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Smarter CRM from a Customer Service Perspective: A Process Evaluation on the City of San José's My San Jose Smartphone Application for City Services

Roxanna Moradi
San Jose State University

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My San Jose Smartphone Application for City Services

by

Roxanna Moradi

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BACKGROUND

The City of San José (CSJ) has a brief history of deploying "Smart City" strategies that use smart phone applications (apps) to gather user data reports of various requests for city services, based on city priorities. Attention and resources have been allocated to advance the San José Smart City Vision, which was formally announced by Mayor Sam Liccardo at his State of the City Address in March 2016, and it aims to make San José the most innovative city in the country by 2020 (Liccardo, 2016). Mayor Liccardo has defined a "Smart City" on the initiative's website as one that uses "game-changing technologies and data-driven decision-making [to] drive continuous improvement in how City Hall services [its] community, and to promote concrete benefits in safety, sustainability, economic opportunity, and quality of life for [its] constituents" (Liccardo, 2017a). The main pillars of the initiative are focused on San José being a safe, inclusive, user-friendly, sustainable, and demonstration city (Liccardo, 2016).

A focus on implementing a mobile app for non-emergency city services has been highlighted in audit reports and the Mayor's March Budget Message of 2017, in which Mayor Liccardo announced the Beautify San José (BeautifySJ) initiative. The initiative aims to engage residents to help clean the city supported by the mobile application, My San Jose (Liccardo, 2017b; BeautifySJ, 2017). In July 2017, the City deployed the My San Jose website and smartphone application (City of San José, 2017). The My San Jose website and app allow users to report service requests for six categories: 1) vehicle abatement, 2) graffiti, 3) illegal dumping, 4) potholes, 5) streetlight outages, and 6) general requests (My San Jose, 2017). However, the policy to extract service requests from the public and automatically integrate them into the internal workflow management systems is newer to CSJ, and it has been stewarded by the Office of Civic Innovation and the Information Technology (IT) Department.

My San Jose was not designed to measure performance, but that is the next step in the larger model of an interconnected, smart city, according to a representative from Department Z ($R_{z1,}$ personal communication, November 16, 2017). Because the city services that My San Jose currently highlights were developed as part of district participatory budgeting sessions, the app was intended to be a central platform to capture those requests. Smart cities can have different meanings for different cities. In a report on medium-sized European cities and their development, a city that was "smart" had six main characteristics: smart economy, smart people, smart governance, smart mobility, smart environment, and smart living (Giffinger et. al, 2007). Implementing a mobile application for city service requests does not fulfill the smart city vision as defined by Giffinger et al. (2007) alone, but it does increase CSJ's likelihood of becoming one. My San Jose includes a Frequently Asked Questions (FAQs) page and a My Home Service page, which provides information to residents pertinent to their location, such as street sweeping times, parking restrictions, and residential waste collection. This research paper investigates the service request process.

This research paper provides background on the City of San José's smart phone application history and reviews other similar municipal smart phone applications. It also analyzes current literature on implementations of non-emergency service communications and service requests (311). Primarily, this research paper investigates whether the functioning of the My San Jose smartphone application and website platforms are meeting the intended goal of improving the customer experience for city services.

This paper analyzes My San Jose raw service request data to review performance. In addition, this paper analyzes qualitative information gathered from semi-structured interviews of

CSJ employees to shed additional insight into the processes in place to fulfill these service requests from start to finish.

City of San José Apps

San José's first mobile app, Mobile City Hall, went live on December 12, 2009 during 'Download Day' sponsored by Councilmember Pete Constant of District 1 and was serviced by a vendor, CitySourced (Mercury News, 2009). Like My San Jose, Mobile City Hall was free, and it also enabled users to report potholes, graffiti, abandoned vehicles, street light repairs, and other maintenance or blight issues. According to CitySourced spokesman, David Kralik, Mobile City Hall was the first of its kind in the Bay Area (Mercury News, 2009). The main flaw was that the app was sponsored, or managed, by one council district rather than the administration, as a separate tool that was not integrated with the CSJ's Customer Contact Center nor work order systems. My San Jose addresses this flaw by integrating service requests with internal work order systems and processes. Mobile City Hall logged 1,300 complaints or service requests from all districts (Office of the City Auditor, p.18, 2014). Paradoxically, the City of San José City Auditor's (2014) audit recommendation did not prescribe an assessment.

The first CSJ administration-run app was San Jose Clean (SJClean), which was publicly launched in January 2012 and was a reporting tool for graffiti (Edmond-Mares, 2012). Its data was maintained by a separate vendor, Graffiti Protective Coatings, Inc. (GPC), who received over 9,000 complaints or 75 percent of total graffiti complaints between July and December 2013 (Office of the City Auditor, 2014). Anti-graffiti also became "a component of the Mayor's Gang Prevention Task Force (MGPTF) to maximize community engagement efforts" (Rufino, 2017, p. 2). The graffiti abatement program removes "an average of approximately 2,000,000 square feet of graffiti each year, over the past six years" (Rufino, 2017, p.2). The cost to remove

graffiti for 2016-2017 was $0.44 per square foot, with an overall program cost of $1.78 million, of which $907,357 was allocated for GPC's contractual costs (Rufino, 2017). Gang graffiti, which is prioritized for removal, increased by 16 percent (from 523,080 to 607,532 square feet) from 2015-2016 to 2016-2017 (Rufino, 2017). A separate contractor, Groundwerx, who provides services for the downtown area, removed more than 10,000 tags (Rufino, 2017).

SJClean is reportedly planned to be phased out in 2017-2018, but the coexistence of SJClean and My San Jose to report graffiti does not affect the graffiti abatement program's services and customer service (Rufino, 2017). Of total graffiti complaints received, 85% are reported via the two apps, while the remainder are reported via a 24-hour hotline or email (Rufino, 2017). Furthermore, 94% of San Jose residents provided a rating of graffiti removal services as "good or better" (Rufino, 2017, p. 5). These ratings parallel the City's efficiencies and effectiveness that have allowed it to move from a restoration model to a maintenance model with improved coordination with out-of-jurisdiction partners, such as Caltrans and the Santa Clara Valley Water District (Rufino, 2017). In addition, the graffiti program has a clear vision of the outstanding problems and solutions to address. For example, there has been an increasing occurrence of graffiti on private property; however, tags on private property can be mitigated by educating private property owners and businesses and by establishing closer coordination with them (Rufino, 2017).

Customer Contact Center Audit Recommendations

The City of San José's Customer Contact Center is a call center within the IT Department. It is staffed "during regular business hours and has an answering service [to] respond to resident questions after hours" (Office of the City Auditor, 2017, p. 85). The Customer Contact Center program has 13 authorized positions for 2017-2018 (City of San José,

2017a). The purpose is to receive calls from the public and either take appropriate action to resolve the caller's issue or route the caller to the appropriate department that can. Calls for service requests from the public are entered in the website form related to My San Jose to integrate the request with work order systems. The Customer Contact Center's customer complaint resolution performance was and continues to be highlighted by the administration, particularly the City Auditor. The 2014 audit recommended improved resident access to city services, including technological modernizations (Office of the City Auditor, 2014). Additionally, the audit called for a new Customer Relations Management (CRM)/Service Request Management (SRM) system to be integrated into the internal workflow to streamline and enhance communications for public service requests (Office of the City Auditor, 2014). Notably, "the more self-service options residents use, the fewer phone calls staff has to answer" (Office of the City Auditor, 2014, p. 17), which highlights a cost-benefit metric to evaluate. This audit encouraged the development of a centralized smartphone application effort. Out of the 13 audit recommendations, seven were in progress as of August 9, 2017 (Lloyd, 2017). A table of all the Customer Contact Center audit recommendations and statuses is in Appendix A. Items 2 and 12 are directly related to this research.

Table 1. *2014 Customer Contact Center Audit Findings*

2014 Audit Recommendations*		Closed	In Progress
#2	To improve access to City services and to reduce the City's telephone call handling costs, the Administration should develop a coordinated strategy to: a) Offer new self-service options for the City's most frequently used services by phone, online, and/or by mobile app; and b) Establish utilization targets for new and existing self-service options and advertise them accordingly.		X
#12	The IT Department should work with other departments to set up automated data transfer between online service requests (web forms and mobile apps) and existing departmental work order systems. In addition, the Administration should review whether different service request systems could benefit from integration and CRM implementation.		X

Source: Office of the City Auditor, 2014.

In 2009-2010, the same fiscal year in which Mobile City Hall was implemented, the 2009-2010 Adopted Operating Budget included indications that the Customer Contact Center was underperforming during the economic downturn because of an "increase in call volume and complexity due to increased lien activity, as well as questions related to water drought letters…" (City of San José, 2009, p.452). In addition, the IT Department had 2 positions eliminated with a direct impact on the Customer Contact Center (City of San José, 2009). The 2009-2010 budget also revised and added new performance measures to the Customer Contact Center, such as the "% of customers rating customer support as good or excellent" on response and satisfaction (City of San José, 2009, p.448), with targets of 80%, "% of Customer Contact Center Calls answered" (City of San José, 2009, p. 453) with a target of 75%, and "Average Wait Time" (City of San José, 2009, p. 453) with a target of less than six minutes.

In a more recent report, CSJ's Customer Contact Center continues to be a critical method to obtain city information or request city services, and it received 168,000 customer calls in 2016-2017 (Office of the City Auditor, 2017). The following metrics were reported for 2016-

2017: average wait time was 2.22 minutes (goal: under 3 minutes), 59 percent of calls received were answered (goal: 80 percent), and 32.5 percent were self-service calls or were after-hours calls serviced by a separate vendor (Office of the City Auditor, 2017). Although these metrics do not differentiate between the type of customer requesting service (i.e. residents vs. businesses vs. employees), they provide a platform for customer service analysis. The 2016-2017 average wait time has been the lowest since 2009-2010 (Office of the City Auditor, 2017), when the performance measure was created. Notably, the 2016-2017 Report of City Services did not provide metrics as they related to the My San Jose app, but it did include information about its deployment as part of the Information Technology Department's strategic plan and a short description of the app: "My San Jose allows residents to request City Services through the application or website. Many requests feed directly into the relevant department work order systems. Residents can file and track their service requests through this application" (Office of the City Auditor, p. 85, 2017).

About My San Jose

Since the 2014 audit, the IT Department began the process to establish a new CRM/SRM tool to act on the audit's 12th recommendation noted above:

> The IT Department should work with other departments to set up automated data transfer between online service requests (web forms and mobile apps) and existing departmental work order systems. In addition, the Administration should review whether different service request systems could benefit from integration and CRM implementation (Office of the City Auditor, 2014, p. 67).

In 2015-2016, the IT Department was appropriated funding to initiate a procurement of the CRM/SRM, and the IT Department coordinated with internal partners (Mayor, Council, partner departments) to identify requirements for the Request for Proposal (RFP) (Cooper, 2016). In November 2015, a Request for Proposals (RFP) was issued with the following requirements:

- Utilization of a mobile application to take pictures, geo-tag and submit service requests to the City with a time and date stamp
- Dynamic City to resident communications including texting, chat capability and social media streams including Facebook and Twitter
- Mapping capabilities to display City service requests within a particular geography, neighborhood or district
- 24x7 access to service request status and information
- Enhanced public communications by service type, district or individual topics of interest such as illegal dumping
- Tracking of constituent concerns regarding issues important to communities
- Automatic routing of work orders based on user-selected criteria in web or mobile applications
- Comprehensive, centralized database, user-friendly application (Cooper, 2016, p. 2).

By June 2016, the audit findings to offer new self-service options, including those through a mobile app, were partially implemented as the City was in the process of securing a vendor for the platform (Office of the City Auditor, 2016a). A second audit finding regarding managing Customer Contact Center performance using service delivery statistics was also partially implemented (Office of the City Auditor, 68, 2016). In August 2016, the City Council directed the administration to reissue the RFP and to return to the City Council with the recommended vendor by the first quarter of 2017. In November 2016, the City Council authorized a contractual negotiation, with AST using Oracle software, with a total five-year contractual cost not to exceed $1,021,073 (Cooper & Lloyd 2016; City of San José 2016c).

In December 2016, a third audit was published regarding City mobile devices, with Finding 5 relating to the need for strategic deployments of smartphone applications. Multiple departments were in the process of implementing mobile apps and faced challenges with strategic development and deployment due to a lack of technical expertise and experience. Additionally, as a best practice, it was noted that CSJ and the IT Department should create a comprehensive strategy for deployment instead of implementing autonomous initiatives (Office

of the City Auditor, 2016b). The Office of Civic Innovation (OCI) within the City Manager's Office, created in August 2016, was directed to continue stewarding and supporting innovation products (Office of the City Auditor, 57, 2016b). OCI played an integral part in coordinating with the relevant departments in the process implementation. Notably, the department has since been renamed to the Office of Civic Innovation and Digital Strategy.

The application and website of My San Jose allows users to indicate which type of service they are requesting: graffiti, streetlight, pothole, illegal dumping, vehicle abatement, or a general request. Then, users may add a photo, a location pin which logs longitude and latitude, and a description. General requests are manually reviewed by the City's Customer Contact Center employees who route the request in My San Jose or escalate the request by whichever means necessary. Service requests, other than general requests, are automatically routed to the relevant department, and it is at this point that IT involvement in the service request process ceases (R_{Z2}, personal communication, November 16, 2017). In other words, IT does not administer work orders, rather, the Salesforce platform routes the service request automatically and assigns a work order in the relevant departments' work management systems, such as DOT, Environmental Services, or Parks, Recreation and Neighborhood Services (PRNS). This study will further investigate how each department administers its work orders from My San Jose.

Once a work order is created, the department may send a field worker or contractor out to complete the service request, and he or she is also responsible for closing the ticket. An example of an easier service to complete is graffiti removal, for multiple reasons. The graffiti removal program has experience in implementing smartphone applications and partnering with contractors, as seen with SJClean. In fact, the program also has GPC as its long-standing

contractor, who has as proven history of meeting performance targets as stated above. The legacy graffiti reporting application also requires a photo to complete a graffiti removal request.

On the other hand, reports of abandoned vehicles are more complex to resolve. The definition of an abandoned vehicle is as follows: "It is illegal to leave a vehicle parked for more than 72 consecutive hours on a public street without it being driven at least 1/10th of a mile" (City of San José, 2017b). This policy is the same for surrounding cities, including Santa Clara and Sunnyvale, as well as other large cities in the state, including San Diego and Los Angeles (City of Santa Clara, 2017; City of Sunnyvale, 2017; City of San Diego, 2017b; City of Los Angeles, 2016). The Department of Motor Vehicles (DMV) does not set forth any specific requirements regarding time parked on a public street; instead, such authority is delegated to cities (DMV, 2007). According to the CSJ Vehicle Abatement website, a warning notice typically is left on vehicles before action is taken (City of San José, 2017b). Additionally, when the city determines to tow the abandoned car, the tow company may arrive to find the car already removed, leaving them with no way to get compensation for their time, causing contractual issues as this occurrence becomes more common (R_{z1}, personal communication, November 16, 2017).

Another issue that causes complexity in the closure of service requests is jurisdictional issues. For example, graffiti may be on a utility box, but CSJ cannot remove the graffiti as the box is not city property. CSJ is in the process of drafting communication protocols for staff who interact with the My San Jose platform to improve responses (Lloyd & Lam, 2017).

After one month of implementation, usability metrics started to be recorded. In a presentation to the Smart Cities and Community Service Improvements Committee on September 7, 2017 (Appendix B), Lloyd & Lam presented the following findings:

- As of August 31, 2017, there were 10,340 app downloads
- As of September 1, 2017, there were 400 active users each day and nearly 7,000 'active sessions,' which is defined as users having My San Jose open for 2 seconds or longer.
- Most user ratings on app reviews were 5 out of 5 or a 1 out of 5. Improvements could be made on account, GPS, and photo aspects, while the user interface was rated well.
- Most General Requests from My San Jose were related to homeless issues, abandoned vehicles, parking, and dumping.
- General Requests that were input on the My San Jose website by the Customer Contact Center were related to garbage, water, and utility services.

Comparison Platforms – Seattle, San Diego

Acknowledging a customer's or resident's preferred communication method is not new to cities in their communication of service deliveries. Seattle's mobile app - Find It, Fix It - is one of the older administration-run smartphone applications and platforms. It was deployed in August 2013 (Cook, 2013). The app looks very similar to My San Jose and allows users to add photos to their request. Also, like My San Jose, all requests feed Seattle's Constituent Relationship Management system, while department employees are responsible for managing them (Cook, 2013). Today, all requests also feed the Customer Service Bureau website, which acts as the Constituent Relationship Management System (City of Seattle Customer Service Bureau, 2017).

The website features a powerful platform, featuring a status search for a request, and performance measure dashboards that are more focused on completion rates rather than volume. Additionally, the Seattle Department of Transportation's pothole website clearly states the pothole fill goal rate of three business days, right below the links to the Find It, Fix It app and online form, and details about actual performance are listed in the tab "Projects and Programs", which also boasts a 98% performance rate for September 2017, as well as the quantities (Seattle

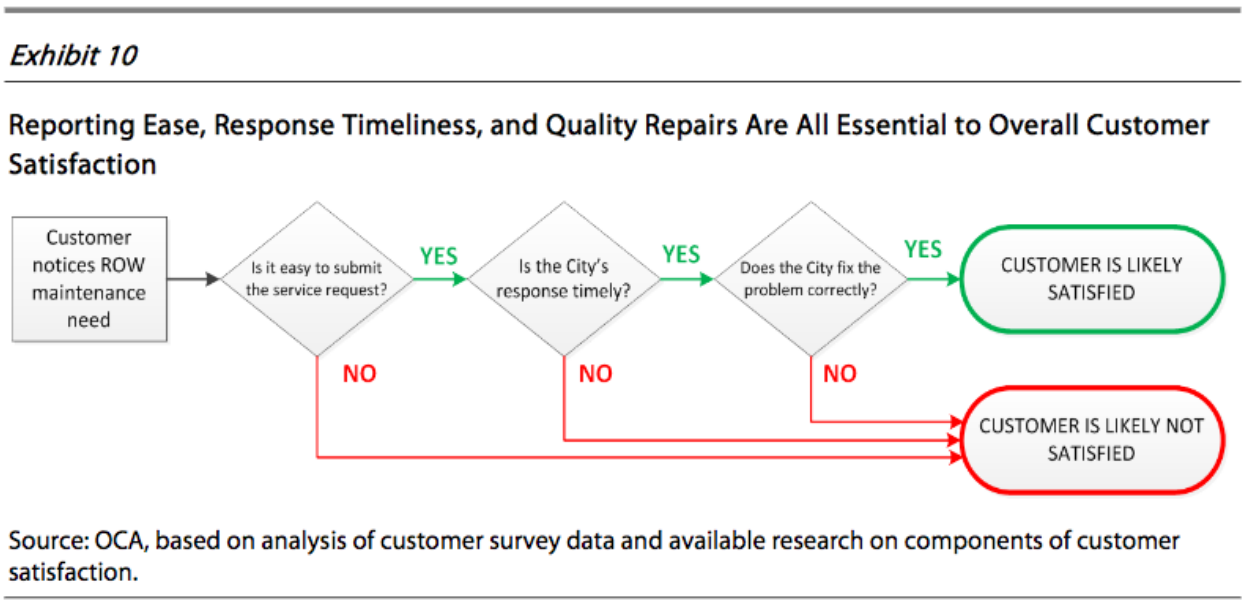
Department of Transportation, 2017). The website to request services also appears to be powered by Motorola Solutions, Inc.

Not only has the City of Seattle shown its responsiveness to its constituents by clearly stating performance goals and meeting those goals, but it also began an initiative called, "Find It, Fix It walks" in 2014 as an outreach and engagement effort (Seattle Department of Neighborhoods, 2017). Despite its launch, neighborhood grievances persisted; subsequently, the mayor brought city hall to the constituents and launched neighborhood walks, during which he walked around the city with additional city employees, interacting with residents, who may voice their concerns, and city representatives may respond (Macz, 2017). The app was updated in June 2017 to send the requestor a status update when the request is received, inspected, and resolved, according to the manager of the illegal dumping and graffiti program (Macz, 2017). The manager also stated that illegal dumping now takes an average of five to 10 days to respond to, compared to the 21 to 28 day timeline at the peak of illegal dumping (Macz, 2017). With continued use and refinement of the app, outreach walks and activities, and a committed team, Seattle has been able to better serve its community.

San Diego's city service app, Get It Done, provides similar access to residents and customers to request services. Like My San Jose, Get It Done also emerged from an audit in 2015, with a focus on right-of-way maintenance (ROW) assets such as "streets, sidewalks, alleys, street and traffic lights" and acknowledged that the City relies on its residents to report ROW issues "such as potholes, illegal dumping, and damaged sidewalks" (Office of the City Auditor, 2015, p. 1). Unlike CSJ's audit, San Diego's Auditor Report included a satisfaction rate of 63% from a survey of 677 residents who submitted ROW requests from September 1, 2014 to November 21, 2014 (Office of the City Auditor, 2015). The logic model behind the customer

satisfaction survey, according to the City of San Diego Office of the City Auditor, is included below in Figure 1 (Office of the City Auditor, 2015, p. 19). While San Diego had four different departments that could receive ROW requests rather than a central customer service center prior to deploying Get It Done (Office of the City Auditor, 2015, p. 20), CSJ already used a central Customer Contact Center.

Figure 1. *San Diego's Customer Service Evaluation Model*



Source: Office of the City Auditor, 2015

San Diego's audit report also acknowledged potential equity and access issues. According to the survey results, 36% of the survey population reported a ROW request once a year, 43% indicated that it was their first-time reporting, 18% indicated that they reported once a month, and 3% indicated that they reported once a week (Office of the City Auditor, 2015, Exhibit 12, p. 22). While the San Diego audit served as a justification to implement a central customer service center and smartphone application, San Diego had already highlighted key issues relevant to this study: equity and access, customer satisfaction, response times, and request resolution. Equity and access issues will be further explored within the literature review.

In the case of the City of San Diego, there was a soft-launch just three months after the audit report was published, and a full deployment of the app, Get It Done, occurred in fall 2016 (Performance & Analytics Department, 2017). Soon after the deployment, negative press cited closed tickets despite unresolved service requests, unfulfilled promises of analytics, location issues, and other communications issues – both from the app and the administration (Graham, 2016). Since then, additional staff were added to the project and a staff report was more recently made available in October 2017 which sought to expand the scope of Get It Done using Deloitte Consulting LLP at a cost not to exceed $2,350,000 (Performance & Analytics Department, 2017). Notably, this expansion includes an interconnected storm water code enforcement database (Performance & Analytics Department, 2017), which currently exceeds the scope of San José's recent efforts.

The staff report notes that the expansion will use a two-pronged approach to assign requests – they will either be administered by the CRM platform as an intake process and worker order assignment process; or the request will be connected to existing systems, which will then assign work orders, such as San Diego's Infrastructure Asset Management system (Performance & Analytics Department, 2017). The staff report also notes that the customer satisfaction element of the project is even more pronounced in this expansion, and it will include more user testing as well as customer feedback (Performance & Analytics Department, 2017).

Despite the emphasis on customer satisfaction, currently there is no formal performance measure for response times; instead, there are custom reports from multiple departments. Completion time for some services, such as potholes (target days to fill is ten days) and streetlight repair (target days to repair is 15 days) are available in the Key Performance Section

of the annual budget, particularly for the Department of Transportation and Stormwater (City of San Diego, 2017).

Pothole repairs in San Diego had been the responsibility of various departments, but the time to fill a pothole was a constant metric since 2009 “as an assessment of pothole operations service delivery” (Office of the Auditor, 2013, p. 5). Pothole repair requests could be sent to the City of San Diego’s Streets Division by way of “email, telephone, or through a mobile application” (Office of the City Auditor, 2013, p. 5) in addition to those that are identified by street crews, which are all similar ways to communicate potholes to the City of San José.

Providing excellent customer service has and will continue to be a main goal for cities, especially Smart Cities. This goal is supported by the following pillars that the mayor of San Jose has set forth in the Smart City Vision: the history of the City of San José’s attention to customer service at its Customer Contact Center in budgets and audit reports, the initiative of District 1 to sponsor its own app to receive requests, as well as the efforts of other cities to launch service request apps. Although My San Jose is still in its initial stage and will likely evolve in years to come, the assessment of its success along the path of helping the city become Smart, or Smarter, will continue to be based on the foundations of customer service and resulting effective response.

LITERATURE REVIEW

Overview of Bureaucracies, Organizational Structure, and Technological Innovation

In the early 1900s, "reformers were concerned with transforming local governments into 'businesslike' organizations in which services could be effectively provided without favouritism" (Shachar, 1996, p.3). This is confirmed by Tolbert & Zucker (1983), who reviewed the history of the civil service reform from 1880 to 1935 in American public organizations during the Progressive Movement. The transformation to a business-like approach was also influenced by the civil service system for the federal government that was created by the Pendleton Act of 1882 (Tolbert & Zucker, 1983). They found that only three states had governance regulations that affected local governments' organization, so corruption persisted (Tolbert & Zucker, 1983). The civil service reforms at the local level, therefore, could be interpreted as an effort to legitimize local government "to change the concept of the city from that of a political body to that of a business corporation" that holds the city government accountable to taxpayers (Tolbert & Zucker, 1983, p.23). Furthermore, Shachar (1996) studied authoritative structures and political behaviors and how they influence information technology (IT) modernization in cities. Larger cities in Western Canada were surveyed and statistically analyzed with various assigned categories of government structures. One of the findings stated that with a more unified authoritative structure, such as a political body and an administration, innovation is more likely to produce IT reforms that support the goals of the organization (Shachar, 1996). The pitfall with this study is that it focused only on behavior; actual performance was not assessed.

Though not directly related to municipal mobile application deployment, Tolbert & Zucker made an important finding about civil service reform adoption that may be applicable to the further success and pervasiveness of mobile apps.

> "The legitimacy of procedures themselves serve as an impetus for the later adopters… as an increasing number of organizations adopt a program or policy, it becomes progressively institutionalized, or widely understood to be a necessary component of rationalized organizational structure" (1983, p. 35).

Codifying procedures can provide legitimacy to programs, staff, administrators, political bodies (such as city councils), and ultimately, the public. As My San Jose evolves, so will the procedures, and the methods of creating and disseminating them.

The correlation between the council-manager form of municipal government and general IT reforms has also been proven for more specific IT reforms, such as any online or smartphone app. For e-services, positive functional perceptions are correlated with performance improvements; however, there can be a negative relationship between an administration's perception of e-democracy and practice of e-services (Carrizales, 2008). The city administration may look to IT to increase efficiencies but not necessarily improve democratic processes, primarily due to an unfamiliarity with the function of the platform (Carrizales, 2008). CSJ also uses this model of IT implementation and has a council-manager form of government, as stated in its Charter (City of San José, 2016). "Smart Governance Systems" is one term to call the new age of governance emerging out of the New Public Management paradigm (Johnston & Hansen 2011).

Nearly 20 years ago, Layne & Lee (2001) created a model of IT integration in the public sector, which included four progressions of growth, with the perspective of the citizen or user as the customer with growing demands. They claim that the stages are the following, from least to most e-government integration: cataloguing, transaction, vertical integration, and horizontal integration (2001). The main goal of cataloguing is simply to "[catalogue] government

information and [present] it on the web" (Layne & Lee, 2001, p. 125). The next stage permits "citizens to transact with government electronically" by allowing users to "…renew their licenses and pay fines on-line" (Layne & Lee, 2001, p. 125). Layne & Lee mention that "in ideal cases, web transactions should be posted directly to the internally functioning government systems, with minimal interaction with government staff" (2001, p. 125).

What has been more recently discussed are the next two stages—vertical and horizontal integration. In fact, many models have been developed since Layne & Lee's 2001 publication, all with different augmentations, and usually expansions, of the last two stages (You, Motta, Lio, & Ma, 2016). You, Motta, Lio, & Ma (2016) claim that all these models, including Layne & Lee's foundational model, lack 1) analytical functions in assessing service fulfillment, and 2) an appropriate data scope which captures 'heterogeneous data', which includes structured, semi-structured, and unstructured data. Structured data is "predefined metadata" that is "widely supported by Business Intelligence (BI) systems" (You, Motta, Lio, & Ma, 2016, p. 53:6) with Key Performance Indicators being a prime example (2016). Their solution is City Feed, which is a "city service maturity framework [that] measures the level of service support, and information integration" as part of a pilot to manage city issues that are citizen-sourced, unlike many of its peer platforms that are not integrated with government workflow (You, Motta, Lio, & Ma, 2016, 53:4). You, Motta, Lio, & Ma (2016) established five levels of service support (publishing, transacting, interacting, collaborating, and evaluating) along with the relational and heterogeneous integration stated previously.

Notably, the City Feed platform includes some features that are unique and smart. As shown in screen shots of their internal system/CRM, there is an option that would allow a manager to modify the ticket if needed (You, Motta, Lio, & Ma, 2016, p. 53:15). Puzzlingly, the

researchers provided an access limitation on the modification feature – for example, a contractor or staff member would not have the access to modify the ticket. Another smart feature is the feed analysis that can detect duplicate service requests by using three types of analysis—geo-location, text semantic, and image similarity, all of which enhance performance (You, Motta, Lio, & Ma, 2016). When the status of a ticket is updated and communicated back with users automatically, costs are usually lowered while customer satisfaction is usually increased (You, Motta, Lio, & Ma, 2016). City Feed can continuously analyze the process of issue management, including how it can enhance the citizen-sourced data itself by running a BI decision tool (You, Motta, Lio, & Ma, 2016). Lastly, the data collected is assumed to be shareable for update streaming, as well as data as a service (DaaS) to organizations outside the city, who may be able to leverage the data to offer relevant services that the government cannot (You, Motta, Lio, & Ma, 2016). These concepts are relevant to the challenges My San Jose is facing, which are discussed further in the Findings and Analysis.

Organizational Implications and Challenges

A relevant topic in organizational theory is innovation and change. Daft (2016) defines organizational innovation as "the adoption of an idea or behavior that is new to the organization's industry, market, or general environment" (p. 425), and technological innovations as "changes in an organization's production process, including its knowledge and skill base, that enable distinctive competence" (p. 425). By applying these definitions, cities that implement 311 technology and mobile apps for service requests can be expected to refine workflows and improve service by increasing competence. Technological changes are just part of an interdependent system of other types of changes, such as strategy and structure, products and services, and culture (Daft, 2016). Therefore, technological change does not emerge in a vacuum.

Daft also claims that "strategy, structure, and system changes are usually top-down—that is, mandated by top management—whereas product and technology changes often come from the bottom up" (p. 426, 2016). As explained in the literature, a political body or leader creates a strategic goal, and other employees that are part of the administration create or identify the technological solution. By using the 'bottom up' approach, Google "intentionally puts out imperfect or unfinished products to test the response and get ideas of how to perfect them" (Daft, 2016, p. 431).

Changing technology and workflow, however, has implications on an organization's strategy and structure, products and services, and even its culture (Daft, 2016). According to Nam & Pardo (2013), CRM technology has amended the definition of 311. They claim that "unless it is built on constituent-focused processes and staff behaviors, it is not CRM" (p. 1953). Based on their revised definition, 311 no longer exclusively refers to public-safety non-emergency issues. Philadelphia's 311 project staffing included a strong manager, team, staff from other departments, as well as temporary staff (Nam & Pardo, 2013). Philadelphia instituted a decentralized approach to its 311-call center by implementing service level agreements as they pertained to the 311 services, thereby creating a separate department altogether, called Philly 311 (Nam & Pardo, 2013). The benefits to this approach included a coordination authority that also worked with interdepartmental teams (Nam & Pardo, 2013). However, this new department was not viewed favorably by the departments, as they saw it as a threat to their own relationships with residents and towards their job security (Nam & Pardo, 2013). Moreover, "City Council considered a 311 system as competitive about constituent services and thus a possible threat of their reelection because they thought 311 is taking their job" (Nam & Pardo, 2013, p. 1959).

CSJ has not implemented My San Jose using this approach, which is further explained in the Analysis. Instead, My San Jose was led by the Mayor, stewarded by the City Manager's Office, and all departments are responsible for completing work and managing their service levels. My San Jose is a non-emergency 311 tool that is "…transforming service delivery, enhancing citizen services, and enabling data-driven decision-making" to make progress towards the larger Smart City Vision, according to CIO Rob Lloyd on Oracle's Customer Success webpage (2017). CSJ's Customer Contact Center and My San Jose are separate from CSJ's 311 telephone system that began in 1997 as California's first 311 pilot program (Office of Community Oriented Policing Services, 2003). The 311 telephone system is operated by CSJ's police operators to quickly connect residents to appropriate staff members, and one of the telephone number options provides callers with a direct transfer to the City's Customer Contact Center for non-emergency, non-public safety inquiries or requests. According to the 2017-2018 Adopted Operating Budget, the estimated number of calls received in 2016-2017 by the Police Department was 381,196 (City of San José, 2017c). Understanding any type of 311 implementation involves technology, organization, and cross-organizational factors (Nam & Pardo, 2013).

In terms of products and services and strategically changing them, the service delivery model also must change. Linders, Liao, & Wang (2015) prescribe an extremist customer-centric approach in their model for Taiwan, although it could be interpreted as invasive and would likely have privacy concerns:

> "In this vision, Taiwan aims to flip the service delivery model by shifting from the 'pull' approach of traditional e-government—whereby the citizens must first know, decide, and seek out government services—towards a 'push' model, whereby government proactively

> and seamlessly delivers just-in-time information and services to citizens, based on their needs, circumstance, personal preference, life events, and location" (Linders, Liao, & Wang, 2015, p.2).

There may be a compromise between the pull-to-push strategy prescribed by Linders, Liao, & Wang (2015) and the heterogenous data prescribed by You, Motta, Lio, & Ma (2016) to provide more intentional solutions for short-term issues, long-term plans, operational needs, and customer needs.

Integration of Workflow Management

Municipal smartphone apps and platforms have been deployed for over a decade, and there are some critical lessons from which San José and other cities can benefit going forward. Prior to the launch of apps and web platforms, cities have been completing work orders as part of their normal business operations and service needs, and integrated them with the first generation of 311 centers, which were call centers.

In the cases of Philadelphia and New York City, which launched 311 call centers in 2008 and 2003, respectively, there was a strong mayor to communicate a clear vision or goal to steer the administration to implement the technological solution in a year or less, and to steer the council in providing the financial resources (Nam & Pardo, 2013). Both cities did not buy into new back-end systems (work order systems) due to time and financial constraints (Nam & Pardo, 2013). However, New York City implemented a new CRM, which then integrated with some department legacy systems (Nam & Pardo, 2013); this is a similar approach that San José used between department systems due to budget constraints, which constrained its ability to be a complete 311 system (Nam & Pardo, 2013). With quick patching to meet launch goals and limited funding, "…it was also a barrier to the progress toward the next maturity phase, which

requires substantial improvements in CRM and other technologies" (Nam & Pardo, 2013, p. 1958-59). Philadelphia used a "launch-then-fix approach" with its 311-call center (Nam & Pardo, 2013, p.1958). Continued operability is a concern whenever there are multiple patches that need continued improvements (Nam & Pardo, 2013). Patchwork solutions are, therefore, partially used to meet aggressive timelines.

While this approach requires an active learning role by all those involved with the implementation, it may also speak to other organizational development topics. Some integration projects may require "…internal committees to assess user demands and user interfaces in current systems", as well as privacy and budget concerns (Layne & Lee, 2001, p.129). Cities that undergo such projects have what Walravens & Ballon (2011) claim to be a System Integratory City Platform typology, which use a "somewhat more closed approach" (p.66) and can be expensive.

A more specific process example is illustrated with You, Motta, Lio, & Ma's (2016) City Feed. Specifically, they used a process analysis and design that sought widespread feedback and input, including mayoral staff, and obtained their feedback either through interviews or surveys (You, Motta, Lio, & Ma, 2016). They then analyzed what the current process is against what it should be, followed by a user requirement analysis using both an "assembly-line analysis" and a "top-down approach". This was followed by a system design that included four tasks: 1) to find the most appropriate technological solution, 2) to identify system details and communication during the implementation, 3) to develop plans of work ownership, and 4) deploy the pilot system (You, Motta, Lio, & Ma, 2016).

Equity, Access, and Civic Engagement

Other studies assessed IT integration and modernization with goals of improving democratic practices. When IT started to be leveraged to achieve certain goals, it was generally used to further the interests of other "dominant groups in the organization who are driven by political and bureaucratic forces" (Laudon, 1974 as cited in Shachar, 1996, p.13). Alternatively, because "cell phone ownership permeates all social strata and exceeds computer ownership among lower socio-economic status" (Kavanaugh, et. al, 2012, p. 486), it is possible that governmental outreach and citizen-to-government communication using apps may be more equitable compared to other outreach activities. Kavanaugh, et al. (2012) conducted an exploratory study that leveraged existing research, archived social media data, and conducted focus group interviews to understand how social media was being used by people, organizations, and government to build a Crisis, Tragedy, and Recovery Network. Access to government services was highlighted in one focus group that expressed concern that governmental community outreach activities may erode in economic downturns, and that they wanted to understand how government can use technology to maintain this outreach.

Residents' use of apps to report community problems to local government may be defined as a form of coproduction. According to Levine & Fisher (1984), there has been a long history of residents engaging in coproduction with their local governments, defined as "the joint provision of public services by public agencies and service consumers" (p.181). In the past, residents used other more traditional means of making service requests, such as writing letters to government, before the advent of apps. Although there are many examples of drivers of coproduction, crime is "…more likely to promote citizen interest and involvement than most any other collective problem" (Levine & Fisher, 1984, p.184). Coproduction included active resident

engagement in volunteer activities like Neighborhood Watch, as well as complaints, calls for service, and letters to elected officials. There are a few challenges that are involved with coproduction and volunteerism, such as maintaining engagement; however, one interesting challenge occurs when coproduction is so successful that crime moves to new areas in which it previously did not exist (Levine & Fisher, 1984). Resident coproduction proliferated because residents contributed "time, expertise, and effort" to produce "an outcome, share more responsibility, and manage more risk in return for much greater control over resources and decisions" (Horne & Shirley, 2009, p. 10). This same outcome could apply to citizen engagement through apps.

Linders (2012) categorizes citizen coproduction into three categories: Citizen Sourcing (citizens to government, where citizens influence government), Government as a Platform (government to citizen, where government is not responsible for citizen activity but disseminates information), and Do It Yourself Government (citizen to citizen, where government can facilitate but does not play an active role). Citizen Sourcing is the typology used to support the My San Jose app, and CSJ also offers an online platform to disseminate information. While there are a few modules in the My San Jose app that are under the umbrella of Government as a Platform, such as the Frequently Asked Questions and My Home Services, this literature review and research paper is focused on the fulfillment of service requests. Linders (2012) highlights smartphone mobile applications, stating that these systems often "issue a tracking number that enables the citizen to track progress and hold the government accountable for a well-timed response" (2012, p. 448).

You, Motta, Lio, & Ma (2016) studied crowdsourcing and its ability to create change in government, particularly process changes. Without additional explanation, they assume that there

is a negative connotation with city governance, and that residents are "neglected in the design of the services that support their daily lives" (p.53). Therefore, there is "a great opportunity to introduce better relationships between citizens and authorities" (p. 53). Despite the unsupported assumptions about city government, they present important distinctions between the purpose of 'crowdsourcing' when applied to the private and public sectors. Crowdsourcing in business can "leverage online crowdsourcers to solve a particular issue" (p. 53:2). They claim that 'citizen-sourcing', borrowed from Linders, "…fosters public participation and engagement for a collaborative governance" (p. 53:2). In the public sector, crowdsourcing is innovative and is part of the "Smart City" model (You, Motta, Lio, & Ma, 2016). Therefore, citizen-sourcing can enhance services and responsibility towards users.

Citizen-sourcing is complex and has limitations and challenges. One limitation is that it should be "a gradual evolution" (You, Motta, Lio, & Ma, 2016, p. 53:2), which counters previous case examples of politically-driven system developments with an implementation deadline of a year or less (Nam & Pardo, 2013), as well as necessary customer satisfaction metrics as part of a highly evolved evaluation model (You, Motta, Lio, & Ma, 2016, p. 53:8). Challenges include the nature of crowdsourcing and citizen-sourcing, in that the net is cast widely to obtain feedback from users; therefore, data can be unreliable, duplicative, or invasive (You, Motta, Lio, & Ma, 2016), like the analysis provided by Horne & Shirley (2009). Open feedback can cause bottlenecks as well (You, Motta, Lio, & Ma, 2016).

The opposite of city-initiated crowdsourcing also has emerged, such as social media platforms where governments have little control of content. If government cares to respond to these platforms and track issues, monitoring social media requires "data mining of diverse real-time feeds related to real-world events" to respond and address issues promptly, which is even

more critical when trying to provide an emergency response (Kavanaugh et al., 2012, p. 481). Potential patterns may also be more quickly identified through data mining rather than the traditional 'wait and report' method. Linders (2012) acknowledges the risk of relying on coproduction, especially if there is a small percentage of the population participating, because the participating users could grow weary of bearing all the burden, and there could be research legitimacy issues. Other non-governmental, social-media apps are used by San Jose residents and council members. For example, event details for Coyote Creek Dumpster Day scheduled for April 14, 2018 was posted on a designated San José City Council page on Nextdoor, along with information on how to report illegal dumping (Jimenez, 2017). While the platform (app and website) is not government sponsored, City Council members use it to disseminate information and receive comments on its posts for targeted neighborhoods.

Desouza & Bhagwatwar (2014) acknowledge that there are many types of platforms useful for coproduction that may not always be sponsored by the local government. They highlight one website, Textizen, which is "a mobile and web-based platform that allows public agencies and citizens to interact regarding local issues" (Desouza & Bhagwatwar, 2014, p. 26) in a question-answer form, and it is available for use in large cities, such as Philadelphia and Chicago. Desouza & Bhagwatwar (2014) used process analysis to better understand participatory platforms by examining the nuances in all phases from development to use in different kinds of platforms, the roles of citizens and agencies in each phase, and the differences in objectives of each platform (2014).

Oakland has a grassroots coproduction app called Crimespotting, which uses data published on the City's community crime mapping website but is not affiliated with the City. This app exemplifies citizen centric and government open data because the application provides

current information regarding criminal incidents (Desouza & Bhagwatwar, 2014). There is no platform to add data as a viewer or have an integrated line of communication to the city.

From an equity and access perspective, there are a few precautions. In terms of allocation of resources, some residents may feel that coproduction is a form of another type tax, and more affluent residents or neighborhoods may be more likely to engage in coproduction-types of reporting, resulting in better service deliveries for their own neighborhoods (Levine & Fisher, 1984). While Levine & Fisher (1984) provide policy foundation precautions, Desouza & Bhagwatwar (2014) provide a modern, technological perspective that will aid in overall success of the platform chosen, government-owned or not. For example, they imply that if civic participation is the goal, then the type of platform that has "a certain percentage of the local population [that] actively [engages] on the platform" may be critical to assess (Desouza & Bhagwatwar, 2014, p. 47). They also admit that not all platforms are legitimate and sustainable, depending on the objective a government seeks to achieve. Having a mobile app that is integrated into workflow management at the City of San José helps achieve legitimacy, but continued legitimacy is also dependent on other factors, such as the following topics.

Establishing Confidence and Accountability

Ensuring that users are confident that their service requests will be actionable, resolved, and communicated is important for many reasons. An example of decreased confidence in an app project is Palo Alto's 311 app. It was deployed in June 2014 initially to address graffiti concerns, and reports also are instantly available on Palo Alto's Open Data platform (Sheyner, 2015). In January 2015, Palo Alto addressed over 2,000 app-reported complaints from 1,300 app users, and the CIO also expressed that when a complaint is reported, there is a timer that starts, allowing anyone to verify whether the complaint was addressed (Sheyner, 2015). By July 2017,

60-70% of cases were referred to a code enforcement employee, which was a quicker way to seek resolution according to the employee; however, the lack of a status follow-up to a complaint had a disconnecting effect, causing one resident to conclude nothing was done about his complaint (Sheyner, 2015). According to a community member, Palo Alto's 311's app both encourages and discourages complaints (Sheyner, 2015). Mid-process performance benchmarks can help connect users to the resolution process and help them feel appreciated. As suggested by Brabham & Radin (2015), "failure to show that government is truly listening to the crowd leads to mistrust for future consultations, and acknowledging contributions will reward citizens for their thoughtful engagement" (p. 64).

Walravens (2015) found that there was a high correlation between public value and governmental involvement with 311 smartphone applications. In his analysis of NYC 311, he found that "while it may solve individuals' questions in the short term, the service's main goal is increasing and improving interaction with the government and quality of life in the city" (Walravens, 2015, p. 237), and the resulting analysis of the location-based data and tagging of issues can assist with the identification of structural issues (Walravens, 2015).

The literature available establishes that the smart governance paradigm goes beyond new public management, and with it come new challenges. With innovative ways for government and residents to engage with each other create challenges to not simply be accountable, but to demonstrate accountability in a platform with an expectation of active engagement between government and the public. The literature answers questions related to why smart technology is important, both as independent platforms and government platforms, as theory and in practice, as in San José. Measuring access, equity, and willingness to engage as resident-users of smart

technology is important to link the technology, the implementation, and the outputs, to the overall policy objective.

METHODOLOGY

This study uses process evaluation to analyze organizational operations and assesses those operations against the goals of "improving the customer experience for city services" by having "highly-responsive service interactions with citizens and businesses at scale, through a unified system for service coordination, communications, data, and analysis", which were included in the November 2016 PowerPoint presentation to City Council prior to its approval of granting authority to negotiate a contract with AST Corporation (Lloyd, 2016, slides 2-3).

Table 2. *Process Evaluation Model*

Problem Identification	**Solution**	**Implementation**	**Evaluation**
The new My San Jose website and mobile app may not be achieving its goal of rapid and accurate responsiveness to community requests for services	Create and apply benchmarks to the current performance measures of My San Jose website and mobile app	Six months of data on My San Jose performance: a. time between request & assignment to department b. time between assignment to department & assignment to staff c. time between assignment to staff & task completion d. number and performance of service requests by input source (Customer Contact Center, website, app) e. accuracy of task assignments using app versus other input source f. Images and location information obtained	1. Does the My San Jose app/website meet the benchmarks for the services it supports? 2. Meet the audit recommendations? 3. Which input source has faster completion times? 4. Which input source is more accurate? 5. Does one district achieve faster completion times over another?

Using the Desouza & Baghwater (2014) categorization of participatory platforms, My San Jose falls underneath the government-centric and citizen-developed solution. However, the app's stated goals incorporate other consultative aspects seen in the citizen-centric and citizen-sourced model (2014). This dichotomy calls for an evaluation to ensure that there are standards and practices to enable users of the My San Jose app and website to feel confident that their feedback matters and is actionable when they use these tools.

Sylvia & Sylvia (2012) call for an assessment tool in a process evaluation. There are two sets of standards that this study suggests and implements: 1) completion times of graffiti abatement, abandoned vehicles removal, illegal dumping abatement, and streetlight repair requests submitted through the smartphone app, and 2) response times between the City back-end receiver(s) and the requestor or other users. Pre-existing goals for completion times of these types of requests are available through City reports and the City website: graffiti – 10 days for private property, 24 hours for offensive, urgent, or gang-related markings, 72 hours for all others, and unspecified for markings on utility company or other agencies' property per the City's graffiti abatement website; abandoned vehicles – 15 days per the City's Department of Transportation (DOT) parking website; illegal dumping – seven days per pickup routine by the Removing and Preventing Illegal Dumping (RAPID) Response Team on the City's illegal dumping website; potholes – two days per the Department of Transportation's 2017-2018 adopted budget, and streetlight repair – seven days per the Department of Transportation's 2017-2018 adopted budget. In addition, the Customer Contact Center has performance measures as part of the budget, including wait times and percentage of calls resolved (City of San José, 2017a).

Table 3. *Assessment Tool Used for Service Requests Supported by My San Jose*

Service Request	Completion Time	Performance Measure Source	Response Time	Source
Graffiti	10 days for private property	PSFSS Committee Item d(3) 12/15/16. "Anti-Graffiti and Anti-Litter Programs Annual Report"	3 days*	Form Center - submitting a request via website form
	24 hours for urgent, offensive, or gang related markings			
	72 hours for all others			
	Unspecified for utilities or other external agencies			
Streetlight Repair	7 days	17/18 Adopted Operating Budget - DOT Performance Measures p. 881		
Abandoned Vehicles	15 days	City Website "Vehicle Abatement" (Parking)		
Potholes	2 days	17/18 Adopted Budget - DOT Performance Measures, p.887		
Illegal Dumping	7 days	City Website. "City Programs to Combat Illegal Dumping" (Environment)		

*Form indicates 3 to 5 days.
Source: https://www.sanjoseca.gov/FormCenter/Customer-Service-20/Feedback-and-Questions-for-the-City-of-S-133

Little literature is available that corresponds to a specific response time to acknowledge the complaint or provide other status updates through a civic smartphone app for services, likely because resources vary for each city. However, response time in communicating a status of a request is important for many reasons, including a positive perception of or confidence in government, and therefore, sustained usage of the platform, which is critical to the San José initiative and policy success. This study applies a city-to-platform response time of three days to account for a 24-hour hotline that the City has available (San Jose 2017a) and for weekends during which most staff are out of the office, as well as any back-log of issues as a result.

Due to the recent deployment of the My San Jose app, gathering data for a full year is not possible; therefore, this study will cover six months of My San Jose service request data provided by the City of San José on February 9, 2018 and included data from July 31, 2017 through January 31, 2018. No personal data was provided nor requested. Data was benchmarked against the performance metrics for response times stated earlier. Notably, 72 hours was used as the overall benchmark for graffiti abatement due to limitations in the data provided.

The data set provided by CSJ on February 9, 2018 included the following fields: reference number, district, incident source, type of request, location for service, date created, date closed, status of the request, and whether an image was uploaded. Using features in Microsoft Excel, the researcher created randomized numbers to replace the reference number as well as district number to preserve anonymity. The researcher also created several other fields that leveraged conversion, VLOOKUP, and IF statement functions in Excel: converted date created, converted date closed, number of days (from creation and close), number of minutes (from creation to close), request type (simplified), location included, and image included. Manual formatting was necessary in some instances. The researcher also inserted a new column of data that extracted the benchmark information via VLOOKUP to enhance reporting. For example, because the SJClean app (legacy app) includes various types of locations of graffiti (such as sidewalk, light pole, and utility box) while My San Jose does not have this granularity, requests from both apps were aggregated as general graffiti. With this enhanced data set, various pivot tables were created and are included in the analysis. In addition, actual ticket reference numbers and districts were replaced with random numbers or letters.

In addition, semi-structured interviews were used to obtain qualitative data. They were scheduled to complement the quantitative data obtained from the City. The researcher interviewed two representatives from Department X (R_{x1} and R_{x2}) and one representative from Department Y (R_y). Inquiries were sent to all five relevant departments. Following IRB protocol, consent forms were obtained prior to the interviews, and no personal opinions or other identifying information was collected. The standardized list of operational questions was sent prior to the interviews and was discussed in-person between February and March 2018. The questions and summarized answers are included in the findings in separate tables. Because answers greatly varied between department services, the tables differentiate the answers, and departments were also renamed with an alphabetical indicator to preserve anonymity. Allowing the opportunity for interviewees to elaborate in their responses was pivotal in obtaining accurate and complete information.

This methodology eliminates cost as a factor in the implementation and evaluation. Although cost data is important, it was not easily attainable nor extractable in granularity when discussing cost per unit (for example, service type, request, employee, contractor). However, the City of San José is implementing programmatic budgeting (City of San José, 2017c). Though My San Jose is not specifically listed as a stand-alone programmatic budget item (City of San José, 2017c), the IT Department received $80,000 from the General Fund to support CRM enhancements, corresponding licenses, and maintenance, and the Customer Contact Center within IT received $39,449 of funding (partial General Fund funding) as well as 1.0 full-time employee position (City of San José, 2017c). Additionally, some of the qualitative findings reveal other important factors that would militate against the need for a cost evaluation

now. Lastly, in the literature review, costing was not a factor in any other process evaluations of municipal mobile app deployment. Further recommendations are included in the Analysis.

FINDINGS

This section provides tables and charts depicting the My San Jose raw data from July 31, 2017 through January 31, 2018. The benchmarking tool mentioned in the methodology is applied to the relevant service requests to assess My San Jose performance against pre-existing departmental performance measures. Quantitative findings precede qualitative findings. For purposes in reading the tables and charts, "Incident Source" refers to an agent at the Customer Contact Center who inputs service requests in the My San Jose website. "Average Time" or "Avg Time" refers to the average number of days it takes to complete a request.

Quantitative Findings

Table 4. *Detail of Overall Performance of Completion of Tickets for Service by Type with Total Count, excluding General Requests*

Assessment Finding	Met Performance Benchmark	Did Not Meet Performance Benchmark	Total
# Graffiti Requests	3,149	1,172	4,322
Percent	*73%*	*27%*	*100%*
# Abandoned Vehicle Requests	6,083	10,456	16,539
Percent	*37%*	*63%*	*100%*
# Illegal Dumping Requests	4,435	1,461	5,897
Percent	*75%*	*25%*	*100%*
# Pothole Requests	290	675	967
Percent	*30%*	*70%*	*100%*
# Streetlight Outage Requests	610	1,242	1,853
Percent	*33%*	*67%*	*100%*
Total	14,567	15,006	29,573
Percent	*49%*	*51%*	*100%*

Figure 2. *Overall Performance of Completion of Tickets for Service by Type, excluding General Requests*

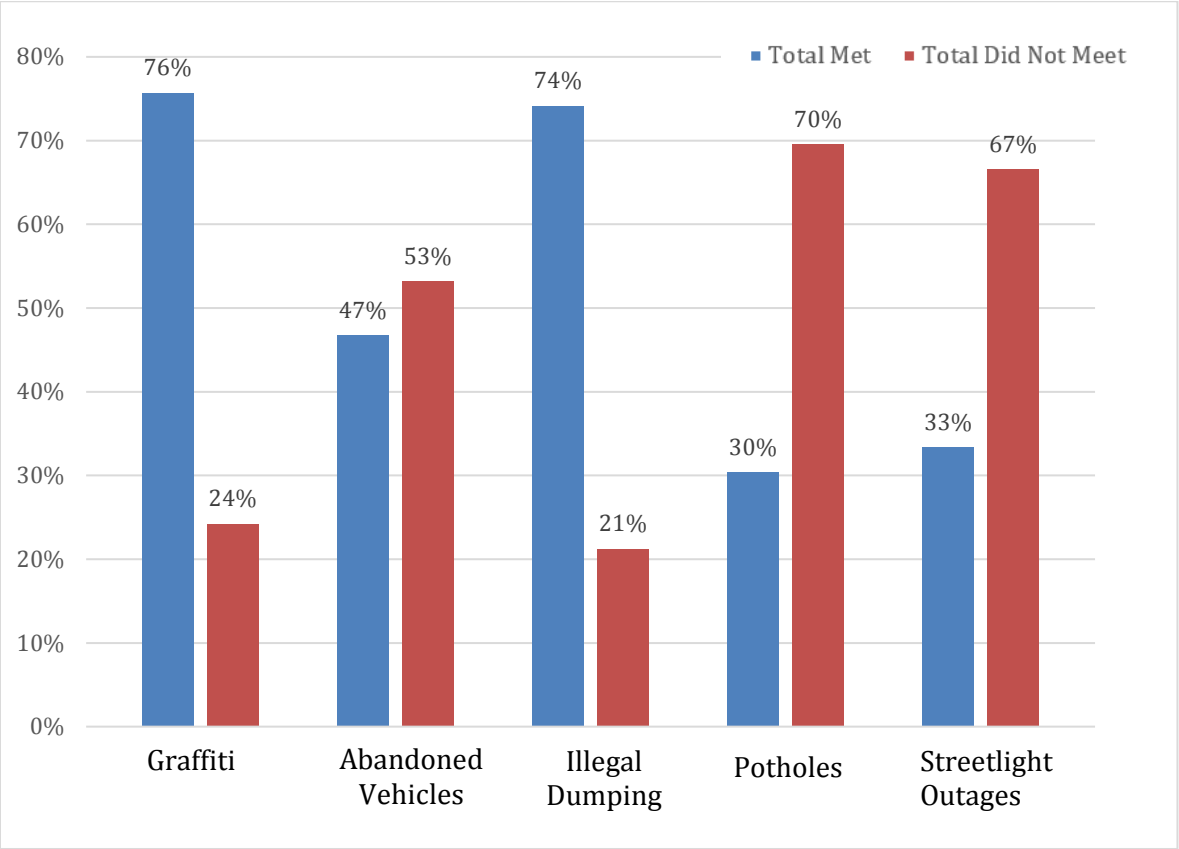


Figure 3. *Overall Performance of Completion of Tickets for Service by Type with Total Count, excluding General Requests*

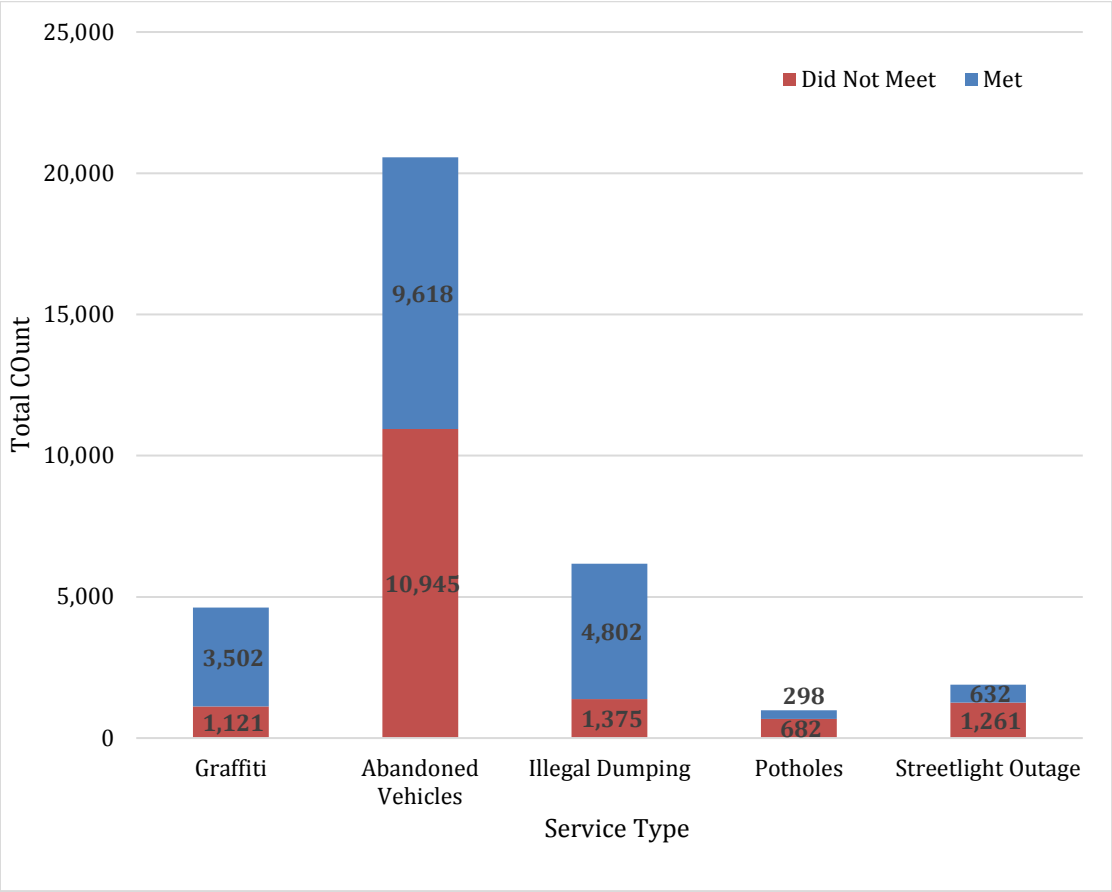


Figure 4. *Overall Performance of Completion of Service Requests, Excluding General Requests*

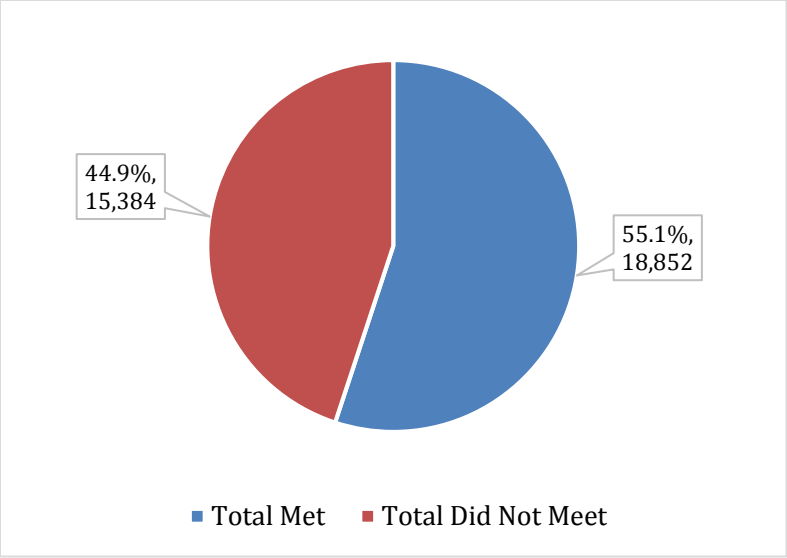


Table 5a. *Service Request Completion Ranking by Incident Source*

Row Labels	Bench-mark	# of Requests	Avg Time	Variance	Incident Source Ranking	Overall Ranking
Agent desktop		**23,435**	**1.36**			
Abandoned Vehicle	15	1,014	21.17	-6.17	3	9
Graffiti	3	19	6.06	-3.06	2	6
General Request (GR)	N/A	529	0.00			
GR-City	N/A	7,069	0.76			
GR-County	N/A	317	0.28			
GR-Other	N/A	825	0.27			
GR-Payment	N/A	866	0.01			
GR-Short Answer	N/A	85	0.00			
GR-Utility	N/A	6,064	0.02			
GR-Water	N/A	6,103	0.03			
Illegal Dumping	7	433	4.84	2.16	1	1
Pothole	2	31	19.91	-17.91	5	
Streetlight Outage	7	80	19.45	-12.45	4	10
Mobile		**18,361**	**10.42**			
Abandoned Vehicle	15	6,357	19.95	-4.95	3	7
Graffiti	3	3,566	3.74	-0.74	2	5
GR	N/A	2,444	1.97			
Illegal Dumping	7	4,753	4.50	2.50	1	2
Pothole	2	516	18.51	-16.51	5	14
Streetlight Outage	7	725	21.30	-14.30	4	12
Web		**18,485**	**17.25**			
Abandoned Vehicle	15	13,193	21.11	-6.11	3	8
Graffiti	3	1,039	2.75	0.25	2	4
GR	N/A	1,415	1.08			
GR-City	N/A	21	3.54			
GR-Other	N/A	5	29.47			
GR-Short Answer	N/A	1	5.78			
GR-Utility	N/A	1	58.13			
Illegal Dumping	7	1,288	4.46	2.54	1	3
Pothole	2	433	17.75	-15.75	5	13
Streetlight Outage	7	1,089	20.33	-13.33	4	11

Table 5b. *Service Requests by Incident Source, Service Type, and Randomized District*

	# of Requests by District											
Row Labels	**A**	**B**	**C**	**D**	**G**	**H**	**N**	**S**	**V**	**Q**	**#N/A**	**Total**
Agent desktop	**351**	**514**	**312**	**534**	**465**	**538**	**537**	**2,357**	**336**	**379**	**17,112**	**23,435**
Abandoned Vehicle	61	161	58	172	108	75	110	88	80	99	2	1,014
General Request (GR)											529	529
Graffiti		3		4	1	3	5	2	1			19
GR-City	18	37	12	49	29	27	23	59	12	18	6,785	7,069
GR-County	1	8	2		2			2			302	317
GR-Other	8	11	5	8	7	7	5	4	6	4	760	825
GR-Payment	2		3	1	3	10	21	257	2	1	566	866
GR-Short Answer											85	85
GR-Utility	212	228	189	209	240	186	149	301	169	205	3,976	6,064
GR-Water	9	8	7	6	18	168	165	1,595	9	15	4,103	6,103
Illegal Dumping	25	52	21	71	46	46	51	41	43	33	4	433
Pothole	3	2	3	8	3	4	4	2	1	1		31
Streetlight Outage	12	4	12	6	8	12	4	6	13	3		80
Mobile											**18,361**	**18,361**
Abandoned Vehicle											6,357	6,357
GR											2,444	2,444
Graffiti											3,566	3,566
Illegal Dumping											4,753	4,753
Pothole											516	516
Streetlight Outage											725	725
Web	**1,438**	**1,633**	**1,261**	**3,158**	**1,833**	**1,635**	**2,373**	**1,409**	**1,787**	**1,706**	**252**	**18,485**
Abandoned Vehicle	968	1,202	800	2,408	1,353	1,006	1,611	997	1,522	1,283	43	13,193
GR	56	149	71	238	101	83	275	114	54	102	172	1,415
Graffiti	195	35	110	141	81	99	225	32	11	109	1	1,039
GR-City											21	21
GR-Other				1							4	5
GR-Short Answer								1				1
GR-Utility											1	1
Illegal Dumping	36	156	89	194	104	239	183	101	49	131	6	1,288
Pothole	43	43	28	53	56	26	47	59	47	31		433
Streetlight Outage	140	48	163	123	138	182	32	105	104	50	4	1,089
Total	**1,789**	**2,147**	**1,573**	**3,692**	**2,298**	**2,173**	**2,910**	**3,766**	**2,123**	**2,085**	**35,725**	**60,281**

Table 5c. *Graffiti Requests by Incident Source*

Graffiti Requests by Incident Source (Benchmark: 3 days)	# of Requests	Avg Time
Agent desktop	19	6.1
My San Jose -Graffiti-Light Pole	1	2.9
My San Jose -Graffiti-Other	7	11.9
My San Jose -Graffiti-Painted Wall	3	1.3
My San Jose -Graffiti-Unpainted Wall	2	4.8
My San Jose -Graffiti-Utility Box	2	5.8
My San Jose -Graffiti-Wood Fence	4	0.9
Mobile	3,566	3.7
My San Jose -Graffiti-Chain Link Fence	96	3.6
My San Jose -Graffiti-Light Pole	546	4.2
My San Jose -Graffiti-Other	966	3.6
My San Jose -Graffiti-Painted Wall	699	3.3
My San Jose -Graffiti-Park Picnic Table	84	3.8
My San Jose -Graffiti-Park Restroom Building	44	3.3
My San Jose -Graffiti-Sidewalk	306	4.7
My San Jose -Graffiti-Tree	18	3.3
My San Jose -Graffiti-Unpainted Wall	161	3.2
My San Jose -Graffiti-Utility Box	486	3.9
My San Jose -Graffiti-Wood Fence	160	3.8
Web	1,039	2.7
My San Jose -Graffiti-Chain Link Fence	24	5.4
My San Jose -Graffiti-Light Pole	121	1.9
My San Jose -Graffiti-Other	503	2.7
My San Jose -Graffiti-Painted Wall	177	3.2
My San Jose -Graffiti-Sidewalk	31	3.4
My San Jose -Graffiti-Tree	5	6.5
My San Jose -Graffiti-Unpainted Wall	60	1.7
My San Jose -Graffiti-Utility Box	87	2.0
My San Jose -Graffiti-Wood Fence	31	5.2
Grand Total	**4,624**	**3.5**

Table 6. *Service Type by Image Upload and Location*

Service by Image and Location*	Benchmark	# of Requests	Average of # of Days	Variance
[A]	*[B]*	*[C]*	*[D]*	*[E]=[B]-[D]*
Image Uploaded				
Location Included				
Abandoned Vehicle	15	20,564	20.76	-5.76
Graffiti	3	4,378	3.38	-0.38
Illegal Dumping	7	6,474	4.52	2.48
Pothole	2	980	18.21	-16.21
Streetlight Outage	7	1,894	20.66	-13.66
No Location				0.00
Graffiti	3	246	6.13	-3.13

*All closed requests included images except most General Requests. General Requests are not included

Figure 5. *Service Request Count by Month since App Deployment by Service Type*

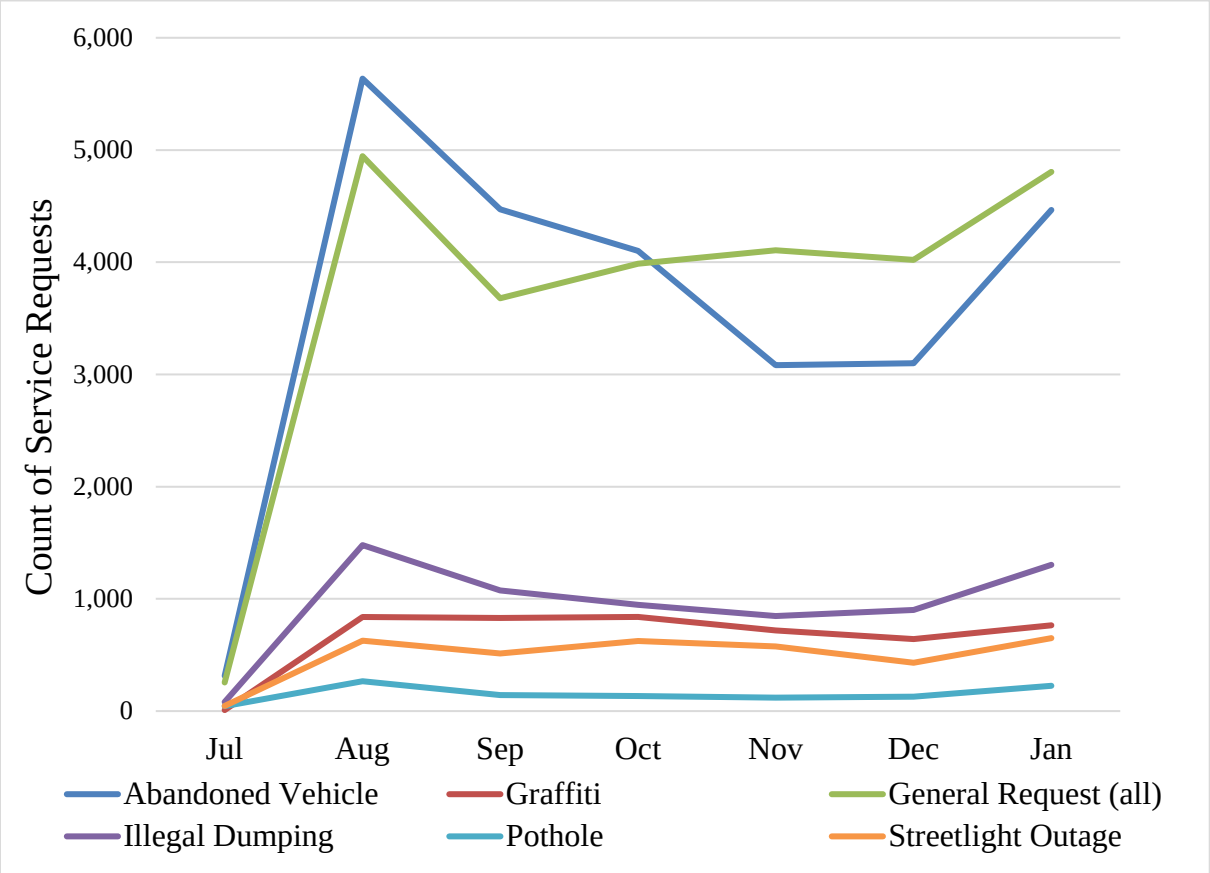


Table 7. *Service Requests by Incident Source and District.* Note: positive values are within the range of the benchmark.

District	Service Type	Abandoned Vehicle			Illegal Dumping			Pothole			Streetlight Outage			Graffiti			Total (Variance Sum)	District Variance Ranking
	Incident Source*	Agent desktop	Web	Mobile	Agent desktop	Web	Mobile	Agent desktop	Web	Mobile	Agent desktop	Web	Mobile	Agent desktop	Web	Mobile		
	Benchmark	**15**	**15**	**15**	**7**	**7**	**7**	**2**	**2**	**2**	**7**	**7**	**7**	**3**	**3**	**3**		
A	# of Requests	61	968		25	36		3	43		12	140			195		1,288	
	Avg Time	28.3	25.1		4.2	4.6		2.1	16.3		16.5	18.1			1.7		23.1	
	Variance	**-13.3**	**-10.1**		**2.8**	**2.4**		**-0.1**	**-14.3**		**-9.5**	**-11.1**			**1.3**		**-51.9**	5
B	# of Requests	161	1,202		52	156		2	43		4	48		3	35		1,668	
	Avg Time	19.8	21.4		4.8	3.4		73.4	11.2		60.4	24.7		13.6	3.0		19.0	
	Variance	**-4.8**	**-6.4**		**2.2**	**3.6**		**-71.4**	**-9.2**		**-53.4**	**-17.7**		**-10.6**	**0.0**		**-167.7**	11
C	# of Requests	58	800		21	89		3	28		12	163			110		1,174	
	Avg Time	24.5	22.9		5.0	4.8		0.6	15.2		11.5	18.2			2.0		20.2	
	Variance	**-9.5**	**-7.9**		**2.0**	**2.2**		**1.4**	**-13.2**		**-4.5**	**-11.2**			**1.0**		**-39.7**	2
D	# of Requests	172	2,408		71	194		8	53		6	123		4	141		3,035	
	Avg Time	17.7	18.2		3.4	4.5		23.4	20.5		13.0	25.1		4.3	4.0		17.3	
	Variance	**-2.7**	**-3.2**		**3.6**	**2.5**		**-21.4**	**-18.5**		**-6.0**	**-18.1**		**-1.3**	**-1.0**		**-66.1**	7
G	# of Requests	108	1,353		46	104		3	56		8	138		1	81		1,816	
	Avg Time	21.1	20.9		7.0	4.6		17.2	22.0		18.3	18.0		1.0	1.4		19.5	
	Variance	**-6.1**	**-5.9**		**0.0**	**2.4**		**-15.2**	**-20.0**		**-11.3**	**-11.0**		**2.0**	**1.6**		**-63.6**	8
H	# of Requests	75	1,006		46	239		4	26		12	182		3	99		1,590	
	Avg Time	26.6	22.2		5.1	5.2		34.0	31.2		27.0	24.6		13.6	2.5		19.8	
	Variance	**-11.6**	**-7.2**		**1.9**	**1.8**		**-32.0**	**-29.2**		**-20.0**	**-17.6**		**-10.6**	**0.5**		**-124.1**	10
N	# of Requests	110	1,611		51	183		4	47		4	32		5	225		2,042	
	Avg Time	22.4	22.2		4.3	4.0		10.1	20.6		3.1	26.9		0.9	3.4		20.1	
	Variance	**-7.4**	**-7.2**		**2.7**	**3.0**		**-8.1**	**-18.6**		**3.9**	**-19.9**		**2.1**	**-0.4**		**-49.9**	4
S	# of Requests	88	997		41	101		2	59		6	105		2	32		1,399	
	Avg Time	20.9	19.7		6.2	4.8		3.9	12.4		15.8	17.2		2.9	2.6		17.7	
	Variance	**-5.9**	**-4.7**		**0.8**	**2.2**		**-1.9**	**-10.4**		**-8.8**	**-10.2**		**0.1**	**0.4**		**-38.4**	1
V	# of Requests	80	1,522		43	49		1	47		13	104		1	11		1,859	
	Avg Time	20.0	21.1		4.6	3.6		34.8	18.6		18.5	14.7		4.6	2.3		19.7	
	Variance	**-5.0**	**-6.1**		**2.4**	**3.4**		**-32.8**	**-16.6**		**-11.5**	**-7.7**		**-1.6**	**0.7**		**-74.8**	9
Q	# of Requests	99	1,283		33	131		1	31		3	50			109		1,631	
	Avg Time	19.4	21.5		4.3	4.6		4.8	11.9		27.0	21.6			3.7		19.5	
	Variance	**-4.4**	**-6.5**		**2.7**	**2.4**		**-2.8**	**-9.9**		**-20.0**	**-14.6**			**-0.7**		**-53.6**	6
#N/A	# of Requests	2	43	6,357	4	6	4,753			516		4	725		1	3,566	12,410	
	Avg Time	8.5	18.1	19.9	5.6	3.0	4.5			18.5		28.2	21.3		0.9	3.7	14.0	
	Variance	6.5	-3.1	-4.9	1.5	4.0	2.5			-16.5		-21.2	-14.3		**2.1**	**-0.7**	**-44.3**	3
	Total #	1,014	13,193	6,357	433	1,288	4,753	31	433	516	80	1,089	725	19	928	0	**29,912**	
	City Average Time	20.8	21.2	19.9	5.0	4.3	4.5	20.4	18.0	18.5	21.1	21.6	21.3	5.8	2.5	3.7	**16.4**	
	Avg variance of incident source by service type	***-5.8***	***-6.2***	***-4.9***	***2.0***	***2.7***	***2.5***	***-18.4***	***-16.0***	***-16.5***	***-14.1***	***-14.6***	***-14.3***	***-2.8***	***0.5***	***-0.7***		
	Incident Source Score	***8***	***9***	***7***	***3***	***1***	***2***	***15***	***13***	***14***	***10***	***12***	***11***	***6***	***4***	***5***		
			3			1			5			4			2			

Table 8. *Service Request Performance Ranking by District*

District	Service Type	Abandoned Vehicle	Illegal Dumping	Pothole	Streetlight Outage	Graffiti	Variance (Sum)	District Variance Score
	Benchmark	15	7	2	7	3		
A	# of Requests	1,029	61	46	152	195		
	Average Time	25.3	4.4	15.4	18.0	1.7		
	Variance	-10.3	2.6	-13.4	-11.0	1.3	-30.8	5
B	# of Requests	1,363	208	45	52	38		
	Average Time	21.2	3.8	14.0	27.4	3.9		
	Variance	-6.2	3.2	-12.0	-20.4	-0.9	-36.3	8
C	# of Requests	858	110	31	175	110		
	Average Time	23.0	4.8	13.8	17.7	2.0		
	Variance	-8.0	2.2	-11.8	-10.7	1.0	-27.4	2
D	# of Requests	2,580	265	61	129	145		
	Average Time	18.1	4.2	20.9	24.6	4.0		
	Variance	-3.1	2.8	-18.9	-17.6	-1.0	-37.8	9
G	# of Requests	1,461	150	59	146	82		
	Average Time	21.0	5.3	21.7	18.1	1.4		
	Variance	-6.0	1.7	-19.7	-11.1	1.6	-33.5	6
H	# of Requests	1,081	285	30	194	102		
	Average Time	22.5	5.2	31.6	24.8	2.8		
	Variance	-7.5	1.8	-29.6	-17.8	0.2	-52.9	11
N	# of Requests	1,721	234	51	36	230		
	Average Time	22.2	4.1	19.8	24.2	3.3		
	Variance	-7.2	2.9	-17.8	-17.2	-0.3	-39.7	10
S	# of Requests	1,085	142	61	111	34		
	Average Time	19.8	5.2	12.1	17.1	2.7		
	Variance	-4.8	1.8	-10.1	-10.1	0.3	-22.9	1
V	# of Requests	1,602	92	48	117	12		
	Average Time	21.0	4.1	19.0	15.1	2.5		
	Variance	-6.0	2.9	-17.0	-8.1	0.5	-27.6	3
Q	# of Requests	1,382	164	32	53	109		
	Average Time	21.3	4.5	11.6	21.9	3.7		
	Variance	-6.3	2.5	-9.6	-14.9	-0.7	-29.1	4
#N/A	# of Requests	6,402	4,763	516	729	3,567		
	Average Time	19.9	4.5	18.5	21.3	3.7		
	Variance	-4.9	2.5	-16.5	-14.3	-0.7	-34.0	7
Total # of Requests		20,564	6,474	980	1,894	4624		
Average of Variance		-6.4	2.4	-16.0	-13.9	0.1		
Service Variance Score		3	2	5	4	1		

Note: positive variance values are within the range of the benchmark.

Qualitative Findings

Some elaboration of responses answered other questions during the interviews. The researcher aligned answers to the most appropriate questions when necessary.

Q1: *What is your department's internal work order system, and how is work assigned? Is there a dedicated team to respond to only service requests from My San Jose? Is work assigned to specific employees? Please describe what the assignment process is.*

Table 9. *Question 1 Responses*

<table>
<tr><th>$R_{1\&2}$</th><th colspan="2">R_3</th></tr>
<tr><th>Department X</th><th>Department A</th><th>Department B</th></tr>
<tr><td>Work orders (service requests) are integrated into the legacy back-end system (SJClean) that the department had prior to My San Jose.</td><td rowspan="3">In most cases, their requests are automated, but it varies by service. One employee from Department A reviews all requests related to A and B to determine which department owns the service request based on location and property characteristics. Only requests that are deemed actionable are triaged to relevant teams. Nonactionable requests are closed out; sometimes additional information is sought.</td><td rowspan="3">Request is triaged from Department A.</td></tr>
<tr><td>The dedicated team is comprised of four technicians from a contractor.</td></tr>
<tr><td>Work orders are assigned per the 4 geographical zones, one for each technician, and the work orders are automatically routed. Site visits are scheduled in the mornings, which help determine if there are any requests out of jurisdiction.</td></tr>
<tr><td>If a request was miscoded and was not for graffiti abatement, then in-house staff will reroute the request, by filling out a new service request on My San Jose - Web platform as a courtesy. Other times, non-jurisdictional issues will be escalated if the other jurisdiction has an email address. A scripted response is issued back to the requestor.</td><td colspan="2" rowspan="2">Currently, the system does not allow rerouting. All service teams are receiving requests that are handled by another team. A new request is completed by City staff who let the resident know.</td></tr>
<tr><td>For business and private property, this department supplies materials to abate graffiti and avoid any Code Enforcement involvement, at which point X's involvement ceases. Paint is available in four colors.</td></tr>
</table>

Q2: *How is work prioritized for the service requests that your department obtains from My San Jose?*

Table 10. *Question 2 Responses*

$R_{1\&2}$	**R_3**	
Department X	**Department A**	**Department B**
Priority requests are flagged in the back-end system. Gang-related and egregious graffiti is prioritized, which pushes an alert to the assigned technician's phone. In the morning, in-house staff review the work-order system or will receive calls from the gang taskforce. Rx_2 then instructs taskforce contacts to create a request in the app to better capture all work orders for metric reporting. In some urgent cases, in-house staff complete the request. Aging requests are prioritized next.	Work is prioritized for the most part internally. Illegal dumping that is blocking a right of way is assigned a Priority 1 status. See Q3 response below.	They are received from Department A. See Q3 response.

Q3: *Please describe the assessment of the service request that is referred to your department from My San Jose?*

Table 11. *Question 3 Responses*

$R_{1\&2}$	**R_3**	
Department X	**Department A**	**Department B**
Service requests are prioritized, based on response to Q2. There is also an inter-agency meeting where there is sharing of information about gang activity and any implications that result from the graffiti tags.	Department A staff review and filter by requests (potholes, streetlights, and illegal dumping). If the request is for illegal dumping, there are two levels of prioritization. Priority 1 means the illegal dumping is blocking the right of way. Priority 2 requests are triaged to Department B. If the request is for abandoned vehicles, staff on Department A's relevant team reviews and assigns the requests to the Parking Compliance Officers.	Department B receives requests based on Department A's designation of Priority 2.

Q4: *Does your department use contractual services to complete these service requests? In full or in part?*

Table 12. *Question 4 Responses*

$R_{1\&2}$	**R_3**	
Department X	**Department A**	**Department B**
Services are mostly completed by contractor. There are some in-house staff that can cover contractor (i.e. a tech is out sick), or for very urgent requests.	Yes, contractual services are used for abandoned vehicles (towing).	No.

Q5: *Does your department coordinate with any other City department to complete service requests? If so, which types of service requests and with which departments?*

Table 13. *Question 5 Responses*

$R_{1\&2}$	**R_3**	
Department X	**Department A**	**Department B**
Yes. Department X will instruct technicians (contractors) not to enter a neighborhood where there was a severe crime, or an officer will be requested to assist. There are also other coordinating practices that X has incorporated into its process workflow. See response to Q3 and Other Information.	Typical service request does not require much, if any, interdepartmental coordination. However, there are many outliers that do require such coordination, such as when an abandoned vehicle is stolen.	Typical service request does not require much, if any, interdepartmental coordination. However, there are many outliers that do require such coordination, such as when illegal dumping is on City property such as a park, community center, or library.

Q6: *How is the service request marked as complete? What does a "completed" service request mean? What does an "in progress" service request mean? For example, is the service request marked as in progress once it is assigned or once it is actionable?*

Table 14. *Question 6 Responses*

$R_{1\&2}$	**R_3**	
Department X	**Department A**	**Department B**
Technicians (contractors) take photos with their devices of the abated graffiti, upload it, and mark complete. The service request typically is marked as in progress once it is opened and then closed once closed.	Different services define when the switching of statuses takes place. An "in progress" status is based on the service and back-end workflow structure: for most requests, the status switches to "in progress" when it is assigned or when it is "touched" by staff.	
	See above. For abandoned vehicles, "in progress" status is turned on when a warning is issued; if the vehicle was moved during a follow-up inspection, the "completed" flag is switched.	See above.

Q7: *Is an employee and/or contractor able to mark "complete" on the service request, and can he/she/they also provide comments back to the requestor? Are they unique or standardized comments? Which is used in which instance?*

Table 15. *Question 7 Responses*

$R_{1\&2}$	**R_3**	
Department X	**Department A**	**Department B**
The technicians (contractors) can complete the service request directly and usually provide comments. If they are sent to a site where there is private property or out of the jurisdiction of the City, then the contractors will close the ticket.	Field staff have iPads to log service completion and use the relevant back-end system which then speaks to My San Jose. Standard operating procedures are evolving with the My San Jose experience. The "City will start monthly meetings of all the service teams to start sharing best practices and getting feedback on what are the most important improvements to the app and to the overall process," according to R_3. Non-jurisdictional requests are closed to avoid performance issues.	

Q8: *Was there a training component for staff and/or contractors?*

Table 16. *Question 8 Responses*

$R_{1\&2}$	**R_3**	
Department X	**Department A**	**Department B**
Yes, the technicians (contractors) and staff were trained on the app and web platform. In addition, in-house staff were part of the beta testing prior to the app's public launch. Due to prior experience launching SJClean (San Jose Clean), staff knew how technicians would need to access the data and accounted for existing expectations users had from the SJClean app.	Yes. Most of the staff involved during the development phase of the app, as well as before My San Jose, for their own back-end systems. There was a two-month testing period which included 200 people, as well as the mayor and council members, to help teams identify issues. There was a lot of training during the testing period as well. Also, staff are usually interacting with their back-end system, which is controlled by their departments.	

Q9: *Since the deployment of the My San Jose app, did your department have any vacancies in positions that are responsible for fulfilling these service requests? If so, approximately how many and for how long?*

Table 17. *Question 9 Responses*

$R_{1\&2}$	**R_3**	
Department X	**Department A**	**Department B**
No. The size of the contractual team is the same and is comprised of 4 technicians. The in-house team includes two part-time and seven full-time employees, although they cover this graffiti abatement as well as another service. They are split funded between the two different programmatic budgets.	Teams are currently in the process of determining the right number of staff to maintain a certain service level.	

Q10: If your department uses contractual services, were there any delays in renewing contracts?

Table 18. *Question 10 Responses*

$R_{1\&2}$	**R_3**	
Department X	**Department A**	**Department B**
No. Renewal is on an annual basis; square footage is the same cost, but the rate can change.	N/A	N/A

Q11: Does your department keep track of performance metrics as they relate to the My San Jose app/platform?

Table 19. *Question 11 Responses*

$R_{1\&2}$	**R_3**	
Department X	**Department A**	**Department B**
Yes, it is possible for Department X to run queries to determine how many requests originated from the legacy source or My San Jose.	N/A	N/A

Q12: About what percentage of total service requests that your department receives that are from My San Jose?

Table 20. *Question 12 Responses*

$R_{1\&2}$	**R_3**	
Department X	**Department A**	**Department B**
31% as of 3/2/18.	N/A	N/A

Table 21. *Supplemental Information Obtained from Interviews*

$R_{1\&2}$	R_3
Additional Information Specific to Graffiti Services	**Additional Information about the App**
SJClean (the legacy app) still exists today. The work order system used intake requests from both SJClean and My San Jose. This is referred to as the back-end system.	Back-end systems were already being built. Investments were made for back-end work order systems to integrate with front-end.
There are "super users" of graffiti service requests	Although IT "owns" the interface and platform, different requests have different fields, which are driven by departmental needs to act on the request.
Graffiti is indexed by the technicians for another department	App users can "follow" other requests.
Department can filter on their back-end system by many factors, including but not limited to: technician, in-house staff, and source (My San Jose or Legacy), intersection, month, closing date, and others.	City is receiving many different types of feedback suddenly. Either users are more active in reporting issues or there is now a better process to funnel a request. In addition, service requests are being reported that go beyond the current scope of the services that the app supports. The City is in the process of determining the most important improvements to the app and overall process.
All kinds of requests have "Graffiti" marked as requests, but truly are for other types of services. These requests are closed, and a new request is manually input by staff into the My San Jose web platform.	All General Requests are automatically routed to the City's Customer Contact Center (Call Center).
There are other contractual limitations based on location. For example, this department team's contract does not cover the downtown area, as another contractor services it, and the program is managed by a separate department and funded separately.	Another priority setting metric is Council involvement. If a request is sent to a council member, then it becomes a priority but is likely already in the system.
	GIS issue - location defaults to current location, not where you take the photo.

ANALYSIS

The Findings provide useful information about the current state of My San Jose service request process and performance for many audiences. This analysis adds value to the Findings by complementing the Findings with insights obtained from the literature review. First discussed is the raw data itself, followed by the evaluation of research questions.

Analysis of Data Fields

The raw data fields provided are a blend of structured and semi-structured data, which You, Motta, Lio, & Ma (2016) identify as being critical to managing city service issues. Although the unstructured data or semi-structured data, such as images, was not provided to the researcher due to privacy issues, its existence is relevant as it speaks to other innovative potential. The data provided also revealed that district numbers were not assigned to requests submitted through the app. While location data is collected and reported, manual data entry or more advanced manipulation is necessary to extract the district number from the mobile app's raw data.

As a result, there are two significant negative implications: 1) it can be challenging for staff to efficiently analyze the full scope of service deliveries by district since the deployment of the app, and 2) it is difficult to assess any progress or degradation of equity, access, and/or civic engagement since the deployment of the app. This is highly salient for councilmembers, as such data apprise them of trends, outreach successes or gaps, and service delivery successes or gaps. This is especially crucial for crime-related activity, such as graffiti. As stated in the literature review, Levin & Fisher (1984) claim that as coproduction of crime-related reports leads to crime prevention in one area, sometimes that successful effort can push crime to new areas. Because residents are more likely to report crime-related activity, these reports once coupled with district

information, will be likely be one of the most complete data sets of crime and service deliveries. Smart cities have continuous access to complete data sets as they evolve through coproduction and citizen sourcing.

Recommendation #1*: The Information Technology Department should implement a solution to tag the district number on mobile app requests.*

Additionally, the process model included in the methodology of this study sought to assess time that elapsed between various statuses, such as from receipt of request to department assignment, from department to staff assignment, and from staff assignment to task completion. However, this data was not obtained due to structural limitations in the CRM. The only statuses available are open, in progress, and closed as discussed in Table 14. Also, based on data in Table 14, the event that triggers a change in status is dependent on the type of service and department. The treatment of current status changes is purely operational and does not provide transparent or accurate status updates to the requestor. This functionality exists in other apps, such as Seattle's Find IT, Fix It (Macz, 2017).

Recommendation #2: *Create a flag on the internal-facing CRM for the various stages of "in progress." The City could determine the most appropriate in-progress flags for the entire CRM, or alternatively, different in-progress flags could be created depending on the service type. Based on the response time metric for the general customer service online form response rate of three to five days as noted in the methodology, an in-progress flag should be triggered within three days. Some examples could be the following:*

- *Issue assigned to staff member/contractor*
- *Staff is assessing the issue*
- *Staff/contractor has been sent to the field*

- *Follow-up needed (with an explanation of why follow-up is needed in the comments)*

Evaluation of Research Questions

Research Evaluation Question 1: Does My San Jose meet the benchmarks for the services it supports?

Overall, benchmarks were met (closed status) 55.1 percent of the time from deployment through the end of January 2017. Service requests are completed on time, on average, for graffiti (76 percent) and illegal dumping requests (74 percent) (Figure 2). The quantitative data is supported by the qualitative data. As noted in the background, illegal dumping has the RAPID Response Team as a dedicated resource to pick up illegally dumped items. Graffiti Abatement is also a long-standing program that has already seen success with its own app. The graffiti team already knows what works for its users and for its internal workflow. There is a significant amount of automation involved in completing service requests at the start of the business day, with assignments routed to the contracted vendor's technicians based on geographical zone (one for each zone), per Table 9. Table 5c illustrates the amount of detail that is included in their back-end system, which helps the team route or respond to the graffiti request more appropriately. The team also has a prioritization process (Table 10) due to the nature of gang-related graffiti. Because there are public safety implications to some graffiti, abating those first is part of a separate, gang prevention effort that is coordinated with other departments and city partners.

The implementation of My San Jose has not significantly altered the team's process. An additional burden on the team may have been added due to the closing of erroneously entered requests, which prompted staff to enter new requests on the My San Jose website. Therefore,

programs that have previously implemented a customer-facing, integrated work-order process tools, such as SJ Clean, have more success in fulfilling service requests.

Recommendation #3: *Track the number of extra tickets that staff enter for services not completed by their respective departments to better determine trends in user error or misunderstanding.*

You, Motta, Lio & Ma (2016) included a service request modification option on the internal-facing CRM, as stated in the literature review. This functionality currently does not exist except for the comment fields and status updates. The system does not allow rerouting (Table 9). The time staff spends on entering new service requests on My San Jose is an opportunity cost to further reviewing, and completing, their own departments' service request(s). While the graffiti abatement and illegal dumping teams can afford to spend time inputting corrected service requests, others' service request fulfillment is underperforming according to the benchmarks, which may be related to time diverted to correcting requests.

Recommendation #4: *Create a modification function to allow staff to more automatically route service requests to the appropriate department.*

In contrast, the worst performing services were potholes (30 percent met the benchmark), followed by streetlight outages (33 percent) and abandoned vehicles (47%) (Figure 2). Once the automatic re-routing is implemented, it may be possible to better investigate bottlenecks as the service request moves throughout a department's workflow. However, the complexity levels of the services could help interpret why certain services can be completed faster than others. Graffiti and illegal dumping are easier to remove if it is within the jurisdiction. Potholes, streetlights, and abandoned vehicles are more complex. There are also traffic and safety implications when filling potholes and fixing streetlights. Therefore, it is to be

expected that these services take longer to complete. It would be helpful to publish exactly how long it takes the City to complete these services while on site, and then adjust the metrics to more reasonable expectations.

Although it is third in overall performance, abandoned vehicles is perhaps the most complex. First is the issue of coordination. If an abandoned vehicle is stolen, an additional layer of complexity is added (Table 13). Secondly, the trigger for an "in progress" status occurs when a warning is issued, not when the vehicle is being towed (Table 14). If the car is moved with or without City action, the "closed" status is switched. Additionally, it received the most service requests, amounting to 20,564 across the City (Table 8). No other service request category exceeded 7,000 for comparison (Table 8). This calls attention to a larger question – is the abandoned vehicle policy appropriate? To reiterate, "It is illegal to leave a vehicle parked for more than 72 consecutive hours on a public street without it being driven at least 1/10th of a mile" (City of San José, 2017b). If there are over 20,000 requests, and for example, only 15% of them receive actual city action of a warning notice or a tow, city resources may not be best allocated to be monitoring these requests at such a brief timeline for removal. To increase efficiencies, this research promotes setting clear priorities when identifying which vehicles to abate first. This may necessitate additional required information when app users or callers are requesting vehicle abatement services, such as whether requesters have seen or reported the vehicle in the past.

Recommendation #5: *Investigate when residents are reporting abandoned vehicles and where. Determine how much of the time a service request is truly actionable. If this outcome is small, conduct a cost-benefit analysis that includes city discussions or surveys.*

Research Evaluation Question 2: Does My San Jose meet the 2014 San Jose City Auditor's recommendations?

The audit from 2014 specifically recommended a new CRM/Service Request Management system that is to be integrated into the internal workflow (Office of the City Auditor, 2014). The implementation of My San Jose and its integration with all back-end systems confirms that the City's IT Department fulfilled this recommendation. The 2014 audit also recommended more self-service options to reduce the number of calls the staff has to answer. (Office of the City Auditor, 2014). According to Table 5a, the preferred method of communicating with the city is still by phone, especially for all types of general requests. Therefore, this research designates an "in progress" status to the action item of reducing the number of calls the city staff members must answer and manage. While cell phone proliferation provides the opportunity for residents to use smartphone apps, another tool for residents to engage with government (Kavanaugh et. al., 2012), a tool is not useful if the residents are not aware that it exists, and it is not productive if its performance results in an erosion of trust in government (Brabham & Radin, 2015). Furthermore, additional options could be created on the My San Jose website and app to better reflect the types of requests CSJ is already receiving such those related to utilities, water, and payments.

Communication capabilities have improved and permeated the marketing and outreach activities of cities (Lloyd & Lam, 2017). Seattle has made extensive outreach and engagement efforts that included face-to-face neighborhood walks with city representatives (Seattle, Department of Neighborhoods, 2017). Just as the walks may make citizens feel incentivized to continue engaging and making reports (Brabham & Radin, 2015), there may be other incentives for business and community partners to advertise My San Jose. Having district data from the

app as set forth in Recommendation #1 would enable councilmembers and the administration to create targeted outreach activities.

Recommendation #6: *Create an immediate outreach and marketing initiative. Explore potential resident, business, and partner incentives.*

Research Evaluation Question 3: Which input source has faster completion times?

By incident source (Table 5a), completion of illegal dumping requests performed the best across incident sources (agent desktop/Customer Contact Center, mobile app, and website), followed by graffiti, abandoned vehicles, streetlight outages, and potholes. By summing the total variances by incident source, service requests input by the Customer Contact Center took longer to complete. Requests entered via the My San Jose website, across all services, were the quickest to complete. There could be various reasons behind these findings, such as language barriers, complexity, unfamiliarity with the app, and interface functionality on the website vs. the app. In addition, a call received by the Customer Contact Center (agent desktop as seen in the tables of data) creates an extra step that could otherwise be automated if a service is being requested.

Research Evaluation Question 4: Which input source is more accurate?

The least accurate input source varies depending on what is being asked. To reiterate, district numbers are not assigned to the mobile app service requests, which skews the data significantly. General Requests were given designations for County, payment, short answer, utility, water, and other. However, there is another field that does not have a designation and simply states "General Request" ("GR" in Table 5a and 5b). These are all received on the website and Customer Call Center's agent input sources. The app only has one "General Request" option. Therefore, there is an opportunity to clean the data categorizations and

standardize them across all incident sources for reporting and performance purposes. Similarly, graffiti requests also have more granular designations as listed in Table 5b. Having these types of designations can assist staff with coordination and resolution, whether internal or with another jurisdiction, especially with an image that is uploaded to confirm the designation. These designations can also be leveraged to standardize any scripted responses.

Recommendation #7: *Explore creating out-of-jurisdiction flags on the backend of the CRM to better assess where there may be a need for regional efforts and script standardization.*

According to the quantitative and qualitative findings, illegal dumping requests have the highest accuracy and completion rates, which are highly correlated to the process involved to assign the requests. Table 11 explains how Department A reviews requests that are automatically routed to it, to assign priority statuses 1 and 2. Priority 2 requests are illegal dumping requests that can be completed by Department B (Table 11). Therefore, there is little to no excess review for erroneously routed requests. This straightforward process coupled with the lower complexity of the task to collect illegally dumped items helps explain the high accuracy and completion rates.

Research Evaluation Question 5: Does one district see faster completion times over another?

Across all service type categories, District S has experienced the fastest completion times, on average (Table 7 and Table 8). For illegal dumping, District H and District S experienced the fastest completion times (1.8 days on average with a goal of 7 days). For graffiti, District H experienced the fastest completion time (0.3 days on average with a goal of 3 days). For abandoned vehicles, District D experienced the fastest completion time of (18.1 days on average with a goal of 15 days). For potholes, District Q experienced the fastest completion time (11.6 days on average with a goal of 2 days). For streetlight outages, District V experienced

the fastest completion time (15.1 days on average with a goal of 7 days). Although District H had experienced the fastest completion times for two services, it is difficult to prove that it is a preferred district to serve, rather it is likely to be coincidental. As mentioned previously, district designations are not assigned to the mobile app requests, and therefore, this evaluation is based on incomplete data.

Recommendation #8: *Create a "fix" in the app to allow a district designation to be automatically populated based on the address of the problem.*

Further research is needed to determine what data is needed to evaluate the service delivery or service request resolution by district.

The district data in Table 7 and Table 8 also would be more comprehensively supplemented by qualitative data about the district characteristics. For example, does a district that has more non-English speakers experience slower completion times? If so, is this due to language barriers, insufficient outreach, lack of access to technology or some combination of factors? Is a district whose residents are more affluent more likely to create a service request? What is the level of trust in each district? How engaged with City efforts are residents from each district, and why? Furthermore, the need for answers to these questions is supported by the initial surge of requests in the first month of app deployment, followed by flatter counts of requests, except for general requests and abandoned vehicles (Figure 5).

Recommendation #9: *Conduct deeper analysis on district characteristics to align outreach activities and plan anticipated service needs, which will help determine the amount of resources the City needs to allocate or reallocate to support a robust response to app-based service requests.*

Recommendation #10: *Conduct a survey solely on My San Jose customer service expectations.*

CONCLUSION

In answering the research question at a high level (*Is the functioning of My San Jose smartphone application and website platform meeting the intended goal of improving the customer experience with requests for city service?)*, the research supports the conclusion that it depends. My San Jose, with just six months of data, has provided enough insight, coupled with historical and newer experiences, to determine next steps for enhancements. The simpler service requests for graffiti abatement and illegal dumping removal are more successful than the more complex service requests for streetlight outages, abandoned vehicles, and potholes. There is room for discussion about changes in response policy for abandoned vehicles once further research is conducted, as set forth in the recommendations. There were limitations in the data provided (namely, districts designations for app requests and intermediate status updates); therefore, a complete scope or evaluation of performance by district is not possible. Additionally, General Requests are typically high and have little to do with the five specific services that the platform supports

Ensuring that My San Jose is as successful and "smart" as possible not only allows the City to continue along its path of becoming a "Smart City", but it also increases the number of active users, accountability of the administration and council, and confidence in the government. My San Jose, unlike many of other case examples, is not a pilot. It is here to stay, with allocated resources included in the budget and expectations of service set in the public perception. While the app is receiving ongoing usage, outreach and marketing need to be increased to ensure that the City can get an accurate scope of all the issues it needs to address, as well as to engage app users to keep them engaged, which in turn fosters a better collaboration between the government and the public. As the 10th largest city in the United States, and as the capitol of Silicon Valley,

the city of San Jose is highly motivated to become the best at municipal innovation, to become a Smart City.

There are theoretical discussions in previous research about administering products and services from an operational perspective, and about ensuring highest customer satisfaction. To do both well can be challenging, but a mutual benefit can be attainable with ongoing public engagement, education, and more complete data.

Appendix A: 2018 Status of 2014 Audit Recommendations

2014 Audit Recommendations*		Closed	In Progress
#1	To improve access to City services, the Administration should correct erroneous telephone numbers and links on the City website. Further, the Administration should develop policies and procedures to ensure that the City website and departmental webpages remain current and are reviewed on a regular basis by individual departments.	X	
#2	To improve access to City services and to reduce the City's telephone call handling costs, the Administration should develop a coordinated strategy to: a) Offer new self-service options for the City's most frequently used services by phone, online, and/or by mobile app; and b) Establish utilization targets for new and existing self-service options and advertise them accordingly.		X
#3	To improve wait times during peak demand periods, the Customer Contact Center should: a) Modify its staff members' duties as needed. This includes continuing call answering duty assignments to Principal Office Specialists as needed; b) Modify its staff schedules as needed, including start, end, and break times for shifts, and scheduled time off; c) Seek short-term staffing relief as needed. This could include engaging temporary staff and utilizing the answering service vendor.	X	
#4	To improve their performance management, the City departments should regularly use call center statistics in analyzing past performance, expected programmatic changes, establishing next performance objectives, examining overall performance strategies, and reviewing their staffing needs. Further, call center managers should regularly review and discuss individual call taker statistics with their staffs, and install real-time monitors where needed to provide real-time customer wait time information to call takers. These performance management practices should be documented in departmental policies and procedures.		X
#5	To improve performance management at call centers, the IT Department should ensure that the new telephone system enables call centers to record phone calls. The call centers should consider implementing customer surveys and should use recorded phone calls to regularly train their staff and improve customer service	X	
#6	To improve the customer experience in its call tree, Animal Care and Services, with assistance from the IT Department should review and revise its call tree in accordance with best practices and a) make it shorter and simpler; b) make it responsive to customer needs by removing unneeded options and ordering options meaningfully; and c) correct the inaccurate information.	X	

2014 Audit Recommendations		Closed	In Progress
#7	To improve the customer experience in their call trees, the call centers with assistance from the IT Department should: a. Immediately change the incorrect messages b. Regularly review call trees for accuracy, simplicity, and ease of use, and establish procedures to continue doing so c. Maintain up-to-date transcripts and flow charts of their call trees, and establish procedures to continue doing so; and d) encourage callers in each tree to use self-service options (when available).		X
#8	To improve customers/ voicemail experience, departments that use voicemail boxes should: a) Develop a new policy on how frequently voicemail boxes should be reviewed and how timely messages should be returned; b. Assign their staff members primary and back-up duties to respond to voicemails, and incorporate this into their procedures; c. Regularly review voicemail retrieval reports to ensure that voicemails are being checked; d) remove those voicemail boxes that will not be checked or will not be needed; and e) use the online interface to retrieve voicemail messages. The IT Department should ensure that the new phone system has an online voicemail interface.		X
#9	To ensure accessibility of City services to non-English speakers, the Administration should clarify that the Language Line purchase order is available to all line departments and provide assistance to line staff on how it can be used.	X	
#10	To ensure accessibility of City services to non-English speakers, the Administration should formulate a policy and goals that further language accessibility and provide assistance to line departments implementing this policy.	X	
#11	The Administration should coordinate development of an online knowledge base that enables call takers in various departments to provide accurate information to customers and minimize the number of times that a customer's call needs to be transferred.		X
#12	The IT Department should work with other departments to set up automated data transfer between online service requests (web forms and mobile apps) and existing departmental work order systems. In addition, the Administration should review whether different service request systems could benefit from integration and CRM implementation.		X
#13	The Administration should develop a long-term strategy to improve customer access including consideration of a centralized call center with integrated CRM.		X

*The table is compiled from audit recommendations from 2014 (Office of the City Auditor, 2014) and the IT Department audit updates (Lloyd, 2017).

Appendix B: Smart San Jose App Presentation to the Smart Cities & Service Improvements Committee

Smart Cities & Service Improvements Committee

My San Jose

Margaret Lam, Rob Lloyd
Information Technology
Sept. 7, 2017

Smart Cities and Service Improvements Committee

My San Jose

OVERVIEW:

- Digitize, automate, and integrate city services for top concerns:
  - Graffiti Abatement
  - Abandoned Vehicle
  - Pothole
  - Streetlight Outage
  - Illegal Dumping
  - General Request
- A modern platform to for a Superior Customer Experience
- A foundation for Smart City Goal: User Friendly City

Smart Cities and Service Improvements Committee

My San Jose

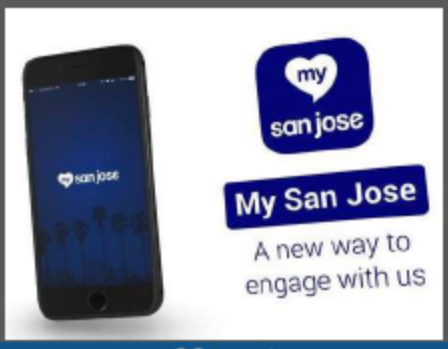
STATUS:

- Successful Go-Live on July 31, 2017
  - Customer Call Handling and FAQs
  - Mobile App and Online Portal
  - Live Chat
  - Public Request Dashboard
  - Integration with departmental systems for dispatch
  - Reduction of duplicate and incomplete cases
- Productize My San Jose for continuous improvement!

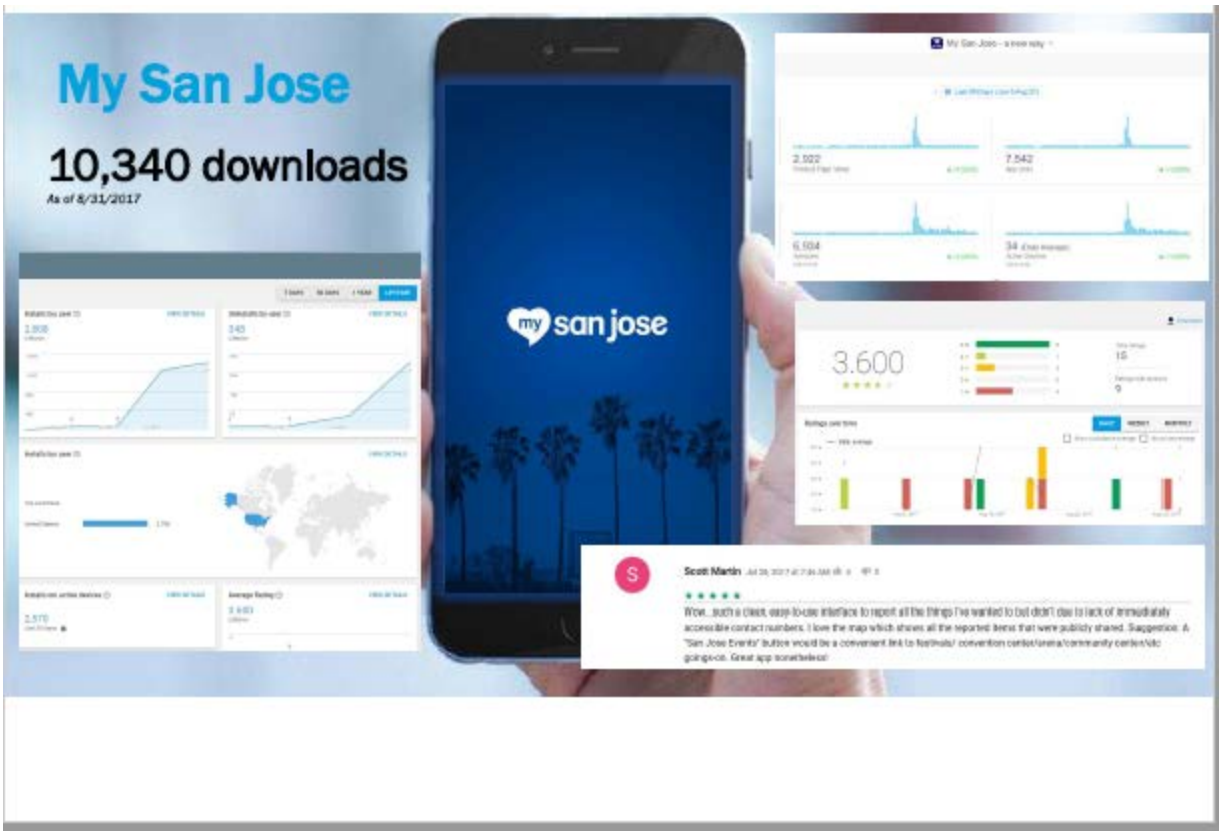
Smart Cities and Service Improvements Committee

My San Jose

Dec 2016 Council Approval → Jan – April 2017 Product Development: Build / Test / Iterate → May 1 Alpha Launch → June 20 Beta Launch → July 31 LIVE!



my san jose



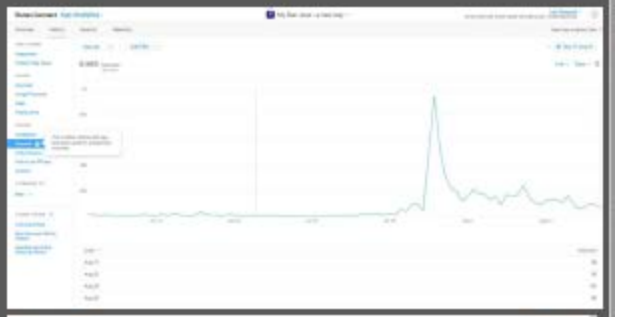
How Many People Are Using the APP?

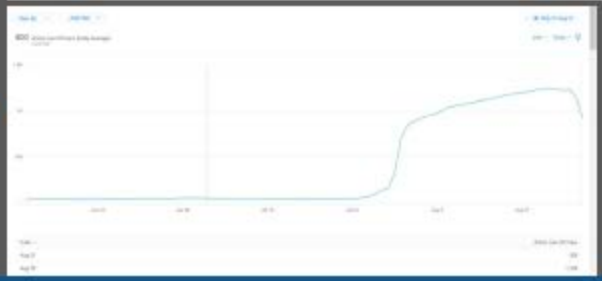
iTunes – iOS

- 400 daily active (last 30 days)
- 6,965 active sessions (online for over 2 seconds)

Google - Android

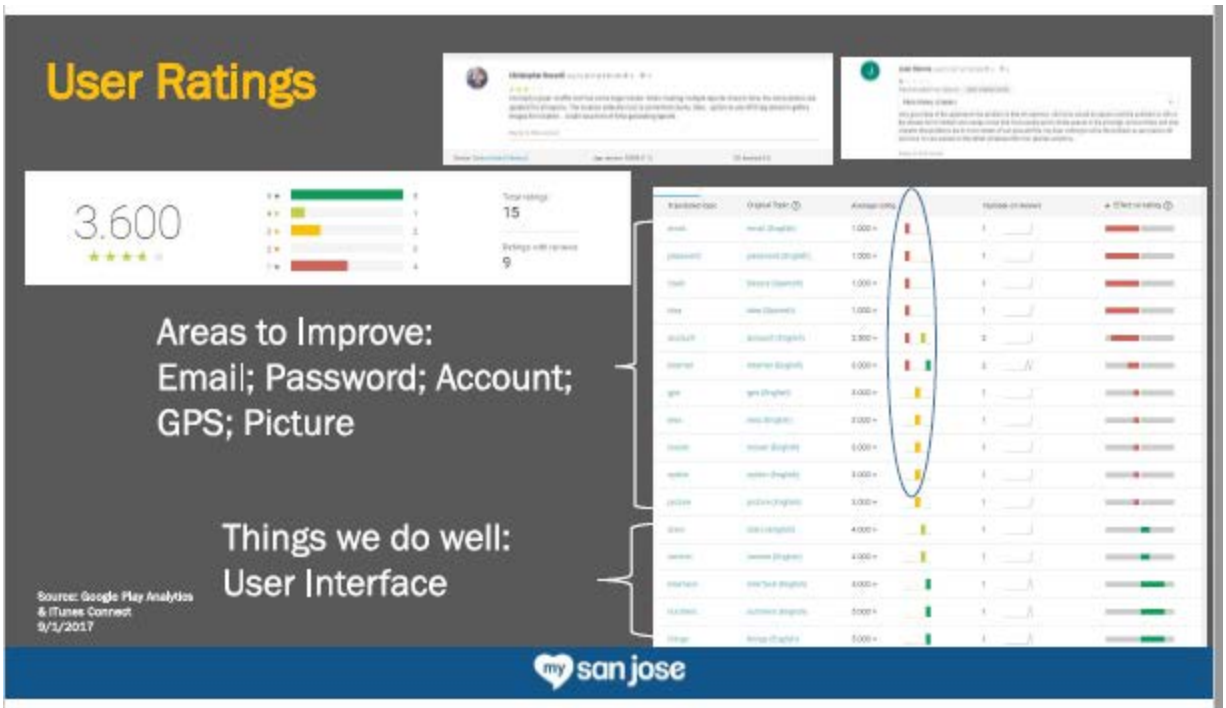
- 2,570 active devices





Source: Google Play Analytics & iTunes Connect 9/1/2017

my san jose

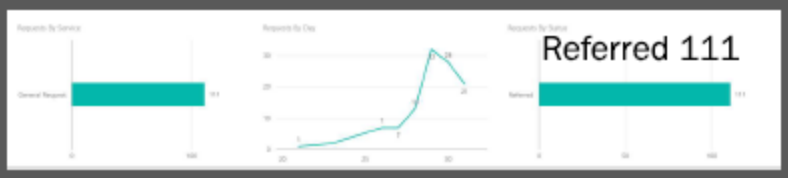

User Ratings
3.600
Total ratings
15
Ratings with reviews
9
Areas to Improve:
Email; Password; Account;
GPS; Picture
Things we do well:
User Interface
Source: Google Play Analytics
& iTunes Connect
9/1/2017
my san jose

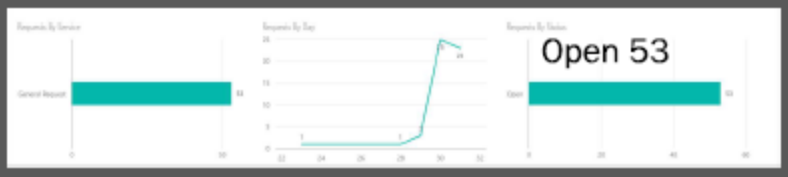

My San Jose - Requests Dashboard
12,300+ Requests Closed since Go-Live!

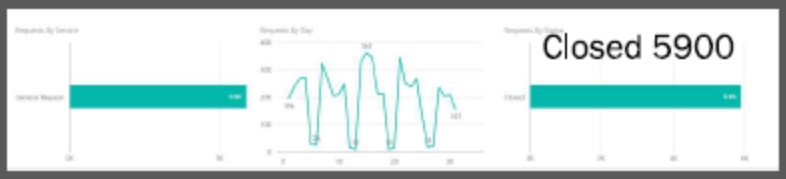
General Requests

- Calls mainly Utility - Water, Garbage
- From the App – Homeless concerns, Vehicle Abatement, Illegal Parking, Illegal Dumping
- "Referred" to other Departments
- "Closed" to outside City jurisdiction
- Live Chat is proving popular

Source Data: 8/1/2017- 8/31/2017







my san jose

Smart Cities and Service Improvements Committee

My San Jose

LESSONS LEARNED:

- Business Process Re-engineering is a team sport
- Customer Experience / Usability
- Improve communication to customers

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Smart Cities and Service Improvements Committee

My San Jose

IDEATION SESSIONS

Ideas & Constructive Feedback

- Housing, PRNS, DoT, Animal Services, ESD, Library, PW, PBCE
- Mayor's Office
- Council Offices

Over 70+ Feature Requests

- Critical Must-Haves
- New Service Request Types
- Nice-to-Haves
- Stretch

"Must-Haves"
Login / Password / Remember PW
Map Pin
Meaningful "Closed Status"
Social Media Login (fb, twitter, ...
Photos, icons, layout, San José...
Structuring of FAQ
Abandoned Vehicle additional fields
Oracle Release Upgrade

"Nice-To-Haves"
Garbage / Recycling Services
Neighborhood Dashboard
Illegal Dumping Reward Program
Random Act of Kindness
Language support for Spanish and Vietnamese
Mobile and Portal sync notifications
Map Pin overlays
Enhance "Sliders" colors

New Service Request Types
Parks Concerns
Animal Services
Traffic Signal Outage
Homeless Concerns

Stretch
An iPad Version
Edit request after submit
Chatbot
Safety Concerns
Illegal Fireworks
9-1-1 Emergency
Facility Requests

my san jose

Smart Cities and Service Improvements Committee

My San Jose

FUTURE RELEASES:

- **Strengthening Platform Performance to Scale**
  - Improve Usability of existing features
  - Refine feature set to work well
  - Improve backend business processes
- **Addressing Pain and Annoyance**
  - Volume
  - Impact
  - Solution Fit
- **Building a culture of Release Management**
  - Oracle System Release Upgrade
  - Must-Have Usability Issues
  - Internal Dashboard to collect iterative feedback
  - Business Process Re-Engineering
  - Operational Rhythm on maintenance / performance
- Budget Process and Audit Recommendations

It may take longer, but let's do it right!

Where can we make an Impact?

Recent Completed Releases
V1.0 - July 1 Go-Live
V1.1 – Multiple Photo Images
V1.2 – Mobile bug fix, Lat/Long/Loc

my san jose


It's all about the journey, the
Amazing Customer Experience!
my
san jose

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