Information requirements to create public value: sharing and opening data to address urban blight

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Abstract

Purpose – Blighted and vacant properties represent a persistent and costly problem for cities and local governments throughout the USA. The purpose of this paper is to identify data needs and requirements for value creation in the context of urban blight. The main assumption is that sharing and opening data through a robust and effective code enforcement program will facilitate more informed management, mitigation and remediation of blighted and vacant properties. Code enforcement programs must be grounded on organizational and technical infrastructures that enable data sharing and value creation for the city and the communities that share its space.

Design/methodology/approach – In this paper, the information needs and realities of a city's code enforcement environment are described, based on data gathered through a series of workshops and focus groups with a range of stakeholders, which included city government departments, police, fire, bank representatives, realtors and community groups.

Findings – The analysis reveals key data elements that could potentially help to build a code enforcement program to better manage the cycles and costs of urban blight. Although some of these data elements already exist, and are public, they are not easily accessible to key stakeholders. The paper ends with sets of short-term and long-term recommendations for establishing an information-sharing infrastructure, which would serve as the main conduit for exchanging code enforcement data among a number of city government departments and the public that may play a role in managing urban blight and its consequences.

Originality/value – In this paper, the authors are connecting extant literature on sharing and opening data with literature on the creation of public value. They argue that sharing and opening government data constitute effective ways of managing the costs and cycles of urban blight while creating value. As a result of an initial assessment of data and information requirements, the authors also point to specific data and its potential value from stakeholder perspective.

Keywords Information sharing, Local government, Open data, Public value, Urban blight

Paper type Research paper

1. Introduction

A city is a complex system where industries, population, housing, labor market and land interact in a variety of ways and follow diverse patterns for development (Forrester, 1969). In ideal circumstances, cities grow and attract people; houses and businesses are built, and the available land is consumed. Over time, the city moves from the growth phase into

equilibrium and the interaction of its dynamic variables like population and economic conditions fluctuate. In practical terms, unless the urban area is continuously monitored and sustained via a conscious renewal process, it will most likely deal with aging housing that may degenerate into urban blight (Sanders and Sanders, 2004). Urban blight is a phenomenon that lacks a universally accepted definition and involves the multidisciplinary intervention of areas as different as urban planning, social sciences, public policy development and urban ecology (Weaver, 2013). Urban blight involves issues ranging from physical conditions of properties to deep systemic and structural issues such as job creation and economic attractiveness. The common citizen has been introduced to urban blight visually through the proliferation of decaying properties; mostly abandoned, large portions of land being neglected, and the accumulation of trash, defined slum conditions.

Regardless of the lens under which urban blight is analyzed, it is clear that the phenomenon has deep economic and social consequences (South *et al.*, 2015). For a city like the one studied in this paper, urban blight presents the daily challenge of dealing with over 1,000 blighted and vacant properties within its jurisdiction. The total cost of blight encompasses a range of costs including those easily quantified and those not easily quantified, therefore calculating a total amount is a subjective process. For example, lost tax revenue and city-provided abatement services have exact costs associated with them, whereas the lost property value within the neighborhood and higher insurance premiums are less exact. Within the city studied, managers calculated that a single vacant property could on average generate expenses and lost revenue of US$10,000 over the course of 5 years. As such, with the number of blighted and vacant properties within the city, the total negative economic impact could reach well over a US$10m over the five-year period. It is important to note that while these estimates are high, they do not include remediation or demolition, which was estimated to be on average US$35,000-45,000 per property within the city. If demolition costs were added in, the economic impact for the city would grow substantially.

Because of the related costs, as well as its economic and social impacts, preventing urban blight is closely related to the creation of public value. Urban blight is such a determent to living conditions that it has the potential to disrupt the balance of the social contract "spurring a downward spiral of widespread rule defection and increased coercive enforcement at significant social costs" (White *et al.*, 2014). On the other side, the concept of public value is anchored on continuing and improving conditions for new public management tenants (Moore, 1995a). At its core, public value is created through government actions that actually produce a net benefit to society (Meynhardt, 2009). Failure from local governments in the overseeing of the urban dynamics that promote decay, stagnation and eventually blight is a contributor to the erosion of public value, while any measures by public agencies and officials to combat the causes and consequences of the phenomenon could, at the same time, create it.

In this paper, we argue that sharing and opening government data constitute effective ways of improving code enforcement programs and contributing to better tools to manage the effects of urban blight while creating value. The purpose of the paper is to identify data needs and requirements for value creation in the context of urban blight, from the perspective of key stakeholders in the city. The main assumption is that sharing and opening data through a robust and effective code enforcement program will facilitate a better management of property cycles and costs of blighted properties. Our argument is based on the case of a small city[1] in New York State (population of approximately 66,000), facing the need to manage urban blight. City officials and other public and private entities identified code enforcement[2] as a fundamental element of the city's sustainability, economic development and effective service delivery to the citizens. This group of key stakeholders believed that the

first step in addressing the deteriorating conditions of hundreds of properties was to identify and assess the data currently in place as part of their code enforcement information environment, and then moving toward the creation of an organizational and technical platform to better manage the city's urban decaying trend. Such platform would allow city agencies to share code enforcement data among the departments while setting the stage for opening these data to the public. Our results, although preliminary, make evident the need for these stakeholders to share and open code enforcement related data. Moreover, information gathered through these initial stages of understanding project context and requirements allows us to make connections between data elements, stakeholders and sources of public value in managing urban blight.

Following this introduction, this paper is organized into an additional five sections. Section two introduces key concepts of public value and their relationship to sharing and opening data. Section three describes the main methods used by the city to approach the problem and understand its information environment. Section four includes the main findings from the data gathered in the workshops and focus groups, and section five identifies key themes and challenges. The last section of the paper includes our conclusions and main recommendations for the city.

2. Literature review
2.1 Open data and public value creation
The concept of public value was introduced by Moore (1995a) as a way of translating principles of strategic thinking from the private sector into the public sector. The concept was born as a result of Moore's reflection in contrasting the goals of public and private managers. From his perspective, instead of having the commitment to create private (economic) value, public managers had the commitment to create public (social) value. In this sense, public value may be understood as a concept to refer to the outcomes of public management actions. There is closely related literature that focuses on public values (Jørgensen and Bozeman, 2007; Bozeman, 2007). This literature's focus is on defining catalogs of public values, as well as understanding the ways in which society agrees on them. One stream of this literature focuses in ways of facilitating conversations among key stakeholders in a continuous dialogue about relevant values (Harrison *et al.*, 2012; Cresswell *et al.*, 2015). Although there are some attempts to integrate both literatures (Bryson *et al.*, 2014; Stoker, 2006), in this paper, we are following Moore's understanding of public value as an outcome of public management actions. Moore's main objective was to provide public managers with a framework for understanding the strategic alternatives to the process of creating value.

In his initial work, Moore introduced the concept of the strategic triangle as a reference framework that shows the importance of aligning three related processes:

(1) the definition of public value;
(2) the construction of a diverse group of stakeholders to provide an environment of authorization; and
(3) the mobilization of internal resources and those outside the organization to achieve the desired results (Benington and Moore, 2011).

From this perspective, public value is defined and planned by elected and appointed officials, and it is finally delivered via "a range of intervention options that rely extensively on building and maintaining networks of provision" (Stoker, 2006). In other words, citizens create the demand for services; government officials, acting as representatives of the people, assess the demand and prioritize it and, when services are delivered via a network of public

and private actors, value for the public is created. Wirtz and Birkmeyer (2015) identified information and communication technologies (ICTs) as the cohesive mechanism between public agencies and the civil society in the quest for a collaborative and participatory process to define the actions and the administration of government. To that end, governments all over the world and at all levels (federal, state and local) are using modern ICTs to publish volumes of data (data sets) and making them accessible to their constituents to incentivize citizen participation while legitimizing the provision of services and their corresponding perceived value (Ganapati and Reddick, 2014).

As an example of this new trend, the Obama administration enacted an Open Government Directive looking for public agencies to act within a framework of transparency, collaboration and participation (Ganapati and Reddick, 2010; Orzag, 2009). Open data are defined as "non-privacy-restricted and non-confidential data, which is produced with public money and is made available without any restrictions on its usage and distribution" (Janssen *et al.*, 2012). At the local level, Kassen (2013) suggests that benefits of promoting citizen participation via open government and open data are multiplied, as these types of initiatives tend to have a higher return on investment because a higher percentage of people may get involved and more specific (local) knowledge is shared. In fact, being able to scrutinize the data that drive the policy-making process increases the public's confidence in their elected and appointed officials because of the implied transparency in the regulatory actions of the government (Napoli and Karaganis, 2010).

Although the literature tends to overemphasize the value created by opening data in terms of increased transparency or citizen participation, research has also found that there are risks and disadvantages in the process such as violations to privacy or misuse and misinterpretation of open datasets (Zuiderwijk and Janssen, 2014). In this way, risks and value creation from open data projects needs to be carefully assessed, especially in those projects involving data shared across organizational boundaries in government (Zuiderwijk and Janssen, 2015).

As we will discuss later in this paper, code enforcement data constitute a source of value when local government agencies create capabilities to share it and open it. Code enforcement in the USA is associated with the foundational duty of government to protect its citizen's property rights. To that end, in the early 1800s, municipal governments created agencies of housing code inspectorates whose sole purpose was to promote public safety by preventing code violations such as structures that were vacant or simple noise nuisances through community relationships (Uzdavines, 2014). In modern times:

[…] every code enforcement agency must effectively accomplish three things. First, it must properly and systematically identify code violations. Next, it must monitor the properties identified as violating the code, and take the proper action when the problem is not remediated. Finally, there must be a remediation process, which results in either restoration or demolition of the problem property (Uzdavines, 2014).

These three steps may become resource and time intensive depending on the geography, population and density of the specific municipality compounded with the inevitable fact of navigating through the American court system to determine the liabilities, and responsibilities of the property owners (Uzdavines, 2014).

2.2 Data sharing and governance in the public sector as a creator of value
In the preceding section, we discussed the main concepts of open data and public value. In the case presented in this paper, both of these ideas are intertwined with the exploration of the needs and requirements of sharing data to address urban blight through a stronger code

enforcement program. In this way, this section briefly introduces concepts related to data sharing and governance, as they are relevant to the context of the paper.

At a high level, data sharing is conceptualized as the process of gathering data across technology platforms and organizational boundaries. In the public sector, its ultimate goal is to transform such data into improved policy decisions and measure their effectiveness; achieve operational efficiencies and to assess the performance of government institutions (Gil-Garcia and Aldama-Nalda, 2011; Gil-Garcia et al., 2009; Wenjing, 2011; Dawes et al., 2009). It is important to note that data sharing arrangements are most of the time private data exchanges between agencies, and possibly between agencies and private organizations. This is different from open data where data are made available to everyone without restrictions. Emergency response agencies are prime examples of the importance of data sharing. Being able to access, send or receive data from partners is crucial in these agencies' attempt to serve the public in the case of disasters such as fires, hurricanes, floods or earthquakes (Harrison et al., 2006). Code enforcement data are also shared with emergency response agencies such as the police or the fire department. As we will describe later in the paper, code enforcement data are useful in the processes of responding to emergency calls.

Nevertheless, the implementation of a data sharing infrastructure presents a number of challenges such as disparate technological landscapes and organizational structures that make it harder for public agencies to fulfill the vast amounts of service requests they receive from their constituents and other partners (Wenjing, 2011; Luna-Reyes, 2013). As an alternative, governments have tried methods of governance emulating networked structures that could actually promote the exchange of data for better decision-making (Dawes et al., 2009; Luna-Reyes, 2013; Aldama-Nalda and Gil-Garcia, 2011). This new type of participatory system not only enhances collaboration but also creates the notion that mutually beneficial solutions are achievable because they promote involvement in the decision-making process (McCaffrey, 1995).

It can be argued that pursuing a data-sharing infrastructure needs to be seen as an opportunity for organizations to share resources, values and solutions creating elevated levels of trust among partners (Dawes et al., 2009; Luna-Reyes, 2013). This new alignment of objectives, human and political capital should contribute to building a comprehensive technology roadmap that promotes clean, normalized and integrated data that in the end augments the value of public services (Gil-Garcia, 2012). Moreover, the engaging of non-public partners in these new, networked organizations forming a collaborative governance arrangement should pave the way for better programming and consented deployment of public policies (Ansell and Gash, 2007; Luna-Reyes et al., 2013). Nevertheless, and as a counter-balancing argument, existing research has suggested that technological transformation, like implementing a data sharing infrastructure, not only falls short on delivering the expected results to the public but also have failed in making government structures more efficient (Park, 2015) and policies tied to such initiatives more effective (Norris and Reddick, 2013).

As data are seen as an asset to the efficiency and effectiveness of an organization, it is necessary to reflect on how public entities administer it. Dawes (2010) views the government as a driver throughout the lifecycle of data assuming the roles of "collector, producer, provider and user" with the ultimate goal of establishing a data-driven policy development process. Paradoxically, existing policies may prevent government officials from clearly seeing the benefits of streamlining the public data lifecycle as well as the necessary steps for exchanging data with internal and external partners and opening public data to citizens (Harrison et al., 2007). For example, Helbig et al. (2012) stated that organizations need to consider the contextual usability of data, i.e. data to be shared should also be "ready to use"

so the recipients of the data, either internal or external are able to fully understand the message the data are conveying within a specific context. We can then infer that a higher value can be created from sharing and eventually opening complete, consistent and effectively contextualized data. On the other side, managing distributed data involves the planning, execution and monitoring of plans, policies and procedures that oversee the dynamics of creating, maintaining, publishing, retaining and disposing of the data which can be referred to as implementing a data governance process (Anthony *et al.*, 2015; Burke and Pardo, 2009). Regardless of whether a data governance process is in place, and despite recognizing the intrinsic value that opening government data may produce, public agencies still seem reluctant to disclose their information citing issues ranging from privacy and security to potential misuse by the public or even political figures (Zuiderwijk and Janssen, 2015).

3. Methods
The results presented in this paper belong to a project with the goal of understanding the impacts of sharing information in managing urban blight. The larger project follows the Smart IT approach (Dawes, 1996b) which consists of an intervention that follows the principles and practices of other soft systems approaches such as interactive planning or soft systems methodology. Smart IT is a three-stage method that starts with the analysis and understanding of the problem and its context and continues with designing and testing potential solutions to finally make a technical choice with an understanding of important organizational and contextual factors. The approach is rich in the creation of many different types of models and prototypes. Moreover, because of its participatory nature, it contributes with Moore's (1995b) vision of value creation by facilitating an authorizing environment.

This paper reports on initial explorations of the problem and its context, which took place from February to May 2014, and was organized into two streams of work:

(1) identifying information realities (current infrastructure and environment); and

(2) identifying information needs.

Both streams of work carried out data gathering primarily in the form of focus groups, meetings and workshops. Table I shows the schedule of the workshop and working sessions carried out as part of the project. Participants in the data collection activities were a diverse group of stakeholders including the Mayor's office, Building and Code Enforcement administrators and inspectors, representatives of the Housing Authority and Operations, the Finance and Information Technology departments, Zoning, Planning, local bank representatives, community and neighborhood groups, local realtors, the Fire Department, the Police Department and 911 dispatch, among others. The following list gives a brief overview of those data collections methods:

- *Envisioning workshops*: Envisioning workshops were held throughout the course of this project. Each envisioning workshop focused on a specific group of stakeholders to identify their information needs and insights in challenges in information sharing.

- *Focus groups/department meetings*: Focus groups were held to gather members of a specific department to focus on the systems, processes, procedures and policies related to that department's role in the collection, management, sharing and use of code enforcement related data.

- *Meetings*: Meetings (including a kickoff meeting) were held to clarify and expand the information generated through the envisioning workshops.

Activity	Stakeholders
Kickoff meeting (*February*)	Mayor's Office
	Fire Department
	Police Department
	Buildings and Code Enforcement Department
Envisioning workshops (*March-April*)	*Workshop 1: Assessment, Engineering, OGS, Building and Zoning*
	Mayor's Office
	Buildings and Code Enforcement
	Information Technology
	Finance
	Zoning Department
	Assessment Department
	Engineering Department
	Corporation Counsel
	Workshop 2: Fire, Police, EMS and 911 Dispatch
	Fire Department
	Police Department
	911 Emergency Dispatch
	Workshop 3: Community and Neighborhood Groups
	Mont Pleasant
	Hill Neighborhood
	SLIC (Schenectady Landlords Influencing Change)
	SUN (Schenectady United Neighborhoods)
	Habitat for Humanity
	BNI (Better Neighborhoods)
	SCAP (Schenectady Community Assistance Program
	Workshop 4: Banks and Realtors
	Prime Properties
	Prudential Manor Homes
	Key Bank
	NBT Bank
Focus group sessions (*March-May*)	*City Departments*
	Buildings and Code Enforcement
	Corporation Counsel
	Finance
	Information Technology
Meetings (*March-May*)	*City departments*
	Building and Code Enforcement Department
Findings presentations (*May*)	City Stakeholders – Internal and External
	City Council Members

Table I.
Activity schedule and
stakeholders

Each of the activities listed in Table I were designed to collect data about the information and technology environment, as it relates to the city's code enforcement program. Throughout the course of the project, 40 participants took part in the workshops, focus groups and meetings, generating a tremendous amount of data in the form of meeting notes and reports. Each data gathering activity was facilitated by a set of questions, as it is shown in Table II. The nature of the Smart IT approach involves continuous meetings among the project team to summarize and analyze the information collected following a qualitative approach. In this way, data analysis is a continuous process that takes place in project team meetings. During discussions in the project team meetings, the team members were continuously looking for common themes from focus groups and workshops, as well as assessing commonalities,

Data collection activity	Selected questions asked to stakeholders
Envisioning workshops	What code related information you do not have that you wished you had?
	What is the priority order of that information?
	What could you do (actions) if you had access to this information?
	How do you want to access this information and how often?
	What are the consequences of not having this information?
	What information do you get and in what format?
Focus groups	What policies and procedures do you follow in collecting, managing, updating that information?
	Who do you call for this information and how often?
	Who calls you for information, how often, and in what format do you supply this information?
	How often to you call the buildings and code enforcement department for information?
	What are the steps involved in accessing, updating and using code enforcement related information? What role do you play in this process?
Meetings	What is the overall vision of this effort (kickoff meeting)?
	What are your reactions to the data collected so far?
	Where are the challenges associated in getting this information to key stakeholders?
	What are the actions you could take right now to get this information to key stakeholders?

Table II.
Focus of data
collection activities

differences, information gaps, issues and opportunities in the code enforcement information and technology environment in the city. Conclusions and recommendations were also extracted from data through this conversational process of data analysis.

4. Results
4.1 Information needs
Each stakeholder group was asked about their information needs, as it relates to code enforcement related data, which mainly includes data about properties and property owners. Through analysis of the collected responses, data such as owner information, property address, permits issued, history of violations and status of violations were identified as most important to most stakeholders. It was also recognized that access to this information would significantly improve their ability to do their jobs and take proactive action within the city. Table III shows the top information needs identified and how each group of stakeholders interpret each need.

It is important to note how different groups of stakeholders may show similar information requirements as well as similar intended uses of the data. For example, the emergency respondents (Fire, Police, EMS and 911) identified property data and specifically structure type as one of their information requirements, which was shared with the community and neighborhood groups. In contrast, owner information was not deemed relevant by banks realtors, while city agencies and community groups identified owner data as an information requirement. The table also shows that besides specific data on the properties, stakeholders find value on general information about code enforcement regulations, description of violations and code criteria. It is also worth noticing that relevant information also includes information from private actors such as foreclosure or credit information.

In subsequent rounds of questioning and analysis of information needs, the city's emergency response departments collectively identified specific questions that they thought could make their operations more efficient and prioritized the data grouping into two groups:

Category	Assessment, engineering, OGS, building and zoning	Fire, police, EMS and 911 dispatch	Community and neighborhood groups	Banks and realtors
Property information	Organized access to building plans Historical files on building plans	Structure type Is the structure vacant or occupied? Is the structure deemed safe or unsafe based on information from code enforcement visits?	Information on building structures Property history Problem prone properties	Property data and information
Owner information	Need updated, accurate owner information	Need name, address, phone number and owner insurance information	Need to know owner information as well as information on who is responsible for the upkeep	
Code enforcement regulations	Consolidated databases of code enforcement related data including owner, violations, etc.		Information on code standards and processes	Code regulations information (minimum requirements to meet code standards) Code enforcement policies and procedures Housing violation descriptions
Code enforcement violations by property	Number of issues/complaints per property-historical view	Previous police activities (a list of what type of visit, what was found and when)	History of code violations by property with violation types	
Foreclosure/credit information	Updates on foreclosures		Foreclosure information	Information on potential buyers/renters

Table III.
Most relevant
information needs by
stakeholder group

"must have" and "nice to have". In a similar way, the Department of Corporation Counsel, the city banks and realtors and the community groups were invited to identify and prioritize questions that they consider "must have" and "nice to have". Table IV shows data deemed as "must have" along with how each department intends to use such information. The purpose of the table is to clarify the concept that code enforcement information may hold a different meaning and create value for each group of stakeholders according to several purposes. Value is captured partially by the goals or intended uses of information by each stakeholder group, as they were captured during the envisioning workshops, the working meetings or the focus groups. The table shows a sentence summarizing the intended value creation from answers to important questions, as well as quotes from transcripts and meeting minutes.

From the information needs listed in Tables III and IV, it is evident that information is closely tied to specific contexts. Code enforcement information does not necessarily "mean" the same to different stakeholders. This is shown through the range of questions that multiple stakeholders from a range of departments had about properties and property owners. As an example, when referring to owner information, some banks and realtors satisfy their data needs with knowing about the Limited Liability Company[3] (LLC) that holds title to a property, while the Corporation Counsel department may require more specific about the individual within the LLC responsible for the property. This is needed to inform action on the property such as collecting fines or taxes, addressing unsafe conditions and sometimes ultimately removing the entire structure.

Data in the third column of Table IV suggest that similar pieces of data can potentially create different types of value to each stakeholder group. For example, emergency response agencies such as Fire, Police and EMS need accurate owner information to know who is supposed to be in the property, and make sure that everybody is rescued. Community members, on the other hand, are interested in owner information to solve situations in the neighborhood such as a vacant and poorly maintained property. The table also shows that stakeholders are interested in different information formats. Emergency departments, for example, not only require pictures to better understand the current situation of the properties but also an updated version of the official "safety" determination of the building. Both types of data are valuable when responding to an emergency. Finally, although Banks and Realtors use information to improve the value of their own businesses, better investment decisions in this industrial sector also contribute to reduce the problem of urban blight. As discussed by stakeholders in the project, processes and decisions during the foreclosure of a property have an impact on its status.

4.2 Information realities
While gathering the information needs allows a common understanding of the questions and information necessary to help key stakeholders and organizations operate, it is just as important to understand the realities of the feasibility to collect and share data and information for those departments and organizations. Additionally, it also provides understanding with regards to opening these data to the public. An understanding of the information realities that exist within the city's departments was also identified through workshops, meetings and focus groups. A look at the data inventory, data elements, systems, policies and procedures that make up the buildings and code enforcement environment produced two distinct themes that describe the information realities within the city.

4.2.1 The city's buildings and code enforcement department serves as an informal information center. While the city's Buildings and Code Enforcement Department carries out a set of core functions, it has also emerged into an informal information center that is requiring staff to continually split their time across a range of responsibilities. As the need

Stakeholder group	Their *MUST HAVE* answered questions	Value creation if questions answered	Examples of negative impact if questions not answered
Assessment, engineering, OGS, building and zoning	How many times do I need to deal with property issues? When was the last time I wrote a violation at this property? How many times I have done that? Who is doing what on issue "X"? What is the next step? What is my role in the issue? Where is the most trouble-prone/cheapest place in town? Is investment in the place possible? Does County have similar plans to attract business investment and residency to the city? Where they plan to launch an initiative??	Improve efficiency and reduce error that damages government reputation	"Legal notices will be sent out the wrong person while the right one does not take on the responsibility. More severe consequence is to arrest the wrong person. The series of actions to the wrong person shadow the government's reputation" "If people always need to spend time looking for information they want, the city will have to pay for that. If it takes a city employee approximately 20 minutes/each time to go to Code Enforcement for some information, it cost around US\$2,964 to US\$4,992 per year/person, accounting for that person's 7% to 12% salary"
Fire, police, EMS and 911 dispatch	Who is the emergency contact person for each property in city? What does the property/building look like (picture)? What insurance information does the owner have? What services (permit modifications) are currently in progress on the building? What are the past and current code violations on the structure? What type of structure is it? What are the contents of the property? What is the total occupancy for the property? What is the tenant contact information for the property?	Improve productivity, emergency response and increase understanding of code violations	"When there is a fire, without accurate owner information, firefighters do not know who is supposed to be in the property, and they do not know whether everybody is rescued. Owner information has direct impact on such life-or-death issues" "A photo of the property clearly shows the exterior conditions of it. If problems are there, they are reflected on the picture. If, for example, people from the sanitary are equipped with mobile devices, they can simply take a picture of the property that seems to violate the regulation, and send it to Code Enforcement" "Code Enforcement has an official determination of "safety." We want to know whether the building is safe or unsafe with compliance with the standard" *(continued)*

Table IV.
"Must have" information needs and perceived value by stakeholder groups

Stakeholder group	Their *MUST HAVE* answered questions	Value creation if questions answered	Examples of negative impact if questions not answered
Community and neighborhood groups	Who is the owner of the vacant or blighted property? What is the history and status of the violations on the property? What are the building and code regulations for NYS and the city?	Neighborhood/community watching; proactive community involvement	"Community groups stated that owner information would help them better understand situations in their neighborhoods. If they knew accurate emergency contact information, they would be more confident and helpful in emergencies. It is a waste of time and resources when they need information of the owner (a person), but only find a listing of LLCs" "Community groups do not have a Code Guideline now. When problems occur, they have to call Code Enforcement to ask what to do. They cannot be proactive to problems without a general guideline"
Banks and realtors	What are the houses or apartments that are vacant? What are the codes/regulations information that provide guidance for the business and the public: Housing violations, permits needed, building guidelines and codes? What are the guidelines for addressing and tracking code enforcement violations?	Business development, better vetting of properties for sale/investing	"Banks and Realtors want to have monthly-updated information about vacant properties. They would like to know if those properties meet the requirements for sale" "They think that Housing Violations should be shared to all so that they can make better selling/investing decisions, and customers can rely on that to make their decisions, too" "Banks and realtors use the code-related information to partner with the government and to promote or advocate for their business"

for property and property owner information increases, it is becoming increasingly harder for the department to meet all their critical responsibilities while also providing information to other departments.

Specifically, the core functions and tasks for the Building and Code Enforcement Department include:

- advising, reviewing and issuing permits;
- assessing complaints and issuing violations;
- inspections;
- weighing in on zoning and other jurisdictional decisions; and
- prioritizing properties for a range of actions.

The role of the information center is also increasing as city departments and civil society organizations request information about properties, property owners and guidelines and regulations. For example, the Building and Code Enforcement Department receives, on average, about 20-30 calls a week from the 911 dispatch. These calls are in response to emergencies at properties where the owner is unknown. There are also requests from members of the Social Services Department that average about 20 instances per week asking about the conditions of properties where children might be placed. Other departments such as Engineering, Public Works and the Water Department make about 4-5 requests per week asking about the status and conditions of properties. Additionally, Corporation Counsel and finance collectively request information about 35 times a year for the purposes of carrying out legal action on problem properties.

The Buildings and Code Enforcement department fulfills over 2,500 requests for information per year broken down as follows:

- 911 dispatch – 1,300 calls;
- social services – 1,040 calls;
- engineering, Office of General Services and Water – 208 calls; and
- corp counsel and finance – 50 calls.

This elevated number of information requests has forced the Buildings and Code Enforcement department into playing the role of information provider in addition to its core functions. These new responsibilities are deemed necessary because of a number of reasons, including:

- city departments are not able to get access to the systems that house the property and property owner information;
- city departments may have access to the systems but are not trained in using the system; and
- the information is not centralized nor integrated [i.e. there is not a single point of entry for consulting property condition and property owner information. Some information resides in the city's ERP system (MUNIS), while other is kept in supplemental databases maintained by the code enforcement administrators].

These issues around data accessibility and completeness force inspectors trying to obtain information to go through a time-consuming process to ask for assistance, search through paper files stored in different locations in addition to consulting the code enforcement system and the stand-alone databases.

4.2.2 Multiple information sources in multiple formats. A reality that is common to many governments is the multiple and disparate silos of data that exist within a city government. In the case of the code enforcement related data (property condition, status and owner information), it is collected, managed and stored in many places and formats within the Building and Code Enforcement Department and within many other city departments. Data are traditionally updated and managed by those who use it, and as there are many departments using the data for different purposes, it is more convenient for departments to manage their own data in the spirit of making it more accessible for their own operations.

The essential data needed to inform all the questions listed above are located in the following places:

- MUNIS, an ERP used citywide with Code Enforcement Module;
- four specialized access databases within the Buildings and Code Enforcement Department;
- paper archives located in the Planning and Zoning Department;
- current paper files within the Building and Code Enforcement Department;
- compliant log-in access spreadsheet within the Building and Code Enforcement Department;
- specific excel and paper files within Planning Departments;
- city-owned property excel spreadsheet within the Planning Department;
- city real property system within the Assessment Department; and
- county and state real property system and paper files within the County Clerk Office.

The multiple locations of information are then compounded by the information managed in multiple formats, leaving it almost impossible for ready and easy access and cross department analytical tasks. This is a reality not foreign to many city governments throughout the world.

5. Discussion
The objective of this paper was to identify data needs and requirements for value creation in the context of urban blight. We argue that sharing and opening code enforcement data can constitute effective ways to manage problems related to urban blight while creating value. Involving private, non-profit and community organizations was deemed necessary to build a robust data sharing infrastructure while creating an authorization environment for value creation (Moore, 1995a). Discussions with these private and community groups made evident the need for opening code enforcement related data as high-priority and high-value requirement. As a result, we identified two distinct groups of information needs and uses to promote value creation. The first group encompasses the requirements for successfully and effectively sharing data among city agencies. The second group is related to opening code enforcement data to the public and in particular to banks, realtors and community groups, all of which, have high stakes in finding a solution to the urban blight problem and its consequences.

Regarding public value, sharing code enforcement related data among government agencies should contribute to at least two significantly different purposes identified in the basic information needs (Tables III and IV). On one hand, code enforcement related data will facilitate the creation of operational efficiencies within and across city agencies that depend on accurate, reliable data, which could be labeled as an incremental, rather than transformative change (Norris and Reddick, 2013). On the other hand, data can also be used

in emergency response situations like in the cases of the fire department or 911 dispatch. As an example of potential benefits, public safety organizations could see reduction of unnecessary procedures currently in place to find the data in disparate systems, and they would be able to quickly determine whether a specific property is deemed to be safe. These uses of shared data are consistent with uses already reported in the literature (Dawes *et al*., 2009; Harrison *et al*., 2006; Luna-Reyes, 2013). Our analysis, although linked to initial stages of the project, already shows ways in which different data elements are linked to the creation of public value. Table IV shows connections between data requirements and processes of value creation to the public. It is evident in the table how a single data set, such as owner information, is linked to different processes for different stakeholders. Moreover, using the data by code enforcement agencies, as well as by private actors such as banks, realtors and community groups has potential in contributing to mitigate the problem of urban blight. Initial assessments also suggest that sharing data should involve partnerships with private actors in the process of value creation (Jarman and Luna-Reyes, 2016).

To be successful in the development of a system that shares information, city departments that want to share data they own will be required to collaborate and develop the necessary trust to create a system (Luna-Reyes, 2013;Ansell and Gash, 2007; Luna-Reyes *et al*., 2013). It becomes clear that all of these efforts will position city agencies to start the process of cataloguing their data and should enable an incipient process for the public to transact with city agencies, which would position the city within the middle stages of developing a solid electronic government initiative (Layne and Lee, 2001).

Although opening data to the public was not the main goal of the project of study, initial explorations suggested that both community groups and local bankers find value in some of the data that needs to be shared within government agencies (Tables III and IV). Again, the needs assessment reveals two potentially different uses of the data, which will need to be carefully analyzed to open it in a way that creates value in the proper context of use (Helbig *et al*., 2012). Preliminary explorations also suggested that some data required are already available in government websites. However, it is not always easy to find.

Shared data are among the most difficult data to open given the additional complexities associated with ownership and governance (Zuiderwijk and Janssen, 2014). Under such context, the organizations that are currently exploring the creation of a shared data infrastructure may face difficulties deciding whether to open their information on the basis of their assessment of risks and benefits (Zuiderwijk and Janssen, 2015). But what is the effort involved in opening code enforcement data? Zuiderwijk and Janssen (2014) listed among others, the establishment of a comprehensive data governance as a hindrance to the opening of government data in general, as government data have numerous real and perceived owners, and it is necessary to reconcile their goals, objectives and organizational and political interests. Additionally, Helbig *et al*. (2012) warned us about the fact that any governance guidelines around data must take into consideration the transformations needed to make the data adequate for use within specific contexts.

Urban blight is a very complex phenomenon with a significant number of endogenous factors interacting and making the finding of one do-it-all solution an uphill battle. For the city of study in particular, developing the capabilities for sharing high quality, useful data within its own agencies and eventually with external partners is considered a first step toward managing the impacts of urban blight but not the ultimate solution. Nevertheless, data sharing could be a transformative force that would help the city attain administrative efficiencies in the use of code enforcement related data. Moreover, opening data would promote the participation of community groups in developing better solutions to manage blight and mitigate its impacts on the quality of life, which could be strong enough reason for

challenging the exiting findings to the contrary (Park, 2015). After all, the original intent of American municipalities when the earlier versions of code enforcement departments were created was precisely the involvement and participation of the community (Uzdavines, 2014).

6. Conclusions and recommendations

The reality of the existing environment (multiple and non-interoperable data stores) within the city is so pervasive that it is actually considered normal for all stakeholders involved in enforcing code regulations within and outside city government. However, these practices can lead to having low quality data, duplicative efforts, redundant technology investments and the inability to effectively share data within and across city departments. Thus, streamlining an organization's data management processes would not only yield more efficient ways to exploit the data and make available to more stakeholders but also will eventually have positive organizational and political effects, enabling a more informed, more collaborative decision-making process (Dawes, 1996a). Improved decision-making and collaboration is a necessary step in fighting urban blight, and key stakeholders have recognized code enforcement data to play an important role in the process. Certainly, value from data can be obtained in different ways according to each stakeholder group. As we showed in the results section, emergency response organizations find value on shared and open data by making better decisions and planning operations. This improved decision-making creates value to the public by increasing safety. Banks and realtors find value on the data to improve their decision-making to make their business growth. Their activity together with the actions of code enforcement agencies and community groups have the potential of a positive impact on urban blight.

Understanding that the city, with limited funding for capital investments and resources to initiate a large-scale system redesign, is still looking to make positive changes in their information environment, short-term and long-term recommendations were identified. The following table presents recommendations for the city to consider.

In an attempt to start to address the issues around sharing code enforcement related data, the short- and long-term recommendations as illustrated in Table V start to prepare the city for building the infrastructure to share. Generally speaking, the short-term recommendations are oriented toward enabling new technologies while promoting a more effective use of existing ones

Recommendations	
Short term	Provide more information about the city's code enforcement guidelines and regulations on the website in an easy to find location
	Invest in the development of a prioritization strategy of information requests from other departments
	Continue to test functionality in using the mobile application and promote data sharing on use among inspectors
	Review the information needs for the public safety professionals and determine how to get the data to them without waiting for the large-scale system investments
	Meet with community and neighborhood groups to discuss their targeted list of recommendations
Long term	Identify and assess the long-term business needs of the Buildings and Code Enforcement Department, as it relates to the current and expected functionality of a system
	Begin to parse out the exact data elements in property and property owner information and determine each element's accuracy and completeness

Table V.
Short- and long-term recommendations

with the ultimate objective of making data readily available for consumption. These two actions should be a starting point for improving the quality of services offered by the city while enhancing the operation of the departments adopting new information technologies (Gil-García and Pardo, 2005). However, city officials should be aware of the fact that any new data management practices will, by default, create tensions between those who should become stewards of the data and those who ultimately need to use them. Such tensions should be addressed to fully realize the benefits of having useful and complete, well-maintained data: reduction of operational risks, increased public value and increased transparency (Dawes, 2010)]. For the new data sharing paradigm to be successful and more important, sustainable, new collaborative practices and aligned operational procedures should be put in place between producers, owners and consumers of code enforcement data (Gil-Garcia *et al.*, 2009; Wenjing, 2011; Boudry and Verdegem, 2012).

Naturally, urban blight is a highly complex phenomenon that will require a more profound transformation within city departments and stronger partnerships with private entities being affected by the decay of properties and the deterioration of living conditions within the city. Nevertheless, if implemented, the recommendations described in Table V will position the city to more effectively improve the lifecycle of a key pieces of data in addressing urban blight. At the same time, the city is learning about the role information sharing may play in transforming their urban landscape. Yet, it is important to note that once data are being shared within departments and other agencies, a potential subsequent need is to open the data for public (citizen) consumption. As stated in the literature, and in the discussion sections, opening the city's code enforcement related data might be a harder goal to accomplish due to the tensions surrounding the process of making useful data available to the public. Even more, there might be a delay in the city's ability to expose code enforcement related data, given that the implementation of the new processes and technologies still need to be proven adequate and effective for the city.

Information sharing and subsequent positive technological and administrative impacts would not necessarily fix the problem of urban blight, but it is a step in the right direction. Reflecting on the value of data and information from the perspectives of key stakeholders, moreover, contributes both to the establishment of an authorizing environment for public value creation and to the definition of public value itself. The administrative synergies of sharing and opening code enforcement data will work toward creating more public value due to the operational efficiencies in key departments such as Public Safety and Emergency Services. Future research around information sharing and urban blight could be geared toward understanding the intended and un-intended effects with a larger range of stakeholders and with other types of data including measures of economic growth. The progression toward using technology and information as transformative agents is challenging for a city of any size but with a strong desire to use information in new ways some cities are making the investments in their technical, management and policy infrastructure so that they can work toward a greater public value.

Notes

1. For the purposes of this paper, we are classifying this city as "small" based on the population size in contrast to other NYS metropolitan areas [e.g. Buffalo (approximately 260,000), Rochester (approximately 210,000) and Yonkers (approximately 195,000)].

2. Code enforcement consist of supervising and enforcing compliance with the municipal code. Many codes such as illegal dumping, anti-litter, snow removal, streets and encroachments are identified as issues related to quality of life (Uzdavines, 2014).

3. An LLC is an unincorporated business organization of one or more persons who have limited liability for the contractual obligations and other liabilities of the business. The LLC is a hybrid form that combines corporation-style limited liability with partnership-style flexibility. www.dos. ny.gov/corps/llcfaq.asp#whatisllc

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