



Open Data & Civic Apps: 1st Generation Failures – 2nd Generation Improvements

Melissa Lee

Esteve Almirall

Jonathan Wareham



ESADE Working Papers Series

Available from ESADE Knowledge

Web: www.esadeknowledge.com

© ESADE

Avda. Pedralbes, 60-62

E-08034 Barcelona

Tel.: +34 93 280 61 62

ISSN 2014-8135

Depósito Legal: B-4761-1992

**Open Data & Civic Apps:
1st Generation Failures – 2nd Generation Improvements**

Melissa Lee,
ESADE Business School
Ramon Llull University
Barcelona, Spain
melissajo.lee@esade.edu

Esteve Almirall,
ESADE Business School
Ramon Llull University
Barcelona, Spain
esteve.almirall@esade.edu

Jonathan Wareham,
ESADE Business School
Ramon Llull University
Barcelona, Spain
jonathan.wareham@esade.edu

October 2014

Abstract

Beginning in 2009, governments across the world intensified their efforts to open their vast collections of data to provide transparency to the public, improve the provision of civic services, and encourage economic development. An initial strategy to encourage the use of this data was the creation of app contests based on civic open data. Though these contests became popular, their impact and value creation was less than anticipated. We examined open data initiatives in eight cities in the US and Europe to understand the failures of these early contests. We conclude with potential improvements and best practices based on second generation open data initiatives.

Keywords

Open data, open innovation, public policy management

Introduction

On his first day in office in 2009, US President Obama signed the *Memorandum on Transparency and Open Government* asking government agencies to release their data to make it open and available to the public [4]. The aim of the initiative was to provide transparency in government and to improve the provision of services through new technologies developed on the backbone of civic open data [5]. Transparency was realized through a public data catalog that was the most comprehensive at the time, providing such information as real time crime feeds, school test scores, and air quality metrics. However, few citizens would make the effort to comb through the trove of over 272,000 datasets that had been provided to the public by May 2010, only one year later [6]. In response, leaders of the open data movement sought to engage code developers to make this information not only more digestible for greater transparency, but also incorporate it into applications, services, and businesses that could better serve the public and foster economic growth.

United States CTO Vivek Kundra led the effort and enlisted the help of digital creative agency iStrategyLabs, based in Washington DC. To spur interest in the data.gov repository, iStrategyLabs launched “Apps for Democracy”, a contest with cash prizes to stimulate civic app development. With an investment of only \$50,000 provided for the prize-winning solutions, 47 apps were created with an estimated \$2,300,000 value, based on the cost to develop the solutions via more traditional means [1]. Further, the brief 30-day contest significantly compressed the amount of time it would have taken to launch the government down this innovative path, estimated to be two years with normal methods. The strategy was deemed a success; New York and San Francisco soon followed with similar contests. Indeed, as momentum increased in the open data movement, cities, rather than the federal government, took control of publishing and promoting open data initiatives. In the following 2-3 years, these strategies were replicated in cities throughout the world.

However, by 2011, much of the initial enthusiasm behind the open data movement had waned. The adoption, impact, and value creation of apps developed using open civic data was far less than anticipated. In the last two years, the open data repository has been accessed through downloads of more than 2 million datasets, though few applications based on this data are widely used, nor do they have high quality ratings [2]. For instance, none of the apps appear in the top 100 overall applications in either the

Apple or Android stores. While a huge potential market for civic apps exists, these initiatives have failed to create the social or economic value that was projected.

In this paper, we examine early strategies behind the open data movement. We interviewed application developers and civic organizers in eight cities in America and Europe including Amsterdam, Barcelona, Berlin, Boston, Helsinki, New York, Philadelphia, and Rome. Throughout the course of these interviews we tried to uncover some of the reasons why these initiatives failed to meet expectations. We conclude by examining more recent adaptations to the strategies that offer pathways towards greater impact.

Promoting Open Data through Application Development Contests

Bold Vision – Meager Results

Following the apparent success of the Apps for Democracy contest in 2009, cities all over the world began hosting application contests to capitalize on their newly open data catalogs. These contests continue to be the predominant strategy to foster transparency and economic development provided by civic open data. However, these initiatives suffered from a lack of impact, both within government and the public. To begin, though efforts were made to open data throughout all divisions of government, developers tended to incorporate only a small range of this data, with an overuse of certain datasets. A multitude of apps targeted similar solution spaces such as transportation and mobility with limited use or impact. Organizers began to recognize that neither data quality nor general interest were the cause of the meager impact of the apps. Rather, the limited public knowledge of the significant operational challenges facing city governments generated a portfolio of somewhat anemic apps targeting a predominantly consumer space. Developers, with similar social demographics, were guided by personal experience or interests to develop apps centered on restaurants, parks, or public transportation. As Betsy Scherzer, an organizer of New York's Big Apps Contest explained,

“I think a lot of it depends on what developers are interested in and what seems useful. For example, we get a lot of data from the Office of Management and Budget. That data does not match or lend itself easily to apps. Not too many people want a city budget app. Whereas the parks department, which has all the

info on park WiFi and stuff you can see, pull out your phone and use the info - those datasets get used first.”

Even within those datasets that received attention, developers often failed to envision solutions that greatly complemented the provision of municipal services. Tourism apps, for example, represented almost 12% of the apps in Amsterdam’s 2013 Apps for Amsterdam contest. But the utility of the solutions were anchored in mobility and consumption, not in an increased level of service provided by the city. Applications that had real impact for citizens or government were few. App “donteat.at”, exemplifies an exception, demonstrating a better integration of open data and civic services. Donteat.at was created as part of the New York Big Apps competition. Donteat.at integrated restaurant health inspection information provided by New York City’s sanitation department with restaurant location and ratings data. Upon entering an eatery, Donteat.at recognized the locale and determined its inspection status. If that restaurant had been flagged for a sanitation or health inspection violation, the app would send the patron a text message alerting them to the notice. In addition to providing a service to citizens that greatly affected their actions, this app also provided impact by affecting the role of the sanitation department. Previously, health inspections would go virtually unnoticed until egregious and final violations called for public notices and restaurant closure. Donteat.at worked to reinforce even minor violations by making the public more aware of infractions. Health inspectors began to see cleanup happening more quickly and without repeated visits because patrons were leaving after receiving the alerts. The app demonstrates the time and cost savings that civic apps can provide to a city and citizens, though few apps coming from the contests had this level of impact.

Lastly, apps developed in city-sponsored contests failed to make an impact because developers often came with ready-made solutions. Contest organizers hoped that the range of datasets would spur new and innovative apps to improve internal city processes, provide better civic services, or facilitate government-to-citizen interaction. But because the requirement for participation in the contests was often the simple inclusion of a city-provided open dataset, most developers submitted previously developed apps with minor adjustments to accommodate civic data. So where numerous re-cycled apps exploited the civic datasets, deeply novel business innovations or improvements in the provision of civic services were rare.

Failure to Provide Value Capture

In addition to a lack of impact, the open data initiatives were not managed in a way that guaranteed value capture. Contest organizers did not fully understand the motivations of external participants to ensure their continued involvement, nor did they expect real savings to be accounted for in city hall. Initially, contest organizers reasoned that prize money was a strong motivator for developer participation, providing a foundation for them to jumpstart and sustain development of their apps. Some contests offered tens of thousands of dollars for prize winners. However, though prize money was never refused, most developers believed the amount garnered through contest participation was not enough to provide complete application support, maintenance, and sustainability over time. They were instead looking for much larger amounts. As Jonathan from Cab Corner, an app that provides a cab-sharing utility noted,

“Our reason for participating is to be recognized enough to get serious funding. Not ten or twenty thousand but someone who will give you a quarter of a million dollars or so and really get involved and bring more people in. The prize money is not a game changer. The real reward is when someone calls you of the blue and says they have real venture capital for you - then you can get things done.”

Developers did not chase the prize money but participated in civic apps contests as they would non-city-sponsored contests – for exposure, reputation, and evaluation. Coders sought exposure to potential funders, which in contrast to one-time winnings, could be a sustained source of income for those looking to start a business from their app.

As contest organizers became more aware of developers’ motives, greater efforts were made to include entrepreneurs and venture capitalists on the panel of judges. They also hosted events and closing ceremonies that included potential funders. A few developers found success with this model. *My City Way* was an app and platform developed to allow businesses to connect to their customers in real time as they are mobile throughout a city. *My City Way*’s exposure in New York Big Apps won them over seven million dollars in venture capital. News of their success spread through the developer community and increased participation for others looking for funding through contest exposure. *My City Way*, though, was an exceptional case, and as a whole, developers could not expect this amount of funding to be the norm in city-sponsored contests. This left developers struggling with financial constraints that often led to the abandonment of apps.

Aside from external funding, participants still hoped to capture value through the exposure gained from participation in the contest; exposure not to potential investors, but to a larger citizen market for the app. Developers hoped that citizens would become aware of the civic apps through the cities' websites, or through concerted efforts of city organizers to showcase participating solutions. These efforts fell short of expectations. As Marco Cavalli, a developer in the Apps for Italy contest stated,

“If only we had more exposure leading to more users that eventually paid for the premium version. We hoped to get more subscribers just to start with a small base so that we could continue with our development. But without more initial awareness through the city or other advertising, we were not able to grow.”

Lastly, cities did little to advertise their new collection of apps. Unsurprisingly, citizens did not flock to city websites to discover them. The usual outlets for finding apps, the Apple or Android stores, do not feature categories that highlight city apps, making it difficult to gain awareness in the largest marketplaces. Instead, creating awareness was mostly left to app developers, who found this difficult without additional funding. Though the market for city services remains more than enough to provide continued value to thousands of civic apps, actual adoption remains low and fails to sustain their development.

Failures within Government

Failures in early open data challenges also stemmed from issues within city government and the expectations of participating departments. The first step of these initiatives involved persuading internal agencies to open their data and provide it in useable formats. With strained budgets, overworked employees, and other, more critical responsibilities expected on a daily basis, releasing data was not only a chore with no tangible benefit, but also subjected city departments to unwanted scrutiny. Employee reluctance delayed city halls in publically opening data repositories. Most cities eventually introduced legislation to force data publication, but departments were still slow to move.

Additionally, the managing department for most open data contests within city hall was usually the Innovation, IT, or Economic Development department. Beyond data publication, the managing department had little interaction with more core city agencies regarding the apps challenges championed by the organizational periphery. This created

a great disconnect between city operations and the open data initiatives, which greatly hampered their success.

The involvement by civic departments directly requesting specific solutions beneficial to city operations was prohibited by procurement legislation. As Betsy Scherzer from New York's Department of Economic Development explained,

"We had a few agencies that came to us and said 'We are from the Department of X and we would love to have the following guide made for us that does XYZ'. But that's actually a specific enough request that it would be considered something you would have to procure for, and so we're not allowed to accept them because if we did, it would be like procuring something for free."

Not only were agencies prohibited from requesting focused solutions, but general communication between the relevant departments and developers was limited. If involvement of city departments was stifled in development phases, their potential for adoption or support further in the app lifecycle was highly unlikely. There were no instances of popular or useful apps being adopted or partially managed by a city agency. As such, civic apps suffered because the departments for which they were created failed to integrate them into the central services provided by the city.

1st Generation Failures – What Went Wrong?

- Excessive use of popular datasets
- Overcrowding – numerous similar apps in same solution space
- Apps originated from developers with homogeneous interests and demographics
- Data published with no commensurate changes in city services
- Pre-existing apps tweaked for inclusion in coding contests
- Prize monies symbolic – insufficient for long-term sustainable operations of app
- Limited adoption and support by civic governments – city involvement ends with data publication
- Resistance to data transparency by public administrations

Because the management of open data initiatives was handled outside of the core departments, these agencies were not asked to make any financial investment in the solutions. Likewise, the accountability for the impact of the open data and the success of the resulting apps was also dispersed. Managers, therefore, did not expect dramatic returns from the contests, especially in terms of savings that might

accrue to their department directly. Central organizers attempted to quantify the value saved by the contest with metrics measuring the comparable cost of in-house development. But as these savings were not accounted for in any departmental budgets,

there were no reviews or measurements of the actual benefits. Instead, the rationale provided for contests became focused outside of city hall and on the economic development within the community, stemming from new businesses based on the apps. Unsurprisingly, few sustainable businesses have managed to materialize. The number of participants, number of datasets opened, and number of apps developed have become the metrics upon which contests are evaluated. However, these numbers poorly reflect any municipal savings, entrepreneurial or social value.

Second Generation Open Data Initiatives Make Improvements to Maintain Momentum

As open data initiatives continued to gain popularity, cities and developers began to recognize which strategies worked best and how to improve upon others. Though many of the initial efforts continue, some second generation initiatives have incorporated new mechanisms and included additional actors to increase the impact of civic open data and provide value capture for those involved. These improvements represent some best practices and lessons to encourage the momentum behind the open data movement.

Increased Exposure to Civic Needs in Open Data Challenges

As mentioned, early challenges often lacked impact because developers had limited experience with the full suite of civic services and instead created an abundance of solutions with popular consumer appeal. In order to redirect developer focus, organizers sought to educate developers about struggles in government or the plight of other citizen groups. Hack-at-home is a strategy that exemplifies the improvements built into apps contests to enlighten developers about the need and potential for solutions.

Hack-at-Home is an apps contest model developed by DotOpen, an open innovation and digital media company based in Barcelona. The *Hack-at-Home* model provides developers more information about the problems that could be better addressed through open data solutions by increasing the involvement from civic agencies early on. Instead of simply requesting governments' open data, DotOpen works closely with those departments needing solutions to formulate the issues relevant and solvable with information and apps. The result is that in addition to the data repositories, developers are presented with "Problem Statements". These short descriptions include the following: the *Crisis Statement* describes the current situation or process that is failing; the *Needs*

Statement describes, generally, what utility an app would provide without specifically detailing a developed solution; and the *Impact Statement* explains the expected outcome and benefit the developed solution would provide to citizens and the government, if successful. These 500 to 1,000 word outlines add incredible impact by simply guiding developer attention to problems faced by governments. Apps developed in these challenges have, amongst other things, increased awareness of sanitation problems while educating citizens about access to available resources and solutions [7].

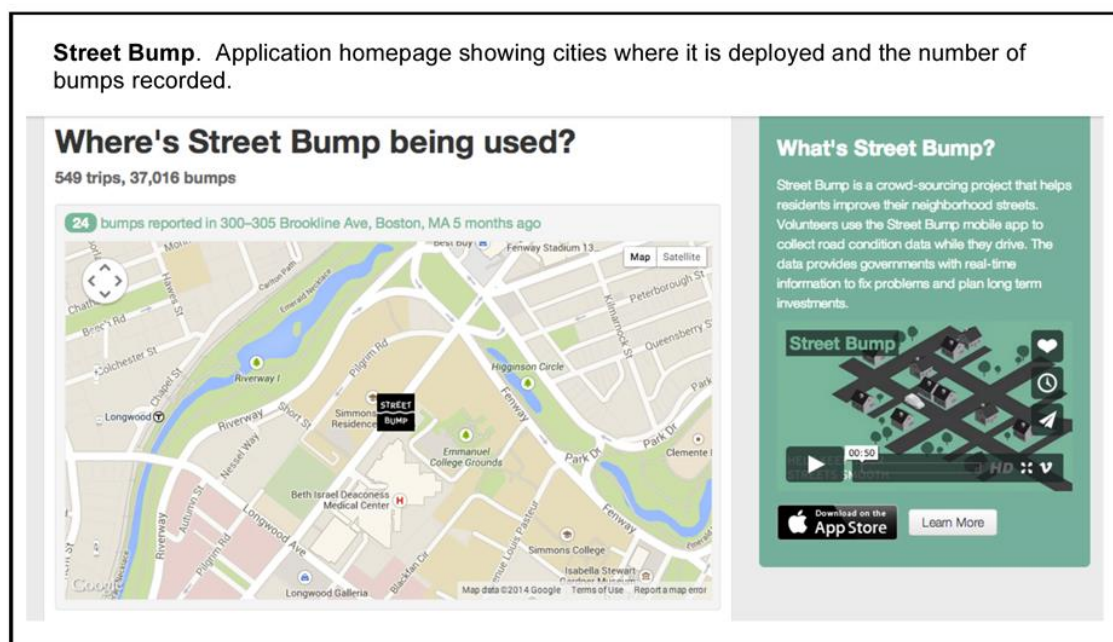
Another method for increasing the impact of open data also involves working with intermediaries to better educate developers about the situations faced by city halls [3]. This strategy, developed by non-profit organization Code for America, abandons the contest model and greatly enhances the direct relationship between coders and civil servants. Code for America chooses roughly 30 developers and eight to ten cities a year to create solutions based on civic open data. These developers must make a full time commitment to Code for America for an 11-month period, and relocate to San Francisco for that time. Developers engage directly with relevant city workers to better understand needs from their perspectives, as well as engaging with citizens that are affected by those problems within the community. This model has spread internationally with Code for Europe, Code for Africa, Code for the Caribbean, and more.

Stronger Management of Open Data Initiatives

Second generation open data initiatives have also increased impact through better and stronger management. Where simple contest-driven strategies were disappointing for the first generation, the increased involvement of internal agencies and external partners has yielded superior results for the second wave of open data. Boston's Office of New Urban Mechanics provides an example of an internal agency that has strong management of its open data initiatives. The Office of New Urban Mechanics (NUM) is an internal innovation department within the mayor's office. NUM is strictly focused on creating solutions through technology that increase the provision of civic services and provide value to government. To begin, NUM invites needs and suggestions for improvements from all actors in a city: citizens, government employees, academia, non-profits, and private businesses. NUM then evaluates these inputs based on their potential for impact on civic services and filters them on targeted areas such as urban development or education. NUM ultimately considers their potential for impact and resource use to guarantee success when selecting which projects to support. NUM has a short, five to seven month timeline for the development of solutions, whether the

outcome is a mobile app or a more complete business based on the technological solution. This model of strict, top-down management, in contrast to the early apps contests, has demonstrated lasting impact, value capture, and sustainability of the solutions.

One example of an app developed through Boston's NUM is Street Bump. Street Bump collects data about road conditions as users drive. The city then aggregates this data, which informs them about real time road deficiencies that can be fixed more quickly, saving the cost of deploying civil servants to comb the streets for places needing repair. However, the success of the app would not have been realized without NUM's strong involvement. Incredible expertise was needed to develop a solution with an algorithm sophisticated enough to translate the data from a smartphone into bumps on a street. NUM partnered with software company Connected Bits and design company IDEO to come up with the innovative product. The results of these more sophisticated collaborations can have had real impact throughout a city.



Common Platforms for Open Data Initiatives

The market for civic apps is virtually limitless as civic needs are shared across city, regional, and national borders. However, most apps are targeted towards specific cities. This problem is mainly caused because managers within government chose to procure their solutions, whether developed in-house or through open innovation initiatives, as

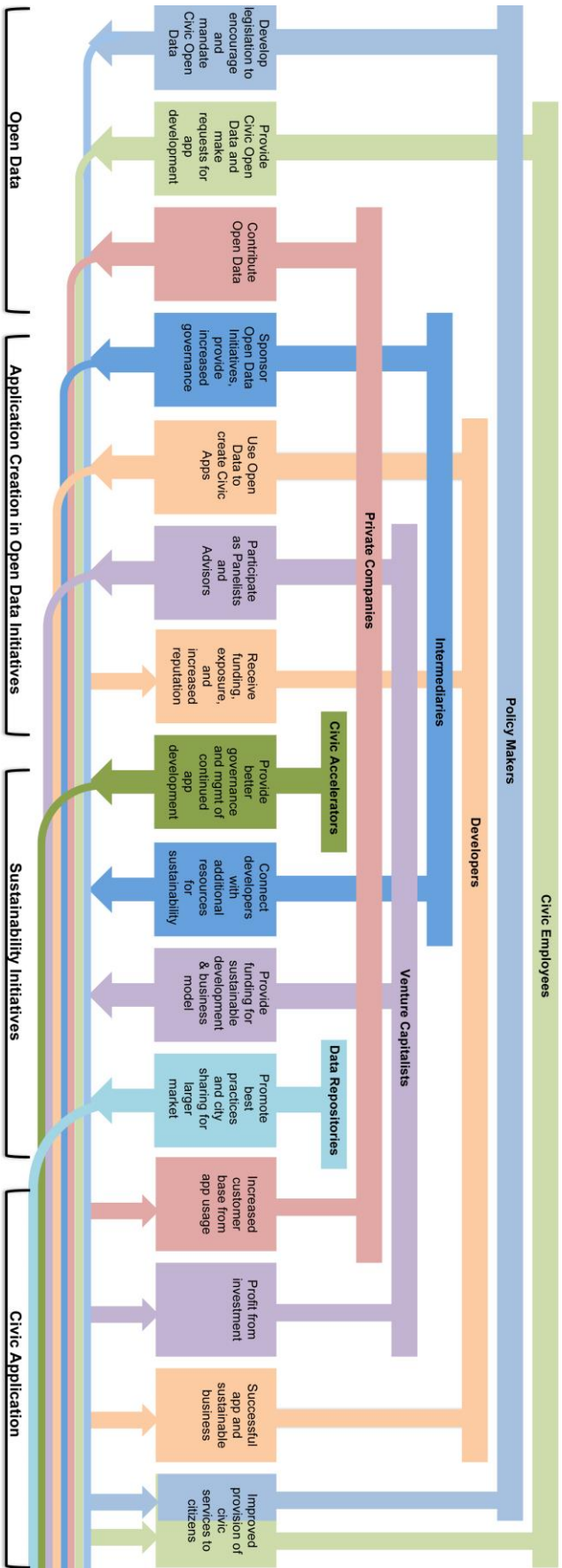
custom-tailored for their city. They imagine their needs to be unique and want to showcase equally bespoke solutions. Yet starting from scratch takes time and resources well beyond those needed to adapt existing apps. And targeting software for a specific city decreases the potential market available for that app. Small cities, in particular, do not have a population that can support a large community of civic app developers on their own, let alone justify the investment in redundant functionality offered by existing software. Civic Commons was an application marketplace created to facilitate code sharing. This collection of civic apps promotes their use and reuse, providing value capture for developers as their markets increase, and savings for cities as they choose to adapt, rather than create completely new solutions. Other repositories have been developed, such as Europe Commons, which not only showcase civic apps, but also offer best practices and case studies in an effort to provide more value capture to developers and savings to cities.

Finally, data standardization between cities limits the potential marketplace for a given developer's app, limiting potential value capture. The transportation app Roadify, for example, provided transit schedules for New York commuters. Interested in increasing app adoption, the developers realized that other cities would need the same information, which was also provided through local open data repositories. However, a lack of data standardization created an obstacle. As Dylan Goelz explained,

“The trouble is that data is provided differently in every market. Google tried to standardize the data, but there are still discrepancies. San Francisco may do something that Boston doesn't, and it makes aggregating the data difficult. We had to develop our own solutions to be able to shift and adapt, which has cost time and money.”

As most city managers do not yet realize the benefit of sharing apps between cities, they also fail to understand that government databases can grow beyond a city's borders. Data standardization requires coordination and procedural changes that are both technical and political. Efforts to promote standardization would not only further sustain the lifetime of solutions, but would also leverage network effects towards greater developer participation and user adoption.

Civic Application Development Lifecycle



2nd Generation Improvements – What was Learned?

- Invitation of entrepreneurs and venture capitalists to judging panels to court funding opportunities
- Legislation to force civic bodies to publish data in timely manner
- Problem statements published by cities to direct developer attention towards significant operational challenges
- Developers embedded in city organizations for substantial time periods to better understand operations and build reciprocal engagement
- Stronger management and direct coordination from city administration
- Ex-ante commitments for financial support of specific apps
- Common app repositories to share best-in-class apps, coding practices and coordinate data standardization

Conclusion

Momentum behind open data and its potential to provide cost savings to cities and better service to citizens remains. Early efforts focused on application contests with low governance failed to produce the results most expected, though these early iterations provided insights into some potential fixes. Second generation initiatives have incorporated better management and knowledge transfer into the strategies to provide increased

value capture and impact. However, room for improvement remains.

Four main problems exist involving mechanism coordination. First, the lack of standardization in data formats and APIs prevents effective sharing in app marketplaces; coders must write numerous interfaces for each city and to maintain them individually. Second, application discovery remain problematic, as no effective discovery and diffusion channels beyond the most popular one hundred applications exist. Third is the problem of Data Stream/API discovery, forcing developers to find and examine many fragmented websites. And finally is the need for an efficient code reuse among public organizations that would allow not only a better use of taxpayers' money, but which leverages network effects towards incremental and cumulative innovation.

Effective incentive management for all types of actors in such heterogeneous ecosystems is certainly more complex than in traditional markets. Three main problems remain here. First, limited standardization and consequent market fragmentation render standard business models based on advertisement or usage fees impractical, forcing app developers to resort to reputation or signaling as alternative modes of value capture. Second, there is a need for trust in the stability, continuity and availability of open data streams and APIs that is not always secure in politically turbulent municipalities. And

third, the inherent tension between collaboration and competition manifests a managerial challenge in these complex and diverse ecosystems.

Open data strategies in the public sector should continue to evolve, and with continued ingenuity, increase in their efficacy, impact and social value. What open data and civic app contest designers have learned is not unique to the world of government data, but extendible to other of spheres of distributed, collective creativity so common in alternative software development platforms.

References

- [1] Apps for Democracy, 2011, <http://appsfordemocracy.org>
- [2] Apps.Gov, 2014, <http://apps.usa.gov/>
- [3] Bakici, T., Almirall, E., & Wareham, J. (2013). The role of public open innovation intermediaries in local government and the public sector. *Technology Analysis & Strategic Management*, 25(3), 311-327.
- [4] Lakhani, K. R., Austin, R. D., & Yi, Y. (2010). *Data. gov*. Cambridge, MA: Harvard Business School.
- [5] Open Government Initiative, 2013, <http://www.whitehouse.gov/open/about>
- [6] Open Government Report, 2013, http://www.whitehouse.gov/sites/default/files/opengov_report.pdf
- [7] Sanitation Hackathon, 2013. <http://www.sanitationhackathon.org>

ESADE

Ramon Llull University

Campus Barcelona - Pedralbes

Av. Pedralbes, 60-62
08034 Barcelona (España)
T. +34 932 806 162
F. +34 932 048 105

Campus Barcelona - Sant Cugat

Av. de la Torreblanca, 59
08172 Sant Cugat del Vallés
Barcelona (España)
T. +34 932 806 162
F. +34 932 048 105

Campus Madrid

Mateo Inurria, 25-27
28036 Madrid (España)
T. +34 913 597 714
F. +34 917 030 062

www.esade.edu