-business Management Consultant in Amsterdam; and Sonja Walti, Assistant Professor in the Department of Public Administration and Policy at American University. Cover, illustrations and layout by Soren Messner-Zidell.

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