

# Opportunities and Challenges for Civic Engagement: A Global Investigation of Innovation Competitions

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## ABSTRACT

The population in many cities all over the world is continuously growing and with this growing number of people infrastructural, health and location-related problems increase. It is assumed that these problems could be addressed by means of open government data which many governments publish on their web portals so that it can be further processed and transformed. Since the citizens themselves know best what they need, governments encourage them to participate in open data innovation competitions and to create value added services for their city. The reuse of open urban government data during hackathons or app competitions is a new trend in knowledge societies of how governments and citizens work together. But have these events still become practice in local governments and are they helpful means to foster government-to-citizen communication and collaboration? The authors analyze innovation competitions in 24 world cities to see how they are applied and whether they have the potential to make the city “smart”.

## KEYWORDS

App Competitions, Civic Engagement, Civic Participation, Hackathons, Innovation Competition, Open Data, Open Government

## INTRODUCTION

Today, many governments as well as municipalities open up their data and make them available online on government data portals. Such open data portals are available on the international level, e.g. open-data.europa.eu (European Union Open Data Portal), on the national level, e.g. data.gov (U.S.), data.gov.uk (United Kingdom), but also on the city level, e.g. open.wien.at (Vienna, Austria) or nycopendata.socrata.com (New York City, NY) and typically provide data that is available free of charge and possible to be re-used without any limitations or technical restrictions (Open Knowledge, n.d.a). By opening their data, governments aim at fostering participation, collaboration and transparency, as well as economic and social values as citizens and companies can or will use the data to produce innovative products and services (Albano, 2013; European Commission, 2011). Especially open data competitions (European Commission, 2011) or digital innovation contests are assumed to be helpful means to foster civic participation in the re-use of open data. Hjalmarsson & Rudmark (2012, p. 10) define such a contest as “an event in which third-party developers compete to design and implement the firmest and satisfying digital service prototype, for a specific purpose, based on open data.” This idea is taken one step further by the concept of app competitions or hackathons (hack marathons) where governments and citizens develop new (mobile) applications

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in cooperation. These events are aimed at involving citizens to solve specific problems or address stated topics and are assumed to be a new way to make civic engagement and participation possible. People from different backgrounds can come together at one table and try to create something value added to improve city life. However, do hackathons or similar contests help to develop value added services? Do all municipalities host the same events or are there differences? What are the outcomes of these events and how do governments accomplish them? Summing up, this study is aimed at exploring the phenomenon of innovation competitions like hackathons and app competitions in more detail and providing example cases in order to help governments in taking more advantage of these events. Accordingly, we investigate hackathons and app competitions on city level and emphasizes best practice examples. In our analysis we focus on informational world cities defined by Mainka, Hartmann, Meschede, and Stock (2015). Those cities are prototypical cities of the knowledge society and provide an enhanced ICT infrastructure. Hackathons and app competitions often take place in big cities, therefore we used a set of 24 cities as a starting point of our global investigation. In the following we will specify open urban data in the context of open government data and draw out the types of hack and app development events, their aims, their participants, and finally take a look at these events' outputs and the challenges they face.

## OPEN URBAN GOVERNMENT DATA

Open data which is generated by the government and also referred to as “open government data” (Open Knowledge, n.d.a) offers non-rivalrous, non-excludable as well as valuable information to citizens (Jetzek, Avital, & Bjørn-Andersen, 2013). Especially on the municipal level, there are huge amounts of data generated e.g. by sensors which are relevant in citizens' everyday life. Consequently, the data which originates from that urban areas can be named *open urban government data* (Mainka et al., 2015; Mainka, Hartmann, Meschede, & Stock, 2016).

There are mainly three types of sources of open urban government data: official statistics, sensor-based data, and user- or company-generated content. Official statistics include data on population, business and economics, jobs, crimes and justice, health, etc. Additionally, there are city-specific official data collections like the urban forest map of San Francisco with detailed data about trees in the city. Sensor networks (Kitchin, 2014) consist of sensors which are embedded in specific structures and measure—in real-time—levels of light, humidity, temperature, gas, electrical resistivity, acoustics, air pressure, movements, speeds, etc. and of transponders monitoring empty spaces in car parks, data from closed circuit television (CCTV) or the progress of trains and buses along a route (Kuhn, 2011)—all in all, sensor-based “big data” with relevance for the city (Bettencourt, 2014). Another type of governmental big data is user-generated content, for example, GPS-based data from mobile devices and neighborhood- or company-specific posts on micro-blogging services. There are far more sources for user-generated data insofar city governments use social media channels (e.g., Facebook, YouTube, Flickr, etc.; Mainka, Hartmann, Stock, & Peters, 2014; Mergel, 2013) to communicate with their citizens. Big data asks for aggregation and statistical analysis, thus for a reduction of the data amount into meaningful entities. It is also possible that private companies will open parts of their data, e.g. on the company's products or services with relation to the city (Immonen, Palviainen, & Ovaska, 2014). All these data can be viewed as *open urban data* and could be used to create services which might help to solve city specific problems, which means transforming data into value and create useful services for the public.

## THE IDEA OF INNOVATION COMPETITIONS

More than the half of today's world population lives in urbanized areas. This evokes many problems for citizens, urban planners, and the government. In addition, smartphones and mobile connectivity have gained increasing importance in recent years and mobile exceeds fixed broadband subscriptions

(Burger, 2012). In so-called “informational cities” (Castells, 1989) or “smart cities” (Castelnuovo, Misuraca, & Savoldelli, 2015) citizens own and use mobile devices (Stock, 2011) and their demand for “services that increase their productivity, efficiency, communication skills, or create experiences that enhance their quality of life” (Walravens, 2015, p. 282) rises. Thus, especially in larger cities, there is a greater need for city-specific apps that help citizens in everyday life.

In informational cities not only a well-developed ICT infrastructure plays a crucial role in a city’s growth and development but also human and social capital. Therefore, smart municipalities should aim at enhancing the quality of life in the city and boosting its economic growth in order to create a public social and economic value for all citizens (Caragliu, Del Bo, & Nijkamp, 2009, p. 48). However, citizens’ participation is needed in order to fulfill their needs and provide services that indeed ease their everyday life. In our history citizens often have volunteered, e.g. as bodyguards in neighborhood safety patrols. According to Bellone & Goerl (1992), in some cases, citizens are able to provide better service than their government is able to. Today, citizens can help themselves and their community to handle open data and transform it into value-added services, for example through developing new smartphone apps. Hence, it is not only the cities’ government that plays an important part in transforming their city into a smart city but also the people within the city are a critical factor for success (Chourabi et al., 2012). These do not necessarily have to be in the app development in order to create valuable services based on open government data, also citizens who do not have any programming skills may be asked to participate through the use of an app, “for example helping to redesign the park you’re walking in” (Millard, 2010, p. 8). In this case, citizens are “data prosumers (both providers and consumers of data)” (Charalabidis, Loukis, & Alexopoulos, 2014).

If citizen became developer of urban applications the services are called ‘citizen apps’ (Desouza & Bhagwatwar, 2012). But designing mobile apps by end-users “can require significant technological innovation, and prizes can act as an inducement for innovation to such challenging development tasks” (Desouza & Bhagwatwar, 2012, p. 109). Therefore, competitions or hackathons can be organized to develop mobile services collectively and motivate the public (Baraniuk, 2013; Briscoe & Mulligan, 2014). However, hosting these events requires much support which in some cases is offered by governmental agencies like the Infocomm Development Authority (IDA) of Singapore, a supporter of the *AppVenture Challenge* (Chan, 2013). This is aggravated by the fact that still less is known about how to construct such events in order to achieve citizens’ engagement as well as valuable and successful services. Juell-Skielse, Hjalmarsson, Johannesson, and Rudmark (2014) found out that fun and enjoyment, intellectual challenge, and status and reputation are the top three drivers of participation in open data innovation contests. By contrast, extrinsic motivation like money was stated to be less important by participants. In addition, Immonen, Palviainen, and Ovaska (2014) propose that the development of urban apps should be embedded in an “open data based business ecosystem” (p. 88), which consists of elements such as key partners, co-creation, revenue strategies, customers and markets, data structure, business development, and the value added. Such a business ecosystem is targeted at ensuring the sustainability of mobile apps (and not a quick development of an app followed by stopping the product some weeks later).

The question arises whether governments involve their citizens in the mobile app development process by hosting open data innovation competitions and if they aim at creating successful and valuable solutions for their citizens. As hackathons and app competitions are still a rather new phenomenon, this study aims at answering the following research questions:

1. What scope do innovation competitions have?
2. What are the addressed topics and outcomes of these competitions?

Furthermore, we expect not only governments to be the initiators of these events, also citizens could organize them in order to build useful services based on the data that is available on governmental open data portals. In addition, the outcomes of these events will only seldom be successful ad hoc and need further support in most cases. Therefore, we want to answer:

### 3. Who organizes and supports innovation competitions?

The need for a long lasting support as well as the continuous development of the resulting apps might be only a few of the challenges that have to be met. Therefore, it is still unclear if these events are indeed useful, for example, to increase citizens-to-government communication and collaboration, or merely a hype with less effect (Johnson & Robinson, 2014; Hellberg & Hedström, 2015). Thus, our last questions are:

4. Which challenges need to be faced?
5. Do these initiatives have the potential to change the government-to-citizen relationship?

## METHOD

In order to answer the afore-mentioned questions, the open data innovation competition movement was analyzed through a web content research in August 2015, since hackathons and app competitions are related to online available resources, i.e. promotions and reviews are hosted online, e.g. on government websites, blogs, as well as online news platforms. For this reason, we conducted an Internet search for announcements of hackathons and app competitions as well as experience reports using Google as search engine. As it can be assumed that there is a greater need for these events in world cities, we used a set of 24 informational world cities (as defined by Mainka et al. (2015)) as the basis for our investigation (see appendix). Hackathon and app competition events, that took place in these cities until the date of the study, were searched in order to explore the types of events, their outcomes, emerging challenges, as well as their future potential for change. To identify the respective competitions and events we used keywords like government data, open data, competition, contest, hackathon, and app in combination with the specific city name.

## OPEN DATA COMPETITIONS

For all 24 cities, hackathons or app competitions could be identified. Popular terms to describe open data competitions are hackathon, app challenge, app competition, prototype-athon, appathon as well as hack or code festival which all can be summarized by the term “innovation competitions”. The first events of this type presumably took place at Sun Microsystems and OpenBSD. Both used the term hackathon independently from each other for the first time in 1999 to announce a hack event for their employees. By using this term, they referred to events which were aimed at developing new software and not at committing computer crimes (Briscoe & Mulligan, 2014). However, differences between app competitions and hackathons can be found in their duration and setting. A hackathon is usually held offline, which means that people meet locally between one and three days, often at weekends, whereas app competitions take place for several months with a deadline till then the finished projects have to be handed in online. In addition, hackathons often allow for developing a new service in a small team whereas competitions in many cases call single persons or companies for submitting their applications. The initiative to host the event was found to come from the government (top-down) in most cases. Often they work in cooperation with local companies as well as NGOs and NPOs but also the hacker community hosted events in some cities (bottom up). In addition, several cities, e.g. Los Angeles, have already hosted specific hackathons (e.g. *Hack for LA*) several times (as in the case of LA every year since 2013) whereas others have only taken place once heretofore, e.g. the *Data in the City Hackathon* by Singapore in 2013.

## Scope of Innovation Competitions

Although we searched for events in relation to cities, we found that hackathons and app competitions are not only a city-specific phenomenon. They can be hosted for different areas, for example, New York City (city level) or larger areas like New South Wales (state level), Finland (national level), the whole European Union (trans-national level), or all over the world (international level). Nowadays this concept of app development takes place in cities and regions all over the world, e.g. Boston, Amsterdam, and Paris, but it has its origins in the US where one of the first innovation contests called *Apps for Democracy*<sup>1</sup> was held in Washington in 2008 (Johnson & Robinson, 2014). The aim of this contest was to make the DC.gov's data catalog useful for everybody within the city. They managed to achieve 47 mobile applications with an estimated value of \$2,300,000 by spending \$50,000 on the contest (ISL, May 09, 2012).

An example of a nationwide competition is *Apps4Finland*, which is hosted in collaboration with the city of Helsinki since 2009 and renamed in *Open Finland Challenge 2015* for its seventh edition. Often the resulting applications from other challenges, e.g. *Open Helsinki – Hack at Home* are handed in for competitions which address larger areas, like *Apps4Finland*. Those competitions are organized, partnered, and sponsored by a wide range of institutions. In the case of *Apps4Finland* the Forum Virium Helsinki, The Finnish Association for Online Democracy, the Finnish Meteorological Institute, Ministry of Transport and Communications, and many more are involved (Apps4Finland, n.d.). Some federal states, like New South Wales, use a concept named *apps4nsw* to call for applications based on the government data of NSW. This was the first competition in Australia which encouraged its participants to use state government data (NSW Government, n.d.) and tries to bridge between government, citizens and industry on the level of a federal state.

Furthermore, there is a concept called *Apps for Europe*, which could be understood as an international network that hosts hackathons (among other events). They want to support valuable applications in their whole development process and “provide tools to transform ideas for data based apps into viable businesses” (Apps for Europe, n. d.). Similar to *Apps for Europe* is the *National Day of Civic Hacking*. This concept started in 2012 as a national one and has grown up by 2014 to be international, which is particular as hackathons – usually – are held locally. However, although it is an international event by now, local meetings still take place but henceforth all over the world at the same time. The National Day of Civic Hacking aims at supporting hackathons as well as meetings and events in general: “The goal of the National Day is to bring all these local events together to provide a framework for collaboration, and a global acknowledgment of the impact that engagement and volunteerism can have in our towns and cities” (National Day of Civic Hacking, 2014).

An example of an international hackathon is the *International Open Data Day*. This event takes place once a year at one single day all over the world and had more than 140 participating cities in 2014 (Weissman, February 24, 2014). In addition, it is one of the few examples which are not awarded but for fun. Instead of monetary awards, the support of open data usage and development of useful services for the neighborhood should be the main motivations to join these hackathons but also meeting new people, discussing ideas, and improving skills can be reasons why people attend the events.

The *Open Stockholm Award* is a noteworthy competition which not only allows Stockholm's residents to take part in the contest but calls for participants from all over the world (Stockholms stad, n. d.). Some originally national level competitions started to build broader networks by forwarding their contributions to an international competition like the *Smart City App Hack*. For example, participants of the *Open Finland Challenge* also took part in the *Helsinki Smart City App Hack* and competed with contributions from Barcelona, Dubai and Phoenix at the *Smart City Expo* held in Barcelona in October 2015 (Forum Virium Helsinki, 2015).

However, civic hackathons and app competitions do not only address people of different nationalities but also with very diverse skills. They primarily appeal on engaged and creative persons to join the events and not for developers and programmers exclusively. For example, Singapore invites “urban planners, architects, sustainability experts, technologists, researchers, developers and

designers to co-create new prototypes to help Singapore become a more livable, competitive and sustainable city” (Newton Circus Pte Ltd, 2015). In addition, Vienna states that the citizens are the most needed and emphasizes that especially statisticians, as well as librarians are wanted participants (OpenDataHackathon 2011, June 18, 2013). By contrast competitions like *apps4austria* also allow companies, institutions, and administrative organizations to participate (Digitales: Österreich, n. d.).

## Topics and Outcomes

Similar to the scope of competitions also the aims and topics they are announced for can be various. The *Apps for Amsterdam* competition, for example, announced six general themes (vacancy, tourism & culture, democracy, mobility, security, and energy) to which contributions should be addressed (Apps for Amsterdam, November 8, 2012). Whereas others aim at solving specific problems like the *Safer Communities Hackathon*. This event was held by the Chicago Police Department in 2013 to see in which ways their new API could be used and to improve their interaction with residents (Whitaker, May 14, 2013). In addition, there are special series of hackathons, like the *Green Hackathon* which aims at developing services for sustainability (Green Hackathon, n. d.). Another mentionable example is hosted by the citySDK project whose goal it is to harmonize application programming interfaces (APIs) of different cities so that they can be accessed by one common API, e.g. the issue reporting API Open311 (Forum Virium Helsinki, n.d.). This API could then be used for the *citySDK challenge* in 2014 to develop the “best cross-city Smart Participation app” (Hanna, April 15, 2014). The recent awarded winner of this contest is an Android app called CityFixer<sup>2</sup>. Unfortunately, the app was not successful as there are only between 1 and 5 downloads according to the Google Play Store on August 15, 2015.

Beside topics also the preferred outcomes of innovation competitions can vary. In most cases, hackathons are aimed at developing mobile applications and prototypes, although the *Open Data Day Helsinki Hackathon*<sup>3</sup> primarily focuses on teaching its participants about open data and how it can be used. In a few cases also ideas to solve problems are highly welcomed and awarded, e.g. for the Stockholm Award. With this award, Stockholm not only rewards apps or web services but also project plans which offer solutions within the stated categories (e.g. traffic and accessibility). Furthermore, they ask for ideas which can be contributed via their Twitter feed (Stockholms stad, n. d.). The Singapore government took the call for citizens’ ideas one step further and established a platform called *eCitizenIdeas!* (Government of Singapore, 2014). It was initiated by the Ministry of Finance and managed by the Infocomm Development Authority of Singapore, which is one of Singapore’s statutory boards and aimed at making Singapore to the “World’s First Smart Nation” (IDA Singapore, 2015) and shall enable citizens to share their ideas and solutions with their government. These ideas do not necessarily have to address hackathons. It is a platform for governmental challenges in general. “The public may also attach files, comment and vote on the best ideas, and share the challenges via their social sharing networks with their peers” (Government of Singapore, 2014). With this platform, the Singaporean Government outsources the generation of ideas to the public what is also known as “crowdsourcing”. The term was introduced by Jeff Howe in 2006, who defines it as “the act of taking a job traditionally performed by a designated agent (usually an employee) and outsourcing it to an undefined, generally large group of people in the form of an open call” (Howe, n.d.).

## Organizers and Supporters

As the afore-mentioned examples show, lots of hackathons and competitions are organized by governmental agencies. San Francisco is reported to be one of the first cities that published datasets online (they started in 2009) and thus foster the use of open data (Franks, January 11, 2013). The first governmental hackathons and app competitions according to our study were found in Chicago, Helsinki, and New York. In addition, there are also new companies that emerged to host hackathons. One example is *AngelHack* which is operating since 2011 and organizes hackathons for other companies. Whereas their first Hackathon was held at Adobe in San Francisco and they are operating

internationally (Cassey, March 13, 2014). Besides governmental agencies, NGOs, and companies that organize and support civic innovation contests, there are bottom-up initiatives as well. One example is a group of Chicago volunteers who name themselves *Open City*. Their goal is “to create apps with open data to improve transparency and understanding of our government” (Eder, October 15, 2014). In March 2012, they started to organize weekly hackathons for designing new mobile apps based on open data. These hackathons are open for everyone and have grown up to a group of more than 60 participants by now (Eder, October 15, 2014). “Civic hacking is a hobby” (Davis, April 23, 2013) states Juan-Pablo Velez, who is one of the co-founders of *Open City*. Velez remarks that the first challenge that has to be met is to identify the problem that a mobile solution is needed for (Davis, April 23, 2013).

An outstanding example of governmental support for app competitions and hackathons is shown by the Infocomm Development Authority of Singapore (IDA). They are aimed at establishing a whole ecosystem where foreign companies, local enterprises, and start-ups collaborate and grow. They support this by setting up the necessary policies and regulations, infrastructure (e.g. by delivering ultra-high speed broadband access) as well as education for the required workforce. Accordingly, they not only support a large number of innovation contests but also workshops to help people with the development of mobile applications, prototypes or open data visualizations. However, the IDA is not the only supporter of such events, also a large number of enterprises, NGOs, and other governmental institutions, as well as citizen communities (Urban Prototyping (UP) Singapore and DEXTRA) have worked together to host about 30 events since 2012 in Singapore. The Barcelona City Council shows similar ambitious work. It hosts a web portal called *Apps4Bcn Pro*, Barcelona’s professional app ecosystem. The City Council targets to foster innovative mobile applications and supports idea competitions and hackathons, but not only for the city itself. With hackathons like the *Smart City App Hack*, they want to establish “a global network of smart cities that face similar challenges and share one vision: to turn citizens into App Makers, empowering them to build apps and businesses that will make for a better city” (Dotopen, 2015).

Many European hackathons and competitions are supported by a foundation called Open Knowledge Foundation, which is separated in single countrywide foundations. This non-profit organization is aimed at opening knowledge and information, supporting projects and collaborations in regard to open data (Open Knowledge, n.d.b). Another non-profit group of volunteers on a city-level is *BetaNYC*, which was founded with the aim of making its government more open, transparent, and participatory. They identify their task as “NYC’s civic technology and open government vanguard” (BetaNYC, n.d.) and organize meetings, events, and support startups in order to “built a dedicated community who believes in the power of neighbors helping neighbors” with weekly meetings to run their projects (BetaNYC, n.d.). As members of the *Code for America’s Brigade* they are part of a global network of volunteers, local governments and community partners that aim at building new tools to solve urban problems, connecting people and exchange about technologies and processes (Code for America Labs, n.d.a).

## Challenges

It is questionable which status the developed applications or services have. Are the winning services and prototypes indeed ready for use? Some of the announced winners of the *Apps for Amsterdam* competitions could also be found on the municipality’s government website<sup>4</sup>, e.g. the *Parkshark API* and *Bike like a Local*. Both of them are designed for a specific operating system (iOS in this case). In the case of *CodeAcrossNYC 2014* hackathon hosted by New York, most of the developed applications are web apps (BetaNYC, February 24, 2014). Whether web applications or smartphone apps, based on specific operating systems, were developed most, is difficult to determine since not all events report about their success and publish the winning services. Nevertheless, organizers of hackathons and app competitions have to think not only about the issues and topics for which these events should find solutions but also about the users of the outcomes and their technical environments. Depending

on the respective operating system various mobile applications could be needed, whereas mobile web apps would run notwithstanding the operating systems but with limited access options instead.

One smartphone application which has become very successful is *Bike Citizens*<sup>5</sup> formerly known as *BikeCityGuide*. It has won nine awards since 2011 (e.g. *Apps for Amsterdam* and *Apps for Europe*) and the Android version has been downloaded between 100.000–500.000 times according to the Google Play Store. But also web applications can become successful, like the Chicago *Flu Shot App*, which was built by a civic hacker in cooperation with the Chicago Health Department and then also adopted by the Cities of Boston and Philadelphia (Howard, January 17, 2013). The advantage of web apps is that they can be used by a broader range of people since they are independent of any device.

In order to bring a social or economic value out of the competition, the resulting ideas and products have to be accepted and used by citizens. In some cases, the developer gets some assistance from the city or the initiators of the hackathon. This can be in the form of financial, technical, as well as social support, e.g. connect the developer with existing project groups. The City of Amsterdam and the Waag Society, for example, select some startups to participate at the *Apps for Europe contest* (Apps for Amsterdam, n. d.) where they have the opportunity to socialize with international experts at a special event for this purpose called the *Business Lounge*<sup>6</sup>. In turn, this event offers the opportunity to win a pitch to the investors of *FutureEverything*<sup>7</sup> in Manchester which is a world-leader in the digital and art sector. However, the literature has shown that extrinsic motivations are not among the top drivers of participation in open data competitions and participants seem to be aware of the low chances to enter the market and making a profit in the end (Juell-Skielse et al., 2014). In addition, these events are hosted with the aim to increase awareness and promote open data, which finally may lead to a collectively shared mission where everyone can make a difference (Hellberg & Hedström, 2015).

Similar to the outsourcing of ideas, as mentioned above, also financial support can be outsourced to citizens which may “donate sums of money to support or finance a specific project” (Zogaj, Bretschneider, & Leimeister, 2014). Such an example of “crowdfunding” is the platform *citizenvestor* where citizens are invited to fund projects they like (Franks, January 11, 2013). The platform *ioby.org* takes this idea one step further and combines crowdfunding with resource-organizing. This means that they try to connect project organizers and supporters to make the projects successful also in the long term. They call this approach crowd-resourcing (ioby, 2015).

In most cases, the resulting services are aimed at solving specific issues with relevance for the city. Therefore, the challenge is not only to develop mobile apps but to make them successful and available to a broad range of citizens. Therefore, the products of civic hacking or app competitions have to be promoted after these events so that they get recognition from a larger audience. For this purpose, Chicago provides a good example. They call for residents to become members of *The Civic User Testing Group* (CUTGroup) which is a project by the *Smart Chicago Collaborative*. The members of this group are paid with 20\$ for testing new apps (Civic User Testing Group, n. d.). In addition, the *Smart Chicago Collaborative* offers free space for hosting new innovative applications. Furthermore, the Chicago *OpenGov Hacknights* provide good starting points for civic app projects (Whitaker, May 14, 2013).

The outcomes of hackathons and app competitions have shown that there is a need for financing and promoting the developed products. However, what if the hackathon is not only announced to develop a product for the market but also to develop tools for the whole city’s engagement? This has happened at an international hackathon event in New York. They hosted a prototype-athon called *CodeAcrossNYC2014* which belong to the international hackathon weekend *CodeAcross 2014* and was hosted under the slogan “Beyond Transparency. Let’s take the open government movement one step further, by focusing on not only making data open, but actionable” (Code for America Labs, n.d.b). This means that participants should work on datasets, portals, policies, and many other tools and topics concerning the provision and administration of open data and built prototype tools for city council members and community boards to help them to use and understand open data (BetaNYC, February 24, 2014). Thereby, the city officials’ awareness was risen to the data they provide, since a

lot of data has been published of poor quality. A major task at this event was to recognize how satisfied the participants are with the data provided by its government as well as rise city officials awareness for the importance and usefulness of open data (Weissman, February 24, 2014).

The increasing popularity and re-use of open data lead to enhanced data quality. Now, governments see that the data is used and they feel encouraged to provide data that is complete and of higher quality. Therefore, new jobs have to be created to fit all the needs, for example, a Chief Data Officer was proved for the city of San Francisco (Franks, January 11, 2013). Hackathons and app challenges have even become so popular that guides, e.g. “How to run a hackathon”<sup>8</sup> and books, e.g. “Civic Apps Competition Handbook”<sup>9</sup> are published to support hosting these events.

## Potential for Change

It still remains unclear whether hackathons are indeed able to make a difference and engage citizens in governmental processes. A survey conducted by the City of Vancouver was carried out to get more feedback from participants at hackathons (City of Vancouver, March 21, 2013). Vancouver’s city government found out that participants demand further hackathon events and more support for the community. They like the exchange between participants and city officials. But there is also a claim for longer hacking sessions, faster internet access, as well as more people with different backgrounds. In addition, participants prefer to be informed about upcoming events on the government’s website, social media channels, as well as via emails (City of Vancouver, March 21, 2013). The city government should show that they strongly support these events and attach importance to participants’ contributions. For instance, Vancouver’s third International *Open Data Day* was accompanied by more than 20 city officials as well as the Federal Minister for Open Data at the national government. In addition, a meaningful location, like a city hall, is assumed to be helpful in order to underline that these events and their participants are highly welcomed by governments (Eaves, March 11, 2013). This confirms the government’s aim for change to a more open and participative culture. Furthermore, the participants should be as much diverse as possible, since also people without programming skills can come up with great ideas (Eaves, March 11, 2013). This is one aspect that has changed over years. These events are not still addressed to developers and computer programmers only, but allow everybody to participate and ask for a wide range of people with different skills. Innovation competitions should be open to participants all over the world and cities should try to work in cooperation with each other. However, the analyzed cities perform very differently in doing so, e.g. in German and Italian cities innovation contests are scarcely available, whereas many other cities like e.g. Amsterdam, Barcelona, Chicago, Helsinki, and Singapore offer a wide range of competitions. Many cities tend to team up and host innovation contests jointly in order to build up global competitions which reach larger audiences. However, not many competitions seem to be well established as several ones were organized only once. In addition, not all of the apps and prototypes developed during these events can become successful in the long term, but to support some innovative ones, it might be helpful to build a whole innovation contest ecosystem around these events, like it is targeted by the Infocomm Development Authority of Singapore (IDA). Such an ecosystem could not only foster transparency and accountability but also participation in terms of the generation of ideas, services, and projects as well as their success.

Finally, more important than building successful applications is to establish a community that aims at solving problems together regardless whether they are city officials or citizens. This could be achieved in cities like Chicago, Vancouver, and Singapore. Strong citizen communities, who organize visible events on their own, like in Chicago, are in the minority and most hackathons and competitions are organized by governmental as well as non-governmental institutions and organizations. For this reason, still more governmental efforts seem to be needed to establish a culture of civic engagement and making citizens aware of the importance of open data, civic technologies and innovations in general for the city. Citizens should recognize that they can benefit from these competitions through making their city more livable and open. One group of citizens who have recognized that is *OpenDataBC*.

They state on their website that governments should not have to do all of this alone, their citizens should help them so that they can “just concentrate on getting the data out there, in raw form, and we will help organize it, assemble it and tag it so it’s more easily used by everyone” (OpenDataBC, n.d.).

## CONCLUSION

In order to answer our first three research question, we can summarize that the scope, topics, outcomes, organizers and supporters of hackathons and app competitions are very different between the cities we analyzed and there are only a few concepts that take place in several cities in the same way, e.g. the *International Open Data Day*. As the first hackathons from Washington DC brought out some nice applications, others started to adapt this idea. Today’s app challenges can range in size, e.g. from the city level up to an international level, in the addressed, from very broad themes, e.g. mobility up to specific solutions and tools for APIs. In addition, the competitions’ outcomes range from ideas up to market-ready mobile apps and not only app developers are welcomed participants but all citizens who may have great ideas and are interested in finding valuable solutions for their city. In many cases, we see that the initiatives of opening data or initiating a hackathon or app competition come from the government but in some cities also the citizens build strong communities and are aimed at supporting their municipalities.

With our fourth research question, we asked for the challenges that need to be faced. Summing up, only a small number of apps will be able to enter the market and most of those will need much support. Therefore, especially the outcomes’ financial support and competitive power are the biggest challenges. Nevertheless, the success of the events’ outcomes is still questionable. But as hacking was stated to be a hobby and moreover a hobby which has the potential to produce useful services from which everyone can benefit and to which everyone can contribute, it should be highly forwarded in future. The main point is that people come together as a community and develop city services, which could make the city smarter and enhance the quality of life. A great advantage is to solve urban problems collectively and foster the collaboration between governments and citizens. This aspect addresses our fifth research question, so we can conclude that innovation competitions could have the potential to improve the government-to-citizen relationship since they call for civic engagement. Whether they are indeed able to change this relationship as well as to which extent citizens are satisfied with these events and aware of their importance has to be analyzed in future studies. In urban areas, private sector companies increasingly open their data and join the hackathon trend. Although, it remains questionable if the potential of the crowd can be embedded into a successful ecosystem which helps to survive or even increase civic engagement to build value-added services for a livable future. At least, city governments should aim at cooperating with as many stakeholders as possible. They do not have to bear the burden of becoming a smart city alone. The example cases of many cities that have been described in this study show that hackathons and app competitions can be helpful means in order to bring citizens, companies, and governments – also beyond the city level – together in order to discuss problems and find solutions in terms of specific services and tools but also in the form of financial, technical or organizational support.

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## ENDNOTES

- <sup>1</sup> <https://isl.co/work/apps-for-democracy-contest/>
- <sup>2</sup> <https://play.google.com/store/apps/details?id=com.projects052314.issuereporting.app>
- <sup>3</sup> <http://forumvirium.fi/en/event/open-data-day-helsinki-hackathon>
- <sup>4</sup> <https://www.amsterdam.nl/parkeren-verkeer/open-data/>
- <sup>5</sup> <https://play.google.com/store/apps/details?id=org.bikecityguide>
- <sup>6</sup> <http://www.appsforeurope.eu/event/29-june-first-business-lounge-amsterdam>
- <sup>7</sup> <http://futureeverything.org/about/>
- <sup>8</sup> <http://www.socrata.com/wp-content/uploads/2013/05/How-to-Run-a-Hackathon.pdf>
- <sup>9</sup> <http://govfresh.com/2012/12/civic-apps-competition-theres-a-book-for-that/>

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## APPENDIX

### List of studied e-governments

Amsterdam (The Netherlands); Barcelona (Spain); Berlin (Germany); Boston (U.S.A.); Chicago (U.S.A.); Dubai (U.A.E.); Frankfurt (Germany); Helsinki (Finland); Hong Kong (China, SAR); London (United Kingdom); Los Angeles (U.S.A.); Melbourne (Australia); Milan (Italy); Montreal (Canada); Munich (Germany); New York City (U.S.A.); Paris (France); San Francisco (U.S.A.); Singapore; Stockholm (Sweden); Sydney (Australia); Toronto (Canada); Vancouver (Canada); Vienna (Austria).