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Alois A. Paulin
Leonidas G. Anthopoulos
Christopher G. Reddick *Editors*

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Citizen Relationship Management in Local Governments: The Potential of 311 for Public Service Delivery

Sarah Hartmann, Agnes Mainka and Wolfgang G. Stock

Abstract The American citizen relationship management system 311 achieved much success in recent years. It started as a simple hotline and has evolved to a multi-channel communication system which offers a wide range of governmental services, e.g., Web self-service portals, social media, and mobile applications. In many cases, it functions as a single contact point for any issue citizens could have within their neighborhood. It is assumed to allow for quicker and easier access to non-emergency municipal services and information as well as to improve effectiveness and efficiency of governmental service delivery. However, current research on the changes in public service delivery evoked by 311 as well as the importance of different communication channels is missing. Therefore, this chapter introduces 311 systems in three American cities and exposes that the extent to which governmental service provision changed is dependent on the type of request. Considering the strong increase in the number of requests, governmental service delivery has improved in recent years. In addition, the variety of different communication channels can be assumed to be of major importance in order to reach a broad range of citizens. Besides that, the data generated by 311 allow for new opportunities in the provision of governmental information and services and have big potential for improvements in public administrations.

S. Hartmann (✉) · A. Mainka · W.G. Stock
Department of Information Science, Heinrich Heine University Düsseldorf, Düsseldorf, Germany
e-mail: s.hartmann@hhu.de

A. Mainka
e-mail: agnes.mainka@hhu.de

W.G. Stock
e-mail: stock@phil.hhu.de

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Introduction

Since the 1990s, the reinvention of government (Osborne and Gaebler 1992) is forecasted due to the increasing importance of information, information systems (IS), and information technology (IT) in reform processes of public management (Heeks 2002). Governments are often accused not to fulfill citizens needs and have shown to be inefficient and ineffective (King and Nank 2011), presumably through their inability "to handle the increasing amount of information and coordination activities that are nowadays needed to provide traditional public services" (Cordella 2007, p. 271). The automation of administrative processes by means of information and communication technologies (ICT) is assumed to improve the efficiency and effectiveness of our public administrations (Cordella 2007). According to Bovens and Zouridis (2002), governments are transforming from street-level bureaucracies to system-level bureaucracies. The former refers to the initial use of e-government tools for the collection and storage of information and data, whereas the latter describes the evolution of fully automated electronic systems (Paulin 2013). The full integration of digital government services across different departments and agencies and thus providing government information and services at one single point of access, e.g., via an online portal, is what is described as the final stage of e-government maturity (Irani et al. 2006; Wimmer and Tambouris 2002). However, the changes in governmental processes and outputs that should have been evoked by the use of ICT in public administration are still in question (Norris and Reddick 2013). In addition, Reddick (2010a) has shown that the Internet is only the second most used source to get information or assistance. Most people prefer to ask someone in person. In particular, the phone is frequently used in order to contact government officials and agencies as well as a combination of different contact channels are preferred toward governmental Web sites and e-mailing (Reddick 2010a).

According to a study by Reddick and Anthopoulos (2014), besides traditional channels (i.e., face-to-face contacts, phone calls, and surface mail) and e-government options (i.e., Web sites and e-mailing), also new digital media (e.g., text messaging, social media, and mobile apps) are used to access governments nowadays. Channel choice seems also to be dependent on the reason behind contacting governments, for example, e-government services are preferred for retrieving information and advice whereas phone calls are primarily used in order to solve problems (Reddick and Anthopoulos 2014). One example of a system, which focuses on the improvement of public service delivery and citizen satisfaction, is the American citizen relationship management (CiRM) system 311. This system originates from a simple service hotline for government information and evolved to a multi-channel centralized system that has the potential to overcome bureaucratic borders. Reviewing the current literature less is known about the improvements and changes in governmental processes and service provision since the implementation of 311 and will, therefore, be explored within the scope of this chapter.

Citizen Relationship Management with 311

The concept of citizen relationship management was deduced from the customer relationship management (CRM) as it is applied by the private sector to manage customer interactions and to learn from them about how to improve services and products (King 2007). CRM is assumed to "encourage customer loyalty and the development of long-lasting profitable relationships for the provider" (King 2007, p. 48) as well as improve service delivery. With a CRM system, citizen data can be captured and analyzed in order to learn more about citizens' needs and problematic areas within a city (King 2007). Primarily, local governments are assumed to achieve more efficiency, transparency, and accountability by implementing CRM systems (Reddick 2010b).

The American 311 response system achieved much success in recent years and is a citizen relationship management tool, which allows for "quick and easy access to non-emergency municipal services and information through a consolidated channel" (Nam and Pardo 2013, p. 1953). It is also assumed to provide a fruitful channel for more effective and efficient service delivery as well as citizen participation in decision-making processes (Schellong 2008). What started as a simple hotline has evolved to a multi-channel communication system which offers a variety of communication channels, e.g., Web self-service portals, social media, mobile applications, and functions as a single contact point for citizens. Particularly, mobile devices offer new opportunities as they allow being accessible anywhere and anytime, collecting more accurate data, making better decisions, reducing operational costs, speeding up processes since data can be gathered in real time, duplicates can be avoided and photographs can be captured quickly for documentation purposes (Sharma and Gupta 2004).

Current research on the success factors of 311 service implementation reveals that besides executive supporters, sponsors, and experienced partners, who help to implement the system, especially the agencies' ability to fulfill citizens' requests is important (Bontis 2007; Nam and Pardo 2013; Schellong 2008). However, data about the agencies' performance are needed in order to optimize it. That data can be offered by 311 and help to detect problems within a city or specific area, foster the dialogue between decision-makers, reallocate resources, improve service efficiency, and help to make predictions about citizens' demand. Furthermore, 311 data are assumed to have the potential to enhance government-to-citizen relationships and citizen satisfaction (Schellong 2008).

Even though there are a few studies that examine the implementation processes of 311 and its challenges according to different cities (e.g., Schellong 2008; Nam and Pardo 2014), less is known about the system's impact on governmental services and processes. In that scope, it is necessary to expose more about the services that are offered by 311 as well as the importance of different communication channels, i.e., face-to-face (as far as walk-in centers exist), phone, the Web, social media and

mobile applications for government-to-citizen communication. Furthermore, mobile applications combine some of these channels, i.e., phone, the Web, and social media and therefore, might become more important than other communication channels. Hence, our first research question is:

RQ1: *Which channels constitute today's 311 systems and is the mobile app more important than any other communication channel?*

In addition, many assumptions are made on the impact that 311 data could have on governmental services as far as it is fed into performance management systems, but there is less evidence of the actual change in service delivery. More efficient service delivery is assumed to improve the government-to-citizen relationship as citizens realize that governments take care of their responsibilities and get their work done (Schellong 2008). Therefore, our second research question asks for the changes in governmental service provision that have been achieved by 311:

RQ2: *How has 311 changed governmental processes?*

Accordingly, this chapter will introduce today's 311 multi-channel systems and their ability to support collaborative decision-making as well as identify changes in governmental service provision. Based on that, we will highlight 311's potential to lower administrative barriers and make suggestions for future implementations. In order to agree to that claim and learn from 311 success stories, the systems in three US cities, namely New York, Philadelphia, and Boston, will be presented in the following.

Method

In order to expose a set of 311 success stories, current literature was reviewed as well as 311 mobile applications were investigated. New York, Philadelphia, and Boston were found to offer successful 311 systems. The investigation is based on face-to-face expert interviews with eight 311 government officials and managers (two from the City of New York, three from the City of Philadelphia, and three from the City of Boston) from November 12, 2015, to November 20, 2015. By means of 311 open data from the cities' open data portals[1] as well as reports published by the city government, the number of service requests, the types of issues, as well as changes in service provision were investigated. However, the latter could not be applied to the City of Philadelphia as they did not provide appropriate data.

[1]NYC OpenData: https://nycopendata.socrata.com/Social-Services/311-Service-Requests-from-2010-to-Present/erm2-nwe9; City of Boston.gov: https://data.cityofboston.gov/City-Services/311-Service-Requests/awu8-dc52; OpenDataPhilly: https://www.opendataphilly.org/dataset/311-service-requests.

311 in New York, Philadelphia, and Boston

Prior to 311, contacting governmental agencies in order to get information or request a service could become a challenging task. A huge amount of different numbers existed, and in many cases, it was intricate to spot the right one. In Philadelphia, for example, a phone book existed with almost of 1000 different numbers that could be called but the main challenge for the customer was to find out who actually is responsible for their specific problem (Philly311 Contact Center, City of Philadelphia 2015, personal communication, 16 November). However, not only citizens had difficulties to detect the right number, also departments were challenged to transfer citizens to the appropriate agency in the case that they had chosen the wrong number (Bontis 2007). Therefore, the main goal of 311 was to simplify and speed up this communication process between the government and its citizens in order to improve transparency and efficiency (Schellong 2008). In general, there are two main types of requests made to 311. On the one hand, citizens can ask for information related to the government, e.g., in regard to taxes, and on the other hand, citizens can request a specific service, e.g., a pothole removal and streetlight repair. In 2015, the most present service requests according to the available 311 open data across all three cities are street conditions, such as defects and pollution, street lights and signals, blocked driveways and abandoned vehicles, heat or hot water conditions, as well as graffiti removals.

Communication Channels of 311

The three investigated cities extended their 311 call centers to very comprehensive systems during the last decade. In addition to the call center, all of them started to offer 311 on the Web, via a mobile application and on social media, e.g., Twitter, Facebook, and YouTube (see Table 1 for respective launch dates). New York added 311 Online in March 2009 as well as its Twitter presence in May 2009 in order to post topical information according to 311 (New York City Global Partners 2011). The NYC311 mobile app is available since October 2009 but was not well-accepted until its relaunch in January 2014 (New York City 311 2015).

Table 1 Launch dates of 311 services on the call center, the Web, mobile, and Twitter channel

	New York	Philadelphia	Boston
Call center	March 2003	December 2008	Launch of new CRM in October 2008
Web	March 2009	January 2009	October 2007
Mobile app	October 2009	September 2012	October 2009
Twitter	May 2009	March 2009	March 2010

see Appendix for references to online presences

With the exception of Philadelphia, the 311 systems offer a 24/7/365 availability. Philadelphia was hit hard by the financial crisis in 2008; therefore, its implementation had to start on a small scale and to draw on already established services. They implemented a less expensive Web-based solution to serve as the CRM system. Because of missing marketing budget, Philly launched a word of mouth approach and visited community meetings, held presentations, talked to people, and started with meetings at churches and police departments (Philly311 Contact Center, City of Philadelphia 2015, personal communication, 16 November). Out of this, they developed a comprehensive community engagement program which brings 311 services into the neighborhoods and changes the way citizens interact with their city government.

The City of Boston launched a new CRM system in October 2008, which fulfills many of their services much faster than before, e.g., new recycling bins could be delivered in a week instead of a month (Crawford and Walters 2013). The program was piloted by the Department of Public Works, the Department of Transportation, and the Department of Parks and Recreation. However, one of the difficulties was that some departments already had their own CRM systems that had to be integrated. Only one year later, they published the 311 mobile app (which was first called "Citizen Connect" but later renamed to "311") in order to improve city services and solve citizen's problems (Crawford and Walters 2013). Since 2011, a complement of Citizens Connect called City Worker app has become available for field workers of departments such as Public Works, Parks or Waste Management and allows them "to respond to dynamically updated requests and to close them on the spot" (Crawford and Walters 2013, p. 17).

The first 311 CiRM system was implemented in Baltimore in 1996 based on a call center (Bontis 2007). Today, there is a shift toward digital and mobile media. Interviewees from the City of New York report that "the majority of interactions happens in the digital channels and people love the mobile. Mobile is very successful for us. Thus, our strategy moving forward is 'mobile first'. People think about their mobile. They don't think of going to their desktop" (NYC 311, City of New York 2015, personal communication, 12 November). Nevertheless, the call center is still the biggest channel in New York, but it is shrinking whereas the mobile and Web channels are growing. This does not mean that the call center becomes useless: "I think there are always people who want to call the call center and that is going to be by demographic group and also certain types of calls … that are a little bit complex and you may feel better talking to an agent" (NYC 311, City of New York 2015, personal communication, 12 November). According to the Mayor's Management Report of the fiscal year (FY) 2015, the number of phone calls to 311 is more or less stagnant (Shorris and Tarlow 2015). Almost 21.1 million contacts were made by phone in FY 2015, 9.6 million via the 311 Web site, and 704,000 via the 311 mobile application (Shorris and Tarlow 2015).

By contrast to New York, Boston reports that although the use of the mobile channel increases, the number of phone calls has not decreased. Figure 1 approves that and shows that the number of requests that were made to the City of Boston increased about 266% from 2011 to 2015. In particular, in terms of calling as well

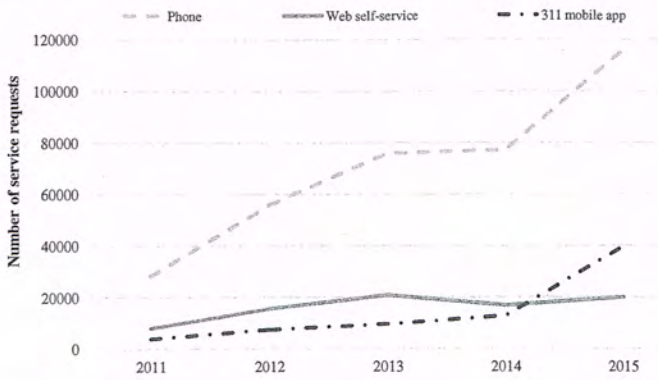

Fig. 1 Number of service requests made via phone, the Web, and the BOS:311 app from 2011 to 2015 in Boston (based on BOS:311 open data)

as using the 311 mobile app, the number of service requests leaped from 2014 to 2015. The number of requests made via the 311 Web self-service portal is much smaller but edging up. Interviewees from Boston explained that there is considerably more a change in the citizens' engagement since people are more aware of different ways and channels that they can use to contact their government (Department of Innovation and Technology, City of Boston 2015, personal communication, 20 November). To reach as many people and get as much information as possible, therefore, the city has to make sure that they allow citizens to use the channel they prefer (Mayor's Office of New Urban Mechanics, City of Boston 2015, personal communication, 20 November).

According to the interviewees, social media is another channel that is growing but primarily used for information requests. Nevertheless, the number of service requests made via Philly311's Twitter channel grew from 44 in 2011 to 565 in 2014 (Table 2). In general, most of Philly311's communication channels are growing,

Table 2 Number of service requests made on Philly311 communication channels per year

	2009	2010	2011	2012	2013	2014
Phone	63,184	72,966	90,620	78,963	79,843	93,257
Email	987	3302	4274	5318	5810	5341
Mobile	–	–	5	1677	1777	7441
Walk-in center	974	1398	1507	1122	878	795
Communities	447	884	1366	952	260	1812
Web self-service	–	1066	2483	906	135	1129
Twitter	–	–	44	262	210	565
Fax/mail	2	37	21	13	5	1
Facebook	–	–	–	–	–	33

Source The Philly Innovates Blueprint, n.d.

except for email and the walk-in center. Primarily, the social media channels are reported to be very helpful for information dissemination, more precisely for education: "We write via blogs … about how things work within the city and guidelines like dos and don'ts, for example, why you cannot dump something on your neighbor's yard in" (Philly311 Contact Center, City of Philadelphia 2015, personal communication, 16 November). In Philadelphia, they name it the 3 Es "educating, empowering, and engaging" of customers, what is the main goal of Philly311.

However, why people prefer different channels is difficult to answer. "People who are more comfortable to use the mobile app, are more comfortable with technology and are more comfortable to give information on the mobile device" (NYC 311, City of New York 2015, personal communication, 13 November); therefore, users' age might be a factor but also their personal habits. In New York, most people do not want to talk to an agent personally (NYC 311, City of New York 2015, personal communication, 12 November) whereas "in Philly a lot of customers like to talk via phone" (Philly311 Contact Center, City of Philadelphia 2015, personal communication, 16 November). Although that might be related to the respective city, all interviewees mentioned that it is very important to "meet the customer where the customer is" (Philly311 Contact Center, City of Philadelphia 2015, personal communication, 16 November) and to get as many people as possible to report and make them feel comfortable with the technology they have (Mayor's Office of New Urban Mechanics, City of Boston 2015, personal communication, 20 November). For this reason, the City of Philadelphia not only offers a great number of different 311 contact channels but even allows for face-to-face communication, community meetings, and responds to personal letters. A higher preference for non-digital communication channels might also be reasoned in the digital divide that is still an issue in Philadelphia. About 27% of people living there do not have access to the Internet in their households or via smart devices (United States Census Bureau 2014). For this reason and their budget constraints, the city also developed several community engagement programs along with 311, e.g., the Neighborhood Liaison Program (NLP) at which volunteers are trained to record items discussed during community meetings, so that the public service concerns of their neighborhood are directly reported to Philly311 (Philly311 Contact Center, City of Philadelphia 2015, personal communication, 16 November). Also, the City of New York established a service which focusses on specific people. They offer homeless assistance via 311. In the case that citizens detect a homeless person on the streets, who they want to help, they can call 311 or send a request via the NYC311 mobile app.

Additionally, it depends on the users' need which channel they prefer (NYC 311, City of New York 2015, personal communication, 13 November). Issues with higher complexity will certainly be reported by phone. In the case of Boston, in fact, differences between the type of service that is requested and the channel that was chosen for that specific service can be shown. Table 3 presents the ten most frequent service requests in regard to BOS:311's different communication channels. Although it is possible to request snow plowing or report about missed trash via the 311 mobile app. Most of these service requests were made by calling whereas

Table 3 Number of service requests made via phone, the Web, and the 311 mobile app in the City of Boston, according to the top ten most often requested services in 2015

Type of service	Phone	Web self-service	311 mobile app
Request for snow plowing	20,933	3459	5946
Missed trash/recycling/yard waste/bulk item	12,321	3419	560
Requests for street cleaning	2116	0	6263
Schedule a bulk item pickup	12,073	5379	0
Request for pothole repair	1354	365	2407
Parking enforcement	2394	303	5527
Street light outages	1268	293	3471
Building inspection request	4857	99	0
Sign repair	537	93	1705
Graffiti removal	361	245	3666

requests for street cleaning, street light outages, sign repairs, or graffiti removals are more often made via the 311 mobile app. This might be due to the urgency of the matter. In fact, 70% of all service requests that came in via the app are attached by a picture. In many cases, the self-service option via the 311 Web site is less often chosen than calling by phone or reporting an issue via the 311 mobile app.

Consequently, not only the use of the 311 communication channels has changed; moreover, the channels are used for different purposes. Whereas the phone is reported to be more suitable in order to notify about complex problems, the mobile app is valuable when pictures are needed to document an issue. In general, the phone is still the most used channel followed by the mobile app in Boston and Philadelphia. In New York, the Web portal got higher numbers of requests than the mobile app, although the city wants to change that and shift more people to send requests via the app (NYC 311, City of New York 2015, personal communication, 12 November). However, less frequently used communication channels, e.g., social media or the Philly311 walk-in center, are important as well, as they allow attracting a wide range of people who might otherwise be excluded (Philly311 Contact Center, City of Philadelphia 2015, personal communication, 16 November).

Nevertheless, there is a trend of reporting conditions on a mobile app that affect citizens' neighborhood, like where to plant a new tree in their street or reporting about potholes. The 311 apps are assumed to allow for improvements in civic participation as they can be used location-independently and more easily be adapted to temporary issues, e.g., at election times or seasons (Philly311 Contact Center, City of Philadelphia 2015, personal communication, 16 November). The mobile apps offer better ways for communication between city government and citizens, e.g., by providing photographs when the service that has been requested is fulfilled or asking for additional information in the case that difficulties occur (Department of Innovation and Technology, City of Boston 2015, personal communication, 20 November). It was never possible to reach that many people in a very short time before. In particular, in emergencies, the 311 app is helpful to push out information

that is needed by citizens (Philly311 Contact Center, City of Philadelphia 2015, personal communication, 16 November). The City of Boston mentioned that the advanced options for personal communication are the main advantage of the mobile app, e.g., a city worker should be able to get directly into contact with citizens, and thus, a chat function is planned. In future, citizens will not only be informed about case closures but about inspections or information transfers to other departments. When thinking about the next years of Philly311, mobile apps will become more intelligent from the governmental side, and instead of waiting for the customer to call, they should become more proactive (Philly311 Contact Center, City of Philadelphia 2015, personal communication, 16 November). For example, kids could be informed about areas in which criminality is expected, e.g., by a short notice popping up when they approach that area. However, although the 311 app is a very important channel, the other ones will not become useless in the near future as long as there are people who prefer to walk-in or to call 311.

Changes in Governmental Processes

The interviewees reported that 311 makes it "easier for our customers to interact with local government. The customers don't have to know who they need to talk to. They only have to explain their problem and then the agents will assist them and find the required information" (Philly311 Contact Center, City of Philadelphia 2015, personal communication, 16 November). Although it is very important to educate citizens in particular about the complexity of service requests, the time till a topic is resolved strongly depends on the type of request. Some departments share their responsibilities, and in some cases, the difficulty is to classify the issue correctly, e.g., the customer might report a pothole, but when the streets department goes out to investigate it, they might identify it as a ditch. Whereas a pothole takes three days to repair, a ditch or a cave-in takes up to 45 days (Philly311 Contact Center, City of Philadelphia 2015, personal communication, 16 November).

Above all, when citizens see that they can "get something done then they take pride in their community and help report things" (Philly311 Contact Center, City of Philadelphia 2015, personal communication, 16 November). Thus, 311 has the potential to change the relationship between government and citizens. According to the interviewees from Boston, 311 will impact citizens' faith in government since they see that government is actually doing something. They do not only provide services, they also involve citizens in decision-makings because they use the data generated by 311 to drive policies and change citizens' perspective on their political points and their voting preferences (Department of Innovation and Technology, City of Boston 2015, personal communication, 20 November).

In New York City, the Local Law 47 (established in 2005) requires that monthly reports about the data collected on the requests made to 311 are issued. The law helps to ensure that performance data are available which lead to better-informed citizens and a more open government (New York City Global Partners 2011).

All customer correspondence is tracked by the Citywide Performance Reporting (CPR) application that is used to measure request volumes and performances via dashboards and reports (Department of Information Technology and Telecommunications 2015). Interviewees from New York explained that all data are published on their open data portal so that it can be used by everyone, e.g., to develop mobile apps or maps. In addition, in New York, the data are used by their business intelligence tool to make sure that it is of high quality and persuasive for performance management on the agencies.

Philly311 is part of the mayor's performance improvement program along with which the city executives meet regularly for performance management meetings, the so-called PhillyStat meetings (Nam and Pardo 2014). Furthermore, the data made available by 311 help in emergency situations, e.g., during Hurricane Sandy where all requests have been forwarded within a live feed (City of Philadelphia, n. d.). Interviewees from Philadelphia reported that the changes in the street department's route planning are good examples of how the data can help to improve their service. With the help of the data, they can see how many street lights are out and based on that they can prioritize the areas with the greatest need (Philly311 Contact Center, City of Philadelphia 2015, personal communication, 16 November). An interviewee from Philadelphia mentioned that the data help to detect problems according to specific areas, and all cities highlighted that they want to make sure that "the agencies are using the data to drive decisions, better decisions within their departments, so that they become more efficient and effective on what they are doing" (Philly311 Contact Center, City of Philadelphia 2015, personal communication, 16 November). The next step now is to think about how they can visualize these trends better, e.g., in due seasons, it could be helpful to publish flood destinations around that time according to the data. Thus, the data are used to detect trends, to operate better and, due to the open accessibility, many schools and researchers analyze and process them (Department of Innovation and Technology, City of Boston 2015, personal communication, 20 November).

To get a more detailed view on the development of service delivery in regard to the service requests that can be made via 311, the 311 open data of the City of New York and the City of Boston were analyzed in regard to closing dates of service requests. The City of Philadelphia did not provide those data and was therefore excluded from the following analysis.

Considering the time needed to solve the ten most frequently requested issues, as shown in Table 4, in most cases, there are no major differences in the number of days needed to solve a specific complaint between 2011 and 2015. Only pothole repairs and noise complaints decreased, whereas slightly more time was needed to repair street light outages in 2015. However, this is a positive result as the number of complaints increased.

In general, the analysis of the number of days which were needed to close a case in 2011 in comparison with 2015 for NYC311 shows that the average number of days needed to solve an issue is slightly decreasing. Six of the specific complaint types which show the highest differences between the numbers of days needed to close a case in 2011 and 2015 are addressed to street signs. Primarily, in regard

Table 4 Top ten requested service types in New York in FY 2015 with their number of complaints and days until closure in FY 2015 and FY 2011

General type	Description	Number of requests in 2011	Number of requests in 2015	Average number of days until closure in 2011	Average number of days until closure in 2015
Street condition	Pothole	56,090	78,869	11.2	4.8
Blocked driveway	No access	42,867	67,093	0.1	0.2
Street light condition	Street light out	53,537	56,382	9.3	10.8
Noise: commercial	Loud music/party	16,535	31,551	0.2	0.2
Noise: street/sidewalk	Loud music/party	8153	25,421	0.2	0.3
Noise	Noise: construction before/after hours	6892	24,967	8.8	5.6
Traffic signal condition	Controller	27,298	23,515	2.2	2.1
Blocked driveway	Partial access	11,151	22,133	0.1	0.2
Illegal parking	Posted parking sign violation	9188	21,835	0.1	0.1
Sanitation condition	Street condition/dump-out/drop-off	16,121	19,166	1.8	1.7

to street and highway conditions the interviewees mentioned that responsibilities are very different, for example, it depends on the specific location whether the city or the state is responsible as well as on the issue; sometimes, it can be necessary to transfer the case to another agency, e.g., the issue is not a pothole but a cave-in, which has to be repaired by another agency. Further problems can occur in regard to missing location information or time depending issues (Philly311 Contact Center, City of Philadelphia 2015, personal communication, 16 November). In the case of street signs, the Department of Transportation (n.d.) mentions on its Web site that they give higher priority to signs that directly impact safety, e.g., stop signs whereas the six cases mentioned above are less important in regard to safety. Indeed, the number of days needed to resolve the requests in regard to stop signs (two days faster) as well as speed limits (80 days faster) decreased from 2011 to 2015. In the City of Boston, the number of days needed to close a service request increased by about 47 days on average between 2011 and 2015, but the number of service requests did not increase per se, the differences depend on the service type. Some request types need more time, e.g., requests for snow plowing and graffiti removal

(31 days in 2015 toward 20 days in 2011) whereas others could be resolved faster, e.g., street light outages (23 days in 2015 toward 32 days in 2011).

Comparing specific service request types across the three cities is difficult because each categorizes their request types differently. For example, the City of Philadelphia and the City of Boston classify complaints in regard to graffiti removals into one or two categories whereas the City of New York differentiates graffiti complaints into eleven specific request types. Besides that, different terms are used, e.g., "rubbish collection" in Philadelphia and "litter" in New York. Furthermore, different goals are set. For example, a pothole should be closed within one business day in the City of Boston, within three business days in Philadelphia, and within 30 days in New York, whereas a street light outage is reported to be closed within ten business days in all three cities (Department of Innovation and Technology, City of Boston 2015, personal communication, 20 November; Shorris and Tarlow 2015). However, it has to be kept in mind that there are great differences between these cities. They are of different size what leads to differences in the number of people who are complaining as well as the service requests that have to be solved, but also departments' responsibilities and legislations are different. The City of New York, for example, had to pass a law in order to be able to remove graffiti after 35 days without a property owner's permission (Metro 2014).

Nevertheless, 311 provides quick and easy access to the city government and for a lot of people, it is the single point of access to their government as they only have to call 311 and then get the information they ask for or will be directed to the proper agency (NYC 311, City of New York 2015, personal communication, 13 November). People only want to get their "problems be solved and be heard by the city" (Mayor's Office of New Urban Mechanics, City of Boston 2015, personal communication, 20 November). That is what is made possible by 311 as well as it is key to civic participation. A study by Buell and Norton (2013) shows that people are more likely to support governmental programs and develop a more positive attitude towards government if they get a picture back which shows that their service request was fulfilled. "So to me that says that people want to have a little bit more of a human interaction with their city" (Mayor's Office of New Urban Mechanics, City of Boston 2015, personal communication, 20 November). Trust can be assumed to be an important factor for citizen participation in 311. People have to know that if they call 311 the issues that they reported will be handled in some sort of way and be taken seriously (NYC 311, City of New York 2015, personal communication, 13 November). To support that, each request gets a confirmation number which can be tracked. It is important that the city is open-minded and tries to stay up-to-date in terms of new technologies. For this purpose, hackathons and app competitions are mentioned to be helpful in order to come in contact with the civic technologist community and detect new ways of giving as many people access to city government and the services they need as possible (NYC 311, City of New York 2015, personal communication, 13 November).

Conclusion

All three cities developed comprehensive 311 systems that offer a number of communication channels. Social media and mobile apps, additional content, e.g., state and federally related information, as well as specific services, were added step by step in recent years. The most popular service requests are those that affect the citizens' daily life, e.g., street or building conditions. In addition, each city developed further programs, e.g., Philly Neighborhood Liaisons, and services, e.g., homeless assistance, or applications, e.g., Boston's City Worker app in order to address specific needs or problems which they noticed over the years.

Governments noticed that certain groups of citizens, e.g., the youth, civic technologists, and disadvantaged groups, need to be addressed differently nowadays. Therefore, a diverse number of communication channels is needed in order to engage them in governmental processes and issues. This finding is in line with the actual literature debate. Different groups of people in terms of, e.g., age, education, and income, prefer different communication channels (Reddick and Anthopoulos 2014). Therefore, all communication channels are of great importance, although they might only be used by a small number of people. Governments have to make sure that they reach all people living in a city regardless of channel preferences, skills, or living conditions. In particular, mobile technologies have the potential to overcome the digital divide as they are more affordable than wired networks. Mobile services make governments accessible anywhere and anytime and in addition allow for "more accurate data collection, better decision-making, and reduced operational costs" (Sharma and Gupta 2004, p. 466). It has the potential to speed up processes since data can be gathered in real time, duplicates can be avoided, and photographs can be captured quickly to document processes. However, that greater accessibility and channel choice might also lead to many more challenges and costs for local governments that will not be affordable by smaller cities. The multi-channel systems not only evoke greater maintenance costs but it also requires more flexibility in serving citizens equally in much more ways than governments were used to before. In addition, the easier ways of access led to greater numbers of requests which will probably increase even more in future, but citizens will not lower their expectations in terms of an acceptable timeframe to solve an issue. Furthermore, besides service provision, also the analyses of data that are mandatory in order to improve performances and decision-making processes require additional effort that cannot be accomplished by all cities. To solve these problems, the Mayor's Office of New Urban Mechanics in Boston developed a national version of their former 311 app named Commonwealth Connect, which allows citizens across Massachusetts to report issues to their government (New Urban Mechanics 2016).

Summarizing, 311 can be expected to have a very positive impact on citizens' perception of governmental services as agencies now have the opportunity to put the citizen and their satisfaction as well as the quality of life in citizens' neighborhoods at the heart of governmental service provision. On top of that, agencies

work more effectively and efficiently as 311 also allows them to analyze their service outcomes and customer satisfaction and thus agencies steadily know about their performances and are encouraged to improve them continuously. Although not yet great changes in service provision became apparent, even so, that can be highlighted as positive results due to the strong increases in the number of service requests.

This study underlines that the use of 311 data has helped to make governmental processes more transparent and efficient. A large amount of data about civic and neighborhood life issues that are collected by 311 allow for new opportunities in the provision of governmental information and services. For example, the data are used to restructure routes of servicing departments and prioritize areas with a greater demand for governmental service delivery. Besides that, it could be used to send out alerts or push news that might be of interest for citizens in regard to a specific area and, consequently, 311 could become more proactive and arrange for higher safety and comfort levels as well as detect problematic areas before they actually become an issue. This requires that the data are indeed representative for the majority of citizens. Otherwise, data-driven decision-makings and service improvements could lead to greater distrust and dissatisfaction. Nevertheless, the system supports bureaucratic administrations as it helps to optimize information flows, simplifies decision-makings, and speeds up processes based on citizens' needs instead of bureaucrats' and still offers many opportunities for advancements.

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Appendix

311 Web self-service portals

www.nyc.gov/311
www.phila.gov/311
www.cityofboston.gov/311

311 mobile apps

https://itunes.apple.com/us/app/nyc-311/id324897619?mt=8
https://itunes.apple.com/us/app/philly-311/id533292779?mt=8
https://itunes.apple.com/us/app/bos-311/id330894558?mt=8

311 Twitter channels

www.twitter.com/nyc311
www.twitter.com/philly311
www.twitter.com/bos311

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