

Transforming City Government: A Case Study of Philly311

Taewoo Nam

Center for Technology in Government
University at Albany, SUNY
187 Wolf Rd, Albany, NY12205, US
+1-518-442-3892

tnam@ctg.albany.edu

Theresa A. Pardo

Center for Technology in Government
University at Albany, SUNY
187 Wolf Rd, Albany, NY12205, US
+1-518-442-3892

tpardo@ctg.albany.edu

ABSTRACT

This paper describes the transformation of a city government led by a 311 program, which provides a consolidated channel for non-emergency services and information. The paper first discusses the concept of “smart city” as a foundation for the examination of the 311 program as a practice of government innovation. The paper then presents the details of the 311 program as it is being instantiated in the City of Philadelphia. In-depth interviews with city government officials and managers responsible for operating the city’s 311 system (Philly311) offer insights into the contributions the system is making to a more efficient, effective, transparent, accountable, and collaborative city government. Performance data provided by Philly311 enables more efficient resource allocation and informed decision making. Philly311 is credited with making the process of service delivery more transparent to the public, and providing traceability of requested services imbues service departments with a sense of accountability. Service level agreements are providing measurable standards of municipal services and are used to support accountability in terms of service status. Regular reviews of service level agreements and content of the system promote interdepartmental collaboration. 311 systems are broadly recognized as powerful tools to engage residents in improving their neighborhoods. Interviews also revealed challenges Philly311 is facing including limited funding impeding further improvements in software, systems, and staffing, and provided some insights into innovative strategies for addressing resource constraints. Institutionalizing interdepartmental collaborations also emerged from the interviews as a critical new capability required for advancing from the initiation stage of Philly311 to the operational, expansive, and sustainable stages.

Categories and Subject Descriptors

H.4.2 [Information Systems Applications]: Type of systems — e-government applications.

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ICEGOV2012, October 22 - 25 2012, Albany, NY, United States, NY, USA, Copyright 2012 ACM 978-1-4503-1200-4/12/10...\$15.00.

General Terms

Management, Performance, Human Factors, Theory.

Keywords

311, Non-emergency service, Contact center, Customer service, Smart city, Service level agreement, E-government, City government.

1. INTRODUCTION

The phrase “smart city” is used more and more regularly by elected officials, civil society, the private sector, and academia. Regardless of this emerging trend, there is no agreed-upon description of what “smart” implies in the context of a single city. Some recent conceptual studies have discussed a city’s smartness [1,4,6,17,20,21]. In these studies, a smart city is broadly understood as improvements in city infrastructure including information and communication infrastructures, and physical infrastructures such as roads, bridges, and buildings, services such as utilities, social services, and transportation, and a variety of resources such as natural resources, financial resources, cultural resources, and human capital. However, the concept of a smart city is still abstract and even ambiguous.

There is another reason for the lack of agreement around the “smart city” concept. A smart city often comes across as a normative claim. People want the cities they are living in to be smarter; they want to close the gap between their current status and their expectations. Smart city strategies—e.g., integrating critical infrastructures and services, consolidating systems, and interconnecting networks—are emerging as responses to a variety of complex problems such as crime, health concerns, pollution, aging populations, deteriorating infrastructure, and traffic congestion, that cities are currently facing due to dense congregations of people in spatially limited areas [24]. The desirable status of being “smart” is an outcome sought by the public and city officials alike. In this sense, increasing attention is being paid to those city governments who are successful in transforming their cities through “smart city” initiatives. Discussions of and certainly research about smart cities must pay attention to the characteristics of the city governments that to make their city smarter. Previous studies of smart cities emphasize smartness of government, administration, and public management as core factors in the creation of a smart city [6,20,21].

Adopting the view of a smart city as one that has more innovative, more efficient, and more effective government, this paper employs

a case study of Philly311, the City of Philadelphia’s 311 non-emergency contact program, among a variety of current and best practice examples of government efforts to make cities smarter. The concept of “smart city” is used as a foundation for the examination of the 311 program as a practice of government innovation, based on a review of current thinking about the dimensions and components of smart cities. Philly311 is, according to the Mayor of Philadelphia, Michael Nutter, one of his flagship initiatives being carried out to make the city smarter. A case study based on qualitative data from semi-structured interviews with the city’s executives, Philly311 staff, and managers of other related departments allows for a close examination of how the Philly311 service is helping make Philadelphia a smarter city.

The remainder of this paper is structured into six sections. Section 2 draws on recent research to outline the characteristics of a smart city and a smart government. Section 3 presents the methodology used in the study and introduces the case. Section 4 presents the case analysis with a particular focus on changes observed in city management and service delivery in the City of Philadelphia and considered to be consequences of the implementation of Philly311. Section 5 discusses challenges the city is facing in operating Philly311 and also opportunities Philly311 offers. Section 6 further discusses the impacts made by Philly311 as one instance of smart city initiatives. Section 7 concludes this paper.

2. CONCEPTUALIZING SMART CITY AND GOVERNMENT

Since we consider a smart city as transformation and innovation in city government, we use the “smart city” concept as a foundation to describe a practice of government innovation—in this paper, Philly311. This section introduces and discusses a set of working definitions of a smart city, followed by a review of the core components constituting the concept of a smart city derived from both academic and practical research. Finally, we discuss how a smart government is recognized as one of the core capabilities of a smart city.

Several working definitions of a smart city can be found in the literature (see Table 1). They share some features as well as have some unique aspects. For example, while Giffinger et al. [12] view a smart city as one performing in a “forward-looking” way, the Natural Resources Defense Council considers “smarter” as more efficient, sustainable, equitable, and livable. Harrison et al. [15] conceptualize a smart city in a technological sense as instrumented, interconnected, and intelligent. Similarly, Washburn et. al. [24] see a smart city as intelligent, interconnected, and efficient.

The definitions from Anavitarte and Tratz-Ryan [2], Harrison et al. [9], and Washburn et al. [24] each emphasize the role of information and communication technologies (ICTs). The technologies include smart computing [24] and a range of instruments such as sensors, kiosks, meters, personal devices, appliances, cameras, and smart phones [15]. In sum, a smart city is defined with some key elements including meanings of smartness in the urban context, the role of technologies in making a city smarter, domains that need to be smart, and infrastructures and services that are provided to the population.

The definitions taken together provide a roadmap for cities seeking to become smarter. Washburn et al. [24] highlight seven key areas where cities are investing in becoming “smarter” including city administration, education, healthcare, public safety, real estate, transportation, and utilities. Giffinger et al [12] identifies six key aspects of a city where smart cities are seeking to have an impact from their investments: economy, people, governance, mobility, environment, and living. Chourabi et al. [6] put forth eight components of a smart city: technology, management and organization, governance, policy, people and communities, economy, built infrastructure, and natural environment.

Table 1. Working definitions of a smart city

<ul style="list-style-type: none"> • “An urban area functioning and articulated by modern information and communication technologies in its various verticals, providing ongoing efficient services to its population” [2]. • “A city well performing in a forward-looking way in economy, people, governance, mobility, environment, and living, built on the smart combination of endowments and activities of self-decisive, independent and aware citizens” [12]. • An instrumented, interconnected, and intelligent city. Instrumentation “enables the capture and integration of live real-world data through the use of sensors, kiosks, meters, personal devices, appliances, cameras, smart phones, the web, and other similar data-acquisition systems.” Interconnected means “the integration of those data into an enterprise computing platform and the communication of such information among the various city services.” Intelligent refers to “the inclusion of complex analytics, modeling, optimization, and visualization in the operational business processes to make better operational decisions” [15]. • “A city striving to make itself ‘smarter’ (more efficient, sustainable, equitable, and livable)” [Natural Resources Defense Council: smartercities.nrdc.org] • “The use of Smart Computing technologies to make the critical infrastructure components and services of a city—which include city administration, education, healthcare, public safety, real estate, transportation, and utilities—more intelligent, interconnected, and efficient” [24].

The components of a smart city included in the definitions are further specified in both academic literature and practical reports. Recent studies discuss definitional components and conceptual dimensions of a smart city. Nam and Pardo [20] suggest three conceptual dimensions of a smart city—i.e., technological artifacts, people and communities, and institutional arrangements—by exploring a wide array of recent research focusing on a smart city and/or similar (often interchangeably used) labels such as an intelligent city, innovative city, information city, knowledge city, and creative city, among others. Nam and Pardo [20] consider a smart city as a more comprehensive concept comprising such diverse similar labels. Technology is central to defining a smart city, but a smart city cannot be built simply through the use of technology. Importantly, technology is a means to enable social, environmental, economic, and cultural progress. Smart cities thus must be capable of sustaining such progress across the diversity of components and conceptual dimensions [1,17]. Along with this view, smart city initiatives driven by municipal governments can be characterized

as innovation in multiple dimensions—i.e., technology, management, and policy [21].

Three smart city ranking tools and frameworks merit attention as comprehensive sets of components of smart cities. The ranking system to score European medium-sized (population between 100,000 to 500,000) cities (www.smart-cities.eu) includes six categories of smart city evaluation indicators: economy (competitiveness), people (social and human capital), governance (participation, transparent governance, the functioning of the administration), mobility (transportation and ICT), environment (natural resources, environmental protection, sustainable resource management), and living (quality of life, cultural facilities, health, safety) [12]. IBM’s core city systems are categorized into three systems: operating systems (city services system comprising public service management and local government administration), user systems (citizens system comprising health, education and public safety, and business system), and infrastructure systems (transport system, communication system, water system, and energy system) [8,9]. In IBM’s framework, city governance and city strategy connect across the seven systems. Forrester Research’s white paper [24] suggests seven critical infrastructure components and services of a smart city including city administration, education, healthcare, public safety, real estate, transportation, and utilities.

Table 2 compares the comprehensive sets of smart city components suggested by Chourabi et al. [6], European mid-sized city evaluation tool [12], IBM [8,9], and Forrester [24]. While each includes technology and government as components (public service management and local government administration), each model also stresses unique components.

Table 2. Components of a smart city

	Chourabi et al. [6]	European mid-sized cities [12]	IBM [8,9]	Forrester [24]
Technology	√	√	√	√
Management & administration	√	√	√	√
Governance	√	√	√	
City services		√	√	√
People and communities	√	√		
Economy	√		√	
Built environment	√	√		
Natural environment	√	√		

Note. City services broadly include transportation, safety, health, water, energy, housing, and culture.

As shown in Table 2, one of core components of a smart city is a smart government because a city government is a central actor that plays a pivotal role to lead and coordinate smart city initiatives and efforts. In the IBM core city system that Dirks et al. [9] suggested, the concept of a smart government comprises public service management and local government administration as key components. Thus city management and city services can be identified as two main dimensions of a smart government.

Some previous conceptual studies defined the dimensions of management and service in smart city activities. Since a smart city is considered urban innovation, smart city initiatives can be characterized as government innovation in management and services [21]. Nam and Pardo [21] considered a smart city in the aspect of government management as enhancing efficient, effective management both in front-office and back-office operations of city government. They also defined managerial innovation of a smart government as “a mechanism to create managerial and organizational capabilities for effective use of technological tools and conditions” [21: p. 187]. On the other hand, Dirks et al. [8] defined a city services system as “the operational activities and coordination of service delivery provided by the city authority” (p. 5). In particular, smart service means “tailoring services to the needs of individual citizens” and “using technology to integrate the information systems of different service delivery agencies to enable better services for citizens [8: p. 11].

In line to these concepts of management and service as smart government dimensions, many discussions of a smart government have been recently made. According to Chourabi et al. [6], management and organization of a city government and its governance with other actors are key success factors of smart city initiatives. The smart city model suggested by Giffinger et al. [12] underscores smart governance as a larger category including a smart government. The smart governance component comprises participation in decision making and transparent governance. The quantifiable measure of transparent governance represents citizen satisfaction with transparency of bureaucracy and with fight against corruption [12].

Washburn et al. [24] saw efficient management of city operations and effective delivery of city services as key to smart government:

An efficient city administration that provides services to its citizens and fosters businesses is essential to today’s service-based economy. A smart government service is informed about its city’s condition and is able to reach its citizens effectively. A core component of this function is using communication and collaboration technologies to manage city operations. ... Moreover, it uses data and scientific analysis in all phases of the decision-making process to improve the economy and quality of life. (p. 5–6)

Thus smart city administration should contribute to greater efficiency, effectiveness, and the improvement in decision making. Dirks et al. [9] identify local government expenditure and staff as prerequisites of a smart government. Elements of the smart system for management and operation include coordinated service delivery, e-government application, and the use of ICT for service delivery. Outcomes of a smart government appear as increased efficiency and effectiveness of service delivery [9: p. 5].

To sum, a smart government is expected to increase efficiency, effectiveness, and transparency in organizational management and service delivery. A smart government also may promote coordination and collaboration among city departments and with other external organizations and citizens. Thus a smart government can facilitate non-governmental entities’ participation in decision making and monitoring of service delivery. In this sense, a smart government should include governance with both internal (within government) and external actors.

Reflecting on this discussion, we create the metrics of assessing a smart government and will use it to the case of Philly311, as exhibited in Table 3.

Table 3. Metrics for assessing a smart government

	Management	Service
Efficiency		
Effectiveness		
Transparency		
Governance		

3. CASE STUDY METHOD

This study uses case study methodology to understand why and how a social phenomenon of interest occurs [25]. The method helps develop preliminary understanding. Given the emerging nature of 311 contact centers and the paucity of academic research on the service centers, case study methodology is an appropriate approach to conducting this exploratory research [25]. This study is also inductive so that it contributes to building new understanding. This section describes data collection, data analysis, and the case of Philly311 non-emergency contact center.

3.1 Data Collection

In order to identify the relevant interview participants, purposive sampling was employed. Because of the relative newness of the research theme, the sampling technique is needed to identify and target individuals who could provide important information to understand the social phenomenon [11]. The director of Philly311 as an initial informant was asked to recommend others who have sufficient information and knowledge in various aspects of 311 operation. Interview participants were selected to avoid redundant knowledge and maximize new knowledge. Interviewees from different levels and functions include executive-level officials (the mayor, the managing director, and the deputy director), Philly311 staff members (director, operation manager, and technology expert), and representatives of other service departments (commissioner and chief of staff) related to 311 operations.

In December 2011, the authors conducted 16 semi-structured interviews with city government officials and managers with responsibility for managing and operating the City of Philadelphia’s 311 service center, Philly311. Each face-to-face interview lasted approximately one hour, and additional information was collected through follow-up email communication.

Since the data was collected as part of the multinational research project titled as Smart Cities Service Integration, which aims to explore the processes of smart city initiatives and their impacts on cities, people, and city governments, interview questions follow the protocol designed for the research project. For the project, Philly311 has been selected as a research case—one of smart city programs (the city’s program that contributes to the city government’s efficiency, effectiveness, transparency, and governance) and one of city-level service integration initiatives (the city’s single, consolidated channel of frontline service requests). Based on a wide array of smart city literature, interview questions were developed by the whole project team that the authors are affiliated with. The study of Chourabi et al. [6] provides a conceptual background of the interview protocol.

Table 4 presents a summary of interview questions included in the interview protocol.

Table 4. Interview questions

Categories	Questions
Case description	<ul style="list-style-type: none"> • How did Philly311 start? • What are the main goals of Philly311? • What organizations are involved and how?
Smart city	<ul style="list-style-type: none"> • What does it mean for a city to be smart? • What are characteristics of a smart city?
Management and organization	<ul style="list-style-type: none"> • How is Philly311 organized and managed? (probes: organizational structure, business process, workflow, progress tracking, staffing, training, funding, etc.) • What organizational challenges is Philly311 facing in achieving its objectives? • How are those challenges being overcome?
Technology	<ul style="list-style-type: none"> • How is information and communication technology being used for Philly311? (probes: service channels, data analysis tools, system integration, social media use, etc.) • What are the barriers or challenges to using technologies for Philly311?
Governance	<ul style="list-style-type: none"> • How is Philly311 governed? (probes: governing body, governance model, decision making process, and conflict resolution process) • What’s the authority and role of staff, partners, and stakeholders? • How are citizens and other organizations involved in Philly311?
Policy	<ul style="list-style-type: none"> • What is the relationship between Philly311 and the policy environment?
Context	<ul style="list-style-type: none"> • How does the larger environment of Philly311 influence Philly311? (e.g., cultural, social, political, economic, demographic contexts)
People and communities	<ul style="list-style-type: none"> • How does Philly311 affect and is affected by the population and communities of the city?
Economy	<ul style="list-style-type: none"> • What is the impact of Philly311 on the city’s economy?
Natural environment	<ul style="list-style-type: none"> • How does Philly311 affect the city’s natural environment?

3.2 Case Analysis

Interviews were transcribed and analyzed following an inductive logic approach and using grounded theory techniques. Employing a qualitative analysis software tool (Atals-ti), we did a systematic iterative process of joint coding and analysis to minimize personal bias. Grounded theory refers to theory that is developed inductively from empirical data, and the grounded theory approach is a method of using empirical data without preconceived theories to generate or discover a theory [13,22].

For this research, coding refers to a process of labeling, separating, compiling, categorizing, and organizing qualitative data [5,7,18]. Descriptive codes are used so that interview transcripts were coded in sentence or multi-sentence chunks. Glaser and Strauss [13] suggested the four stages of grounded-theory analysis as follows:

- *Codes*: identifying anchors that allow the key points of the data to be gathered

- *Concepts*: collections of codes of similar content that allows the data to be grouped
- *Categories*: broad groups of similar concepts that are used to generate a theory
- *Theory*: a collection of explanations that explain the subject of research

Corresponding to the research logic, Table 5 describes the scheme of this grounded-theory analysis emerging from the qualitative data of semi-structured interview transcripts.

Table 5. The scheme for the grounded theory analysis

Categories	Concepts	Codes emergent from the data
Smart management	Efficient management	Efficient resource allocation; saving budget; saving human resource; business process change
	Effective management	Informed decision making; data-driven management; performance management; business process change
	Transparent management	Anti-corruption; integrity; transparency; open government; service level agreement
	Managerial governance	Interdepartmental collaboration; external partnership; service level agreement
Smart service delivery	Efficient service delivery	Service integration; channel consolidation; shared service capability
	Effective service delivery	Customer-oriented service; professionalism; internal customers; external customers
	Transparent service delivery	External accountability; internal accountability; service level agreement
	Governance in service delivery	Citizen engagement; neighborhood engagement; community engagement; neighborhood liaison
Technological factors	Technological challenges	Under-equipping; cost of upgrading back-office technologies; timing of investment of the right technology at the right time; the digital divide
	Technological opportunities	Channel diversification; emerging technologies; smart phone
Organizational factors	Organizational challenges	Limited funding; limited operation; limited staffing; cultural conflict; interdepartmental difference
	Technological opportunities	Business process change; data-driven culture; performance-driven culture; customer-oriented culture
Governance factors	Governance challenges	Interdepartmental conflict; the lack of a formal governing body; informal interdepartmental collaboration; more burden for extensive data analysis
	Governance opportunities	Relational governance; mutual understanding; citizen engagement

3.3 Case Description

Philadelphia is one of the last cities of its size to activate a 311 non-emergency toll-free number. On the last day of 2008, the

mayor and the managing director of the City opened Philly311 as a concrete step toward their administration’s strategic goal—smarter, faster, and better government through customer service, government efficiency, and accountability. The basic idea—giving the public a direct way to request services or complain and using their feedback to hold government accountable—was not entirely new to Philadelphia. The City already had customer hotlines, but there was no single, consolidated contact point. The new 311 contact center absorbed the City Hall Switchboard, the Mayor’s Action Center, the Department of Licenses and Inspections’ customer line, and part of the Department of Streets’ customer line. Philly311 offers various ways to contact the City: phone call, in person (Philadelphia is one of a few cities with a walk-in center), email, short message service (SMS), and social media (Twitter).

4. PHILLY311 AND TRANSFORMING GOVERNMENT

This section describes what we heard at the interviews about how Philly311 as a smart city initiative makes the city government smart. 311-driven changes are expounded in terms of efficiency, effectiveness, transparency, and governance.

4.1 311-Driven Changes in Management

The 311 service center helps other departments use their resources more efficiently and effectively. One of Philly311’s objectives involves allowing agencies and departments to focus on their core mission and manage their workload efficiently (see www.phila.gov/311). Just as Baltimore’s original motive for launching its 311 was to reduce the crush of calls flooding into 911, Philly311 allows Philadelphia’s 911 center to devote their resources to life-threatening and urgent situations. Philly311 also enables the City Council (the City’s legislative body) to use their resources more effectively, by saving their budget and staff time spent on providing constituent services. According to interviewees, this has freed Council resources, primarily the time of Council members, to other important needs of city residents.

Furthermore, the information Philly311 provides to other departments is driving internal business process changes. One Philly311 staff person gave an example:

[XX department] had a fairly random process in how they prioritize replacement of street lights. Once we provide data, we are able to provide GIS map. That shows where the calls come from—hot spots. They can visually see the clusters. Now they have a data source. The data source actually gave them an opportunity to say “we need to do this.” Always right places.

In this way, Philly311 contributes to informed decision making in the departments. It helps departments easily find hot spots.

Interviewees consider the Philly311 system as crucial to their larger citywide performance management effort. Data pulled from Philly311 can expose what residents care about most. This data is used to discuss departmental performance at PhillyStat meetings, where the mayor, the managing director, relevant deputy mayors, and representatives from the departments and agencies meet regularly to track and monitor operational performance. The City’s performance management program now relies heavily on

data from Philly311 and this type of data-driven management changes the roles of public managers. With the data provided by Philly311, they act as data managers and process managers as much as direct problem solvers.

Philly311's contribution to a smart government involves raising transparency and integrity in government processes. "[People] don't need to know anybody anymore to get services," said one of the executive-level interviewees. "Just call 311!" Other interviewees also agreed that Philly311 transforms the way the City does its business. Before 311, many citizens did not know where they should start to request a service. For service requests, some took advantages of contacting a council person as a representative of their community. Philly311 has become an anti-corruption strategy. Since its launch, citizens can see more clearly how their government works through Philly311. One interviewee said,

People didn't understand the process. The internal process was mystery. For example, we got a request—fix that property. We can say here is the process. Philly311 does that. That's transparency. Now people can see what's happening in the government.

The smart government in a managerial side involves working with other entities. Interdepartmental collaboration is based on written service level agreements that codify each function of the City's key service departments (i.e., Streets, Licenses and Inspections, Police, Water, Parks and Recreation, and Fairmount Park) with a specific timeframe for completion. A service level agreement refers to "an agreement between the provider of a service and its customers which quantifies the minimum quality of service which meets the business need" [16: p. 14]. It is also considered a formal contract between a service provider and its customers [14]. Philly311 staff collaborate on reviewing, updating, and revising both the formal contracts between Philly311 and other departments and the knowledgebase for readily available responses to service and information requests, through regular meetings with internal partners who are key to citizen service (the departments on service level agreements).

The review and revision process allows those departments to learn about Philly311 operations and in turn allows Philly311 to learn about other departments' jobs. Philly311 staff listen to them and work to understand their concerns. The partnership for the service level agreements increases transparency across city departments. "We get everybody's input. People bring their concerns into the table," said one Philly311 staff person. "We own the system and they own the content." Hence the partnership of Philly311 with other departments is built on the integration of the departmental knowledge (content) into the 311 system.

The management of Philly311 has been supported by strategic partnerships with external organizations. In the preparation and beginning of Philly311, private sector partners helped finalize a detailed strategy and implementation plan. They also contributed to relieving the burden on Philly311 caused by under-staffing, providing some of their experienced agents (on-loan call agents). Philly311 call agents benefited from private sector best practices, and in turn the on-loan agents from private call centers learn more about how the City works. From the preparation period of Philly311 through its kick off to the present, the partnership with professionals from some private companies has offered a mentoring opportunity for Philly311 agents and supervisors.

4.2 311-Driven Changes in Service Delivery

The 311 service center serves both as a front-line contact center and as a shared service center. Not only does it integrate frontline services by providing quick and easy access to non-emergency municipal services and information through a single, consolidated channel, but it also creates capabilities for shared service, which denotes "a generic service that is jointly developed by public agencies and can be used many times in different business processes of various government agencies" [19: p. 32]. Services can be shared by multiple agencies to avoid the development of similar functionality over and over again. Philly311 provides shared services to city departments through its consolidated channel for service requests and complaints. Shared services promise chiefly three benefits: reduced costs, improved quality of services, and fewer distractions [3,10,23]. One interviewee addressed Philly311's moderate (but not as much as expected) effect in saving the city's administrative costs.

Shared service capabilities are based upon the service level agreements. The agreements stipulate service standards that are measurable and can be used to support accountability (e.g., response times). For instance, a residential property that is not being maintained must be investigated by the Department of Licenses and Inspections within forty-five days. A dead animal must be removed by the Department of Streets in three days and an abandoned vehicle within thirty days. Similar to this, if a department has agreed in its service level agreements to deal with a citizen's service task in X number of days, the customer should be informed of that service standard. The department is held accountable to complete the service in that amount of time or provide information back to Philly311 as to why the service could not be completed in the agreed-upon amount of time. City agencies perform hundreds of tasks, but Philly311 only handles the ones it can hold an agency accountable for performance on time.

The 311 system serves for customers as an effective contact point. One of executive-level interviewees viewed Philly311 as an interaction tool, by saying "[Philly311] connects people to government as much as possible. It is interactive to see what's on people's minds." Through integration of multiple channels for municipal services and information, Philly311 serves as a main gate to residents, businesses, and visitors of the City. As well, Philly311 becomes a front line of service agents reachable via the toll-free phone line and often digital media. One of the Philly311 launch project team members said:

311 is a front door. Before 311, Philadelphia had hundreds of front doors. Most were blocked, not open at all. The City created the best face of the front door for the City.

All of the Philly311 staff interviewed agreed that everybody is their customer—not merely citizens, businesses and visitors but other city departments as internal customers. Along with this view, the mayor created a unique position, Chief Customer Service Officer, which no other city has. The role is filled by the Philly311 Director. Given the Director's dual roles, the organizational responsibility of Philly311 extends to inspiring the whole city government with a strong customer service spirit. The vision is for customer service representatives of all city departments and agencies to view themselves as city ambassadors who have a major role to play in the relationship with all who live

in or do business with the City. Philly311 as a city agency also manages the program (Customer Service Leadership Academy) for training customer service agents in the whole city government. The program imbues them with customer service professionalism.

All interviewees viewed Philly311 as more than a customer service tool. For external accountability, callers, senders of emails and text messages, and walk-in customers receive a tracking number of service requests, which allows them to follow-up on their requests either by calling back or visiting the 311 homepage. Customers are given a specific timeframe with which they can have clear expectations of when and how their requests will be answered. One executive-level interviewee said, “People want to see government’s workings more connected through technology.” Philly311 is an effective tool for external accountability and also transparency by showing the public how the city government does its work.

For internal accountability, data collected from Philly311 is used in conjunction with the PhillyStat process to track, evaluate, and, if necessary, correct service patterns in the departments. The guidelines described in the service level agreements create a sense of accountability that was noticeably absent before 311. In PhillyStat sessions, each department has the responsibility to account for their performance in front of the City’s executives with respect to service standards put forth in the service level agreements.

The consolidated channel for non-emergency service and information requests enables and empowers people to engage in their communities. One Philly311 staff person said that 311 enables citizens to become involved in their neighborhood by reporting a problem they see. Once citizens see how reporting a problem can impact the neighborhood—for example, requests for removing graffiti from a local park or clearing up a vacant property that can be potentially a place for crime—they are further inspired to become involved in improving the neighborhood they live in. Interviewees indicated that the 311 functionality increases the level of citizen engagement in neighborhood environments around such issues as built infrastructure, public safety, and public facilities. With Philly311, citizens see concrete ways of how they are making an improvement in the quality of life in their community.

One of Philly311’s unique characteristics is its neighborhood liaison program. A neighborhood liaison is someone who serves their community by reporting issues directly to the Philly311 system (oftentimes on behalf of their neighbors) and provides the community with progress reports. This program is open to all residents who are willing to participate in a two-hour training session, through which they are made familiar with various city departments and the electronic reporting system. The importance of their roles and responsibilities is based on the fact that they know their neighborhood and community-embedded wants and needs more and better than anyone else. One Philly311 staff person said:

The liaisons are community leaders. We train them to use our system. They have ability to put information directly into our system. That’s our strong connection in a different way of outreach. Multiple sources of information are embedded in neighborhoods.

Therefore, the neighborhood liaisons are contact points of integrating service requests. Their function is central to connecting the system for 311-enabled integrated services with the service needy, who are usually the poor and the technology-illiterate, especially in distressed neighborhoods.

Table 6 briefs 311-driven innovations discussed up to this point.

Table 6. How Philly311 makes city government smart

	Management	Service Delivery
Efficiency	<ul style="list-style-type: none"> • Resource allocation 	<ul style="list-style-type: none"> • Service integration
Effectiveness	<ul style="list-style-type: none"> • Informed decision making • Data-driven management 	<ul style="list-style-type: none"> • Customer-oriented service • Professionalism
Transparency	<ul style="list-style-type: none"> • Anti-corruption and integrity • Service level agreement 	<ul style="list-style-type: none"> • Accountability • Service level agreement
Governance	<ul style="list-style-type: none"> • Internal collaboration • External partnership 	<ul style="list-style-type: none"> • Citizen engagement • Neighborhood engagement

5. CHALLENGES AND OPPORTUNITIES

Philly311 was established under a very tight timeframe (only 11 months from February to December in 2008), within which no other city of Philadelphia’s size has launched a 311 center operation. The aggressive timeline itself was not a serious problem, but early challenges arose from financial constraints stemming from the budget crisis experienced by the whole city government during the national economic recession. The budget cuts meant scaling back or postponing key elements. The insufficient budget created two severe challenges: under-staffing (six agents short of the operational goal of 57 agents, and recruitment based on internal transfers of inexperienced agents from other departments) and under-equipping (the use of old Customer Relationship Management (CRM) software).

Interviewees said these early challenges have been continuing until now to some extent, but their retrospective views on the first year of Philly311 offered practical lessons about how a city could launch and operate a 311 system with an aggressive schedule and budgetary constraints. Strong executive support, strategic partnership with external organizations, and adaptation and flexibility in staffing and equipping were key factors in mitigating the earlier challenges. One of Philly311 founding members said, “We clearly could not move forward with upgrading with our CRM, and we didn’t change our recruitment strategies. The budget crisis impacted us in a significant way, but we were still able to achieve a majority of outcomes.” These outcomes are the changes made by Philly311 in management and service delivery, as discussed in the preceding section. Interviewees addressed major challenges and concerns in transforming and innovating their city government through 311. This section describes the challenges and also new opportunities in the current phase following after the initiation and early adaptation stage.

5.1 Technology

The technological challenges addressed were mostly about under-equipping. Especially, interviewees wanted to upgrade back office software such as the CRM and database systems for information sharing. One Philly311 staff claimed, “We need the right technology at the right time.”

In the meantime, interviewees suggest some opportunities from new technologies. The city government is now recognizing an increasing number of Internet users through their smart phones instead of desktop or laptop computers. Internet connection through mobile phones is increasingly considered a possible way to closing the digital divide in the City. The extension of the 311 system to smart phones was considered by interviewees as a way to further promote citizen engagement and active feedback of 311 services from citizens.

5.2 Management and Organization

Organizational challenges also basically come from budgetary constraints in recruiting qualified call center agents and keeping call center operation open for 24 hours a day and 7 days a week. While these challenges have continued since the kick off of Philly311, interviews reveal a new challenge. Philly311 as a city agency has a unique organizational culture distinguishable from other departments and agencies, because it serves as a leader and pioneer of customer services in the city government. According to one Philly311 staff person, call center agents may feel that they have to comply with a more rigorous internal standard for excellence in customer services, which is not required in other departments.

The agency was created as a new one in the whole city government for recent 20 years. Its role as a customer service leader is expanding across the whole city government and still adjusting to the relationships with other traditional departments. In this sense, communication with other departments is considered one of organizational challenges as well as the way to better operation of the government.

Philly311 may offer government employees a new opportunity to see their job differently. The way service departments do their business changes due to the 311 center. Directors and managers in the city departments are seeing their job in a more efficient, effective, and transparent way. For example, one of Philly311’s missions is to “provide recommendations into ways to improve City government through accurate, consistent measurement and analysis of service delivery citywide” (see www.phila.gov/311). By the measurement and analysis, Philly311 helps city departments have better understanding of what they are doing and what others are doing. According to one executive-level interviewee, Philly311 is driving a cultural change in the whole city government to data-based, performance-driven, and customer-oriented culture, but that isn’t coming at a short horizon, given the interdepartmental differences in organizational culture.

5.3 Internal and External Governance

Internal governance-related and also cross-organizational challenges mostly lie in interdepartmental or interagency collaboration. A formal governance body for such collaboration does not exist, but instead some staff members of Philly311 meet key people from the departments on the service level agreements

in a regular basis. Philly311 staff identified this process as informal. The City government considers expanding the scope of services and information provided by Philly311 by including more departments in the service level agreements. The process through which the current service level agreements were created is based on interdepartmental collaboration. To establish the interdepartmental agreements, Philly311 staff identified potentially high volume customers (departments) and contacted them. Through the meetings, Philly311 staff decided who has knowledge of city services and information. This process has been semi-regularized, but not based on a formal process. With this informal process, there is a challenge in bringing new service departments into the service level agreements, because Philly311 does not have a formal governance body for organizing new interdepartmental collaboration and cooperation. The mechanism for interdepartmental workings on revising and updating the service level agreements currently relies on *relational governance*, which refers to governance by commitment, mutual dependence, trust, and interpersonal relationships [14]. Interviewees agreed the process has worked well so far, but recognized that the process needs to be formalized for expansion of the service level agreements and Philly311 functions.

On the other hand, the interdepartmental governance around Philly311 allows Philly311 and the departments in the service level agreements to create mutual understandings of their jobs. The series of informal meetings have provided those city departments with a valuable opportunity for mutual learning. Furthermore, some Philly311 staff said the interagency relationship has shifted from competitive on customer services to complementary. At the beginning of Philly311, other departments and agencies had a concern that Philly311 takes their own jobs. Now the mutual learning has developed an understanding that Philly311 does help their jobs. In addition, Philly311’s past three years have changed the City Council’s early perception of the 311 center and other departments as well. The City Council does not concentrate their energies any more on routine constituent services that they dealt with before 311 by receiving service requests and complaints pertinent to Council districts. Philly311 reports to the City Council the status of customer service delivery by Council districts, and the Council members appreciate data and information pulled from 311 as an effective tool to better understand their constituents.

Another side of governance formed by Philly311 indicates the increasing interactions with citizens. Philly311 provides a new way by which citizens are involved in their neighborhood concerns. Philly311 receives requests for service, which may be the reports of community problems residents see: for example, removing graffiti, clearing up a vacant property, moving a vacant car, replacing a street light, and so on. Among them, some requests, despite a small portion in call volumes, reflect concerned citizens’ ideas and suggestions for improving neighborhood environments beyond reporting immediate problems. This citizen engagement category of calls to 311 merits attention from city managers, but inbound calls are currently analyzed in terms of the two main categories (information requests and service requests). Categorizing some calls into citizen engagement and further analyzing those calls in depth needs additional efforts of Philly311 agents.

Table 7 summarizes challenges and opportunities of Philly311.

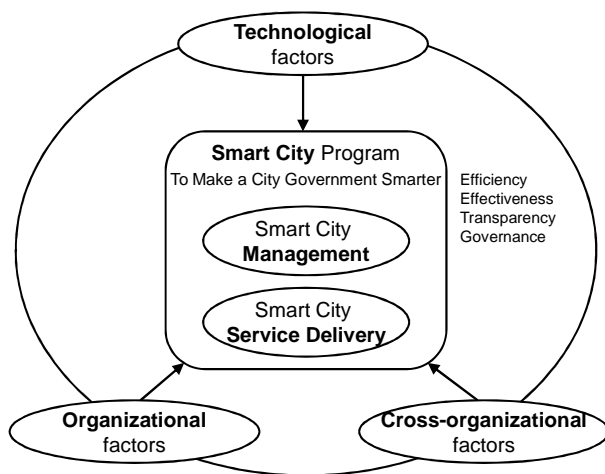
Table 7. Challenges and opportunities of Philly311

	Challenges	Opportunities
Technology	<ul style="list-style-type: none"> • Timing in upgrading software and systems 	<ul style="list-style-type: none"> • New technologies to bridge the digital divide
Management and organization	<ul style="list-style-type: none"> • Limited funding • Cultural differences between 311 and other departments 	<ul style="list-style-type: none"> • Business process change • Change to data-based, performance-driven, and customer-oriented culture
Internal and external governance	<ul style="list-style-type: none"> • Reliance on informal processes in interdepartmental collaboration • Additional efforts for analyzing calls for citizen engagement 	<ul style="list-style-type: none"> • Strengthening relational governance in interdepartmental collaboration • Providing a new way to citizen engagement

6. DISCUSSIONS

Smart city research needs to be inductive. While a growing number of conceptual studies explore the meanings of a smart city, little research empirically investigates smart city activities. A variety of existing theories and theoretical models of urban innovation could explain smart city activities that current cities carry out. However, there is even no consensus on what smart city activities are, though city governments’ initiatives, projects, and programs to make cities smart (for example, efficient, effective, transparent, accountable, sustainable, and so on) could be recognized as smart city activities. Grounded on rich evidence from semi-structured interviews, this study considers Philly311 as a smart city initiative that contributes to making the city more efficient, more effective, and more transparent and facilitating the city’s governance. As a result of inductive research, we suggest a model to understand smart city programs draw, which is grounded on empirical evidence without preconceived theories [13,22].

Figure 1. The model of a smart city program



This study explored what impacts a smart city initiative driven by a city government makes in the context of the 311 non-emergency contact program. Philly311 as a smart city program enables smart city management and smart city service delivery, and the impact

of the smart city program on the city is enabled and also impeded by technological, organizational and managerial, and internal and external governance-related factors.

The 311 service center serves for residents, business, and visitors as a convenient front line of municipal services. Tailing frontline services to the needs of individual citizens is key to smart city service delivery [8]. Philly311’s back-end functions enable the city to gain more efficiency and effectiveness by allocating and using managerial and operational resources in a smarter way, based on performance data. Smart city management thus contributes to efficiency, effectiveness, and the improvement in decision making [24]. Enhancing transparency and accountability of service delivery through Philly311 is also one of the ways to make the city smarter. Enhanced transparency and accountability of city administration contributes to smart governance [12]. Externally, Philly311 allows citizens to engage more easily in their neighborhoods and communities. Internally, Philly311 enables and promotes interdepartmental collaboration and cooperation. Based on the practice in Philly311, this study suggests that a smart city initiative should engage various internal (city agencies) and external (individual citizens and civic groups) stakeholders in making community-related decisions [12].

Some positive changes made by Philly311 are not without some challenges, especially in terms of technology, management, and governance. This finding can be extended to practical implications for smart city initiatives. Budgetary constraints and under-equipped technical conditions have continued since the launch of Philly311. While some smart city programs such as the 311 non-emergency contact system consume capital budget, others may be conducted in a resource-saving way. For the former case, required conditions for basic operations of the smart city system may be gained with high costs, but overcoming technological, managerial, and cross-organizational pressures is critical to making a city government smarter, for example, as Philly311 designed smart strategies for cost saving in equipments and staffing.

The case of Philly311 also offers various practical lessons for smart city practitioners. With the growing importance of Philly311 as a smart city program of the city, data-driven and customer service-oriented culture is increasingly being imbued across the whole city government of Philadelphia, but the extent of cultural change may differ with city departments and agencies. Hence mitigating inter-organizational tensions and conflicts is vital to smart city management. In the case of Philly311, internal governance indicates interdepartmental workings on the service level agreements. The governance mechanism leaves a room for improvement, for example, by formalizing and institutionalizing a governance body. To gain much attention and guarantee active participation of all related actors, a smart city program needs to be formalized and institutionalized by a city government.

Philly311 offers a new way to engaging more citizens in neighborhood issues, but understanding the effects for citizen engagement requires additional administrative burdens. While the whole city government obviously takes benefits from Philly311 by making operational management and service delivery smarter, the 311 service center exposes both challenges and opportunities. That does not mean pros and cons of the 311 service. The 311 service center could make more significant contribution to city management and service delivery by considering addressed challenges and harnessing new opportunities.

7. CONCLUSION

Philly311 is being used as crucial part of the city administration's strategy to transform the city government into a smarter, faster, and better one. The interviews with key people managing and operating Philly311 shed light on its contribution to a smart government and ultimately a smart city. According to the interviewees, a smart government involves operating in a more efficient, effective, transparent, and governance-facilitating way. In this paper, we suggested the preliminary understanding of smart city initiatives in the context of the City of Philadelphia and its 311 non-emergency contact center. The understanding should be extended and generalized to other smart city programs. Further research will focus on more diverse cases of 311 contact centers. We will revisit what this study found from the interviews with managers of the smart city program by hearing about the 311 system from citizen users of 311 and impacted neighborhoods.

8. ACKNOWLEDGMENTS

We thank the City of Philadelphia government participants in this study for sharing their time and valuable insights with us. We are also grateful to all members of the multi-national research project titled "Smart Cities Service Integration." This study is partially supported by a grant from the Social Sciences and Humanities Research Council (SSHRC) of Canada and the home institutions of researchers who jointly work on the multi-national research project. The views and conclusions expressed in this paper are those of the authors and do not necessarily reflect the views of the SSHRC or the home institutions of other researchers.

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