From Smart City to Open City:

LESSONS FROM JAKARTA SMART CITY

Menuju Kota Terbuka: Pembelajaran dari Jakarta Smart City

FROM SMART CITY TO OPEN CITY: LESSONS FROM JAKARTA SMART CITY

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1 INTRODUCTION

In 2011, Indonesia started its Open Government journey when along with seven other countries it initiated Open Government Partnership. Following the global declaration, Indonesia launched the Open Government Indonesia (OGI) in January 2012 with the aim to introduce open government reforms, including open data. This initiative is supported by Law No. 14/2008 on Freedom of Information. Despite its early stage, the implementation of Open Government in Indonesia has shown promising developments, with three action plans enacted in the last four years. In the Southeast Asian region, Indonesia could be considered a pioneer in implementing the open data initiative at national as well as sub-national levels. In some cases, the open data initiative at sub-national level has even surpassed the progress at the national level. Jakarta, for example, became the first city to have its own gubernatorial bylaw on data and system management, which requires the city administration and agencies to open its public data, thus leading to the birth of open data initiatives in the city. The city also have Jakarta Smart City that connect sub-districts officials with the citizen. Jakarta Smart City is an initiative that promote openness of the government through public service delivery. This paper aims to take a closer look on the dynamics of citizens-generated data in Jakarta and how Jakarta smart city program contributes to the implementation of open data.

1.1 Background and rationale

The use of information communication technology (ICT) in creating new channels for public participation has been widely known. Particularly in the developing parts of the world, ICT has been a key factor in bringing about positive changes across various sectors within the state and society. In Indonesia, ICT has played a big role in bridging communication between the government and its citizens to enhance Public Service Delivery (PSD). In particular, ICT has been crucial in enhancing the implementation of the government's open data initiatives for the last three years.

The open government and its open data initiative in Indonesia aim to enhance two streams that have resonated with the public, namely, public innovation competition and public service improvement. This research aims to investigate how actors in public innovation and public service improvements collaborate in enhancing public participation in open data.

This research focuses on Jakarta as its case study as it has the most integrated PSD information system in Indonesia and has been actively involved in a number of open data initiatives. Jakarta is also one of the first cities to have its own dedicated reporting applications. Under the leadership of Governor Basuki Tjahaja Purnama (Ahok), Jakarta has promoted and implemented the open

government initiative since 2012. This was marked with series of events such as Hackathon Jakarta[1], and the initiation of Jakarta Smart City program in 2014. Jakarta Smart City is a program that provide information on Jakarta such as traffic condition, public service delivery, and flood report. All information is obtained from Qlue and Waze application, and Twitter account @petajkt. This program promote deeper citizen engagement to create more effective public services using technology.

Most information in Jakarta Smart City is a citizens-generated data obtained from the above mentioned applications. Citizens accessed the application through their mobile phone. According to the Ministry of Communication and Information Technology report, number of cellular phone user in Indonesia have reached more than 370 million in 2014. Furthermore, Indonesia has widely known as the country with the most active social media user in the world. According to the latest data, number of internet user in Indonesia in 2014 is 88.1 million. In Jakarta, internet penetration go as far as 56% (APJII and UI 2015), and the mobile-phone ownership is as high as 97,24% (BPS, 2015). This number demonstrates that Internet infrastructure in Jakarta is not the biggest concern and an Internet-based application would do well if implemented in the city. The case could also be found in Jakarta Smart City and public service application that has changed the mode of communication between government and the citizens.

1.2 Research objectives and questions

This research aims to understand how the existing initiatives within or outside of the Smart City program have benefitted citizens. Furthermore, this research also aims to see the extent to which the current strategy of the Smart Cities program focuses on citizen vis-à-vis its techno-centric approaches. The three main objectives of this research are:

1. To understand how the Smart City initiative is achieving its intended goals.
2. To identify which aspects have been covered by the initiative, and
3. To examine the enabling factors, barriers, and suggestions to ensure the sustainability of the initiatives.

In light of the abovementioned objectives, we posit the following research lines of inquiry:

1. What motivated the development of the following applications that integrated with JSC program and what process were undertaken to establish them?
    - Qlue

[1] *Hackathon Jakarta* (popularly known as #HackJak) is the first open data challenge where around 53 mobile apps were developed to solve common urban challenges, particularly on budget management and public transportation.

- Peta Jakarta
- Waze

2. How do these applications use open data and what open data were used? Who are the providers of these data? How is the data being shared between the city government and the data providers, such as Waze or petajakarta.org?
3. Who are the intended (internal and external) users of these applications? How are users engaged? What are the strengths and weaknesses of these engagement strategies?
4. How many users are reached by these applications? How do users benefit from these applications? How widely are these benefits shared?
5. Who are the non-users of these applications? Why do they not use the tool?
6. What are the factors that make these applications effective in implementing sustainable and inclusive open data initiatives and securing equitable social benefits from open data?

1.3 Research design

These research followed a process as described in Figure 1.1 using a combination of methods and tools (see Table 1.1).

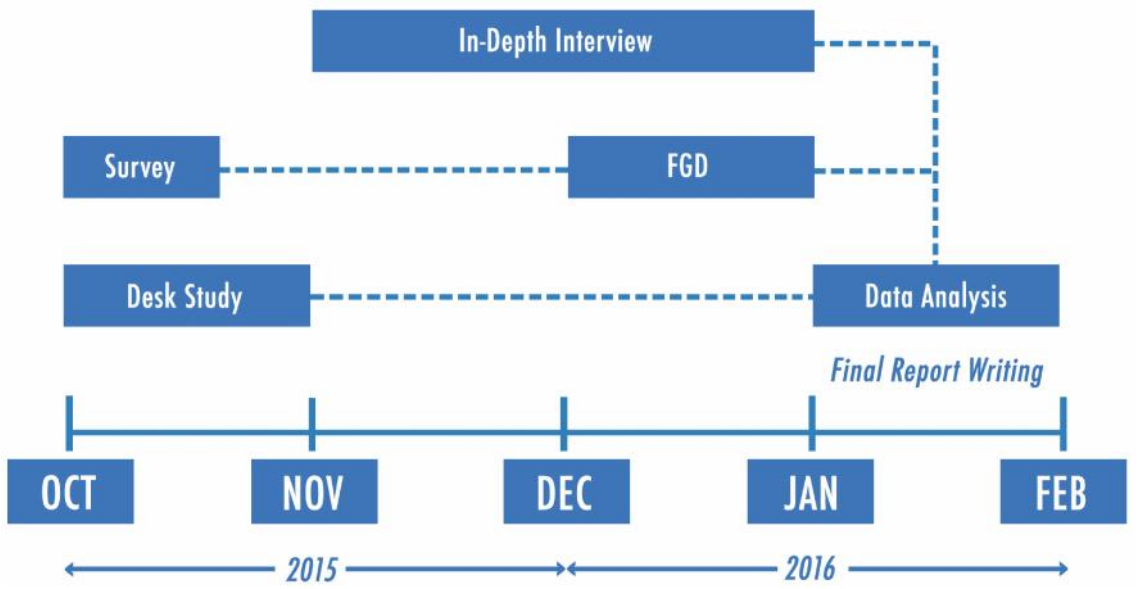


Figure 1.1 Research process

Table 1.1 Overview of research design

	RQs	Area of Investigation	Instrument
1	What were the motivations of the initiatives and what processes were undertaken to establish them?	Underlying factors/contexts Motivations Establishment of initiatives	Interview
2	How has open data made a part in these initiatives? What sorts of open data were used? Who were the providers of these data?	The dynamic of data-initiatives Type of data Data provider	Interview Desk study
3	Who are the intended users of these initiatives? How were the users engaged by the initiative? What are the strengths and weaknesses of these strategies?	Target users Method of engagement Strength and weakness	Interview FGD Online survey
4	How many users were reached by these initiatives? What benefits were they able to get from these initiatives? How did these benefits come about? How widely are these benefits shared?	Benefits & beneficiaries	
5	Who are the non-users of these initiatives? Why they do not use the tool?	Non-users Constraints	Interview Offline survey FGD
6	What elements make initiatives such as these to be effective in implementing sustainable and inclusive open data initiatives, and securing equitable social benefits from open data?	Enabling factors Barriers Possible solution	Desk study Interview FGD

We combined secondary data and primary data collection to comprehensively answer our research questions. To answer the second question, we collected secondary data through a desk study to map the existing regulation and to profile each application in order to perform analysis to answer the second question. Primary data gathering were collected through in-depth interviews to identify the benefits of the applications, enabling factors, and to understand the strengths and weaknesses of the applications to respond to the second until the fifth questions. The data gathering took place between November 2015 and January 2016. In the pre-research phase, we analysed secondary data and sourced statistics, news and reports. This was followed by conducting online and offline surveys, and a series of primary data-gathering interviews to provide us with detailed, nuanced, and insightful stories. Chapter Three will elaborate our methods in more detail.

1.4 The role of open data in urban governance: A preview

This research examines the business process of Jakarta Smart City and the three applications connected with it: **Qlue**, **Waze**, and **@petajkt**. These applications provide communication channels between the government and its citizens and have successfully increased public participation, thus contributing to improved governance. The enabling factors that contribute to the success of those channels are the use of open source platform, harnessing existing channel (e.g. uses Twitter in the case of @petajkt), and the involvement of government and its agencies. In spite of this, our analysis highlights that although technology could help enhance public participation, the government still needs to maintain *offline* communication with its citizens. As the applications are mostly smartphone-based, their scope is limited only to users who use smartphones.

Our study indicates that more than 50% of those surveyed are not aware of Jakarta Smart City initiative despite their use of at least one of the three applications connected with the initiative. The users recognize the benefits of the applications and how they help them to communicate with the government. The non-users say that they are willing to participate and use the applications if they have evidence on how the government will use the data. Users deemed the applications useful if they address their everyday problems, are easy to use, and have interesting features. Waze is the most used applications since it addresses the city's main problem: traffic jam. Qlue, the main application that provides citizen reports to Jakarta Smart City, has been very adaptive to the current situation taking place in the city. @petajkt Twitter account provides real-time flood monitoring in collaboration with the city's Disaster Mitigation Agency and Social Service Agency.

We found that most users of these applications were digital natives and are active in social media. This is related to the nature of channels that require internet access, which, at the same time, limits their scope considering that there are citizens and government officials who are not-yet familiar with the latest IT tools. Although the city administration has provided offline channels, such as CROP (*Cepat Respon Opini Publik*), most reports from citizens still came from online channels (e.g. official Twitter and Facebook accounts).

Each application was developed with different motivations: Qlue and Waze are developed by private companies, which implies a business motivation; @petajkt is a research project; while Jakarta Smart City is a program that aims to increase public service and provide integrated information obtained from Qlue and Waze application as well as @petajkt Twitter account. Almost all data is provided by citizens (user-generated data), and stored mostly in the developer's system, whereby the API of each application is shared with Jakarta Smart City platform. Of the three, @petajkt is the only channel that publishes its API as open data.

Our findings indicate that while Jakarta Smart City through its applications has helped provide citizen-generated data, the use of data available by the government is still very low. There is a

fundamental problem of data governance within the government. There is a lack of data analyst in government and the official is also still lacking of data analysis capacity. This is the case not only with Jakarta Smart City, but also the city's data portal as indicated by the quality of available data. Since the city launched its open data initiative, all work units within the government were compelled to open and publish their data. However, city officials have been struggling to respond to this demand, as they do not fully understand how to manage and use the trove of data produced with this initiative. The situation is made more complicated by the entrenched silo culture within the government that has been the main inhibitor to progress in implementing open data in Jakarta.

However, the deliberation on how open data could help in urban governance seems of little concern to most of the government officials. What is needed here is more attention to the governance of the open data itself in city level; not only forcing officials to implement open data for the sake of smart city, but also to bring valuable results from the available data.

1.5 Chapter summary

We have briefly introduced the dynamic of open data initiatives and its applications in Chapter One. Chapter Two elaborates the theoretical framework necessary to understand the interplay of open data in urban governance and how it informs the dynamics of the Jakarta Smart City initiative. Chapter Three expounds the approach and methods used in this study, which includes data collection tools and methods of analysis, along with their limitations. Chapter Four and the following chapters present the findings and empirical data. Chapter Five then elaborates the user and non-user dynamics. Meanwhile, the drivers, barriers, and enabling factors of the open data initiatives are elaborated in Chapter Six. Chapter Seven presents a conclusion about the role of open data in urban governance, provides audience recommendations, and concludes the research.

2 THEORETICAL FRAMEWORK

The notion of open government data is relatively new. The Open Government Partnership was only established in 2011 and there is still limited amount of research on this topic. To explain the concept of open data, we use several different theories that relate to the phenomenon in the context of open data in Jakarta.

A number of approaches can be taken to examine open data. One is identifying the stakeholders that are involved in order to help comprehend the understanding and meanings in the workings within Open Government Data (Gonzales-Zapata and Heeks, (2015)). As open data involved various stakeholders in its establishment, we will use the perspectives of particular stakeholders relevant to the context of Jakarta. In this case, bureaucratic and political perspectives are chosen because the government and citizens play the main role in the operation of open data.

In Jakarta, the practice of open data can be examined through Jakarta Smart City Initiative. Launched in 2014, Jakarta Smart City aims to become an integrated information hub of Jakarta. To achieve this goal, the government agencies and all of its work units were required to disclose their data. To further explore open data performance and understand the nature of Jakarta Smart City initiative, we adopted the work from Chourabi and colleagues (2012) on the smart city integrative framework, which includes technology, governance, policy context, people and communities, and built infrastructure as key factors.

As an integrated information hub, Jakarta Smart City uses crowdsourcing as a method of data collection. In particular, this is practiced through public reporting tools that are integrated with Jakarta Smart City: Qlue, Waze, and @petajkt. Clearly, citizen participation is the cornerstone of Jakarta Smart City initiative, thus the question of who participates and who does not is a matter of concern. To address this concern, we employ the notion of pattern of political participation by Best and Krueger (2005) who postulated that traditional and online political participation is influenced by the resources that enable such participation. This study aims to identify the resources that influence the citizen participation in the context of application adoption.

We found that even though these concepts may initially be independent, in context of open data in Jakarta they become interrelated. Building on these concepts, open data practice in Jakarta appears to be a manifestation of the government's efforts to improve governance through transparency and by increasing public participation. This entails creating a platform that bridges the government and citizens. Jakarta Smart City Initiative has thus become the core subject of this study, particularly in its relation to the government and the citizens, and as a hub for both.

To summarize, the research questions posited and the theoretical framework employed are as follows:

Table 2.1 Concept and research question

Research Question	Concept	Chapter
What were the motivations of the following applications and what processes were undertaken to establish them?	Bureaucratic and Political Perspective of Open Government Data to analyse the motivation of the program	Chapter 4
	Conceptualization of Smart City used to address factors of technology, governance, and policy context in relation to the motivation and process of establishment	
How has open data played a part in these initiatives? What sorts of open data were used? Who were the providers of these data? How is the data being shared between the city government and the data providers such as Waze or petajakarta.org?	Conceptualization of Smart City used to address factors of 1) Technology in relation to the role and kinds of open data used, 2) Governance in relation to the process of data sharing	Chapter 4
Who are the intended (internal and external) users of these applications? How were the users engaged by the applications? What are the strengths and weaknesses of these engagement strategies?	Political Perspective of Open Government Data to explain intended users of the initiatives	Chapter 5
	Patterns of Online Political Participation to explain the characteristics of users	
	Conceptualization of Smart Cities used to address factors of people, communities and built infrastructures in relation to the characteristic of users and the method of engagement	
How many users were reached by these initiatives? What benefits were they able to get from these initiatives? How did these benefits come about? How widely are these benefits shared?	Conceptualization of Smart Cities used to address factors of people, communities and built infrastructures in relation to users and perceived benefits of the initiatives	Chapter 5
Who are the non-users of these applications? Why do they not use the applications?	Patterns of Online Political Participation to explain the characteristics of non-users	Chapter 5

Research Question	Concept	Chapter
	Conceptualization of Smart City used to address factors of people, communities and built infrastructures in relation to non-users and hindering factors	
What elements make initiatives such as these to be effective in implementing sustainable and inclusive open data initiatives, and securing equitable social benefits from open data?	Bureaucratic and Political Perspective of Open Government Data to analyse elements of initiatives	Chapter 6
	Conceptualization of Smart City used to address factors of technology, governance, policy context, people and communities, and built infrastructure in relation to elements of initiatives	

Consequent to the introduction above, further elaboration of the concepts is provided as follows: Open Government Data Perspective, Conceptualization of Smart Cities, and Patterns of Political Participation.

2.1 Open Government data perspective

Gonzales-Zapata and Heeks (2015) suggested four perspectives related to Open Government Data (OGD), namely, Bureaucratic Perspective, Technological Perspective, Political Perspective and Economic Perspective. Considering the context of Jakarta, we choose to focus on bureaucratic and political perspectives as our analytical framework for the case of Jakarta Smart City.

Jakarta's open data initiative followed from Open Government Indonesia that aimed to make government more open, participatory and innovative to support public service delivery in terms of regulations, strategies, and processes of public sector data (Heusser 2013). Hence, the bureaucratic perspective is appropriate for analysis because it focuses on governmental aspects that are needed to improve public service delivery through greater efficiency and effectiveness of data management.

The initiatives increasingly embraced public participation to further enhance openness and transparency. The notion of public participation is consistent with the political perspective of OGD that sees access to public sector data as the right of citizens (AIE/OKF 2011, Yu and Robinson 2012). This perspective sees public access as key to ensure transparency and accountability over government processes, as well as to build trust between the government and the citizens. Therefore, open government should enable greater public participation and empowerment in decision-making processes in an informed and

structured manner. It would, thus, entail the creation of new platforms for discussion to open more opportunities to join in public discussion (Janssen 2012).

We choose to not use the technological and economic perspective because they are not as prominent compared to the former two.

Technological perspective is not very apparent in Jakarta's open data initiatives. The technological perspective sees OGD as a technological innovation within the government data system undertaken by ICT staff. The aim is to improve the infrastructure of government data where data adheres to foundational qualities (e.g. accuracy, completeness, timeliness) as well as distributive qualities (e.g. free availability, reusability, interoperability) so it is readily accessible to facilitate use by other stakeholders and integration with other datasets (Malamud, O'Reilly et al. 2007, Barros 2011, Kalampokis, Tambouris et al. 2011). While ICT staff is indeed involved in open data initiatives in Jakarta, they are not the main drivers. The development of open data is driven by government and public interest, not technical and technological aspects.

The economic perspective sees OGD as a means to further economic growth driven by economic value through new products, services, revenue, profits, and jobs. Based on OGD, new applications and services can be made, new business models created and existing business models improved (Gonzales-Zapata and Heeks 2015). Although there may be economic impacts created as a result of open data initiatives, at this moment these impacts are assumed to be small and unintended. It is true that one of the initiatives aims to create economic impact by engaging private companies in public service delivery, however this is not the focus for the time being.

For the reasons above, we decided to not include economic and technological perspectives as part of analysis. The bureaucratic perspective will be used to analyse the establishment of Jakarta Smart City initiatives in relation to open government data. The political perspective will be used to analyse citizens as users and potential users as well as their interaction and involvement with Jakarta Smart City and the applications.

2.2 Conceptualization of Smart City

Smart City is a concept that has yet to attain a clear and consistent understanding despite its usage in various cities worldwide. One way to conceptualize a smart city is seeing it as an icon of sustainable and livable city (Chourabi, Nam et al. 2012). Challenges surrounding the urban population are triggering many cities around the world to find better ways to manage themselves and the term "Smart City" has been widely used to describe such initiatives. For the purposes of this study, the conceptualization of smart city is adapted from the work of Chourabi and colleagues about the smart city integrative framework (Chourabi, Nam et al. 2012).

There are eight factors to be considered when examining smart city initiatives. These factors are (1) management and organization, (2) technology, (3) governance, (4) policy, (5) people and communities, (6) the economy, (7) built infrastructure, and (8) the natural environment. These factors provide a basis to see how a city envisions its initiatives, services it is implementing and challenges in establishing it (Chourabi, Nam et al. 2012). Each of the factors are briefly described below:

The management and organization factor is rarely raised in the discussions about smart cities. Instead, this is addressed from the perspective of IT initiatives and projects as a success factor or a major challenge (Scholl, Barzilai-Nahon et al. 2009, Gil-García and Pardo 2005). This concern is therefore discussed in the context of e-government and IT projects.

Technology plays a big part in smart city initiatives, as integration of ICT and development projects can have an impact on how a city is built and managed. However, even though it can improve various aspects of urban life, it can also exacerbate inequality and widen the digital divide (Odendaal 2003).

Governance is an important factor since there are multiple stakeholders involved in smart city initiatives, which requires better governance to manage them. A number of scholars have argued that ICT-based governance is the core of smart city initiatives (Giffinger, Fertner et al. 2007). ICT-based governance should include citizen participation, private or public partnership, and has qualities such as being accountable, responsive, and transparent (Odendaal 2003, Giffinger, Fertner et al. 2007, Johnston and Hansen 2011).

Policy context relates to legal and regulatory issues that enable or hinder the implementation of smart city initiatives. Policies need to be made to accommodate innovations that are planned by the government. Although the innovation in technology for smart city is apparent, changes in policy context are more ambiguous (Hartley 2005).

People and communities are critical as they are the very subjects whose quality of life smart cities aim to improve, as well as actors whose participation is key to the success of smart cities. Citizen participation in governance is important to ensure that the initiatives can be sensitive in balancing the needs of citizens from various backgrounds (Chourabi, Nam et al. 2012).

Economy is also a major driver of smart city initiatives. Economic capacity of a city is one of the indicators to measure the city's competitiveness. In the economic context the outcomes include business creation, job creation, workforce development, and productivity improvement (Chourabi, Nam et al. 2012).

Built infrastructure refers to the availability and quality of the ICT infrastructure of smart cities. Infrastructure, such as wireless Internet connection, fiber optic channels and service-oriented information system, is fundamental for the development of smart cities.

Natural environment relates to the notion of a smart city that uses technology to increase sustainability and improve the management of natural resources (Council).

Putting these factors into the context of Jakarta, we decided to use only five of the apparent factors in the Jakarta Smart City Initiative, namely, technology, governance, policy context, people and communities, and built infrastructure. In this study, technology factor refers to the Jakarta Smart City portal and its integrated applications. This research is heavily focused on these applications, their benefits and relation to citizens and the government. Governance refers to government performance regarding open data and the relations between the government, developers, and citizens. Policy context refers to the Governor's Regulation on System and Procedure of Development Data and Information Management (*Peraturan Gubernur* No. 181/2014) that laid the foundation for the establishment of open data and Jakarta Smart City initiatives. People and communities refer to users and non-users of the applications integrated with the Jakarta Smart City Initiative. Built infrastructure refers to supporting infrastructure that enables citizen to participate in the initiatives and use the application.

Management and organization, economy, and natural environment factors, although no less important than the abovementioned factors, do not feature prominently as of yet in the Jakarta Smart City Initiative.

2.3 Patterns of political participation

One of the most crucial issues in conducting open government is citizen participation. It is vital because citizen participation is the crux of collective decision-making that informs regulations that affect the public. A caveat to public participation is the risk that more active citizens will receive a greater share of policy benefits compared to those who are less active (Best and Krueger 2005), creating a situation of unequal participation. With that in mind, it is important to investigate the characteristics of individual citizens that are more involved in the city's open data initiative and see what factors encourage or hinder individuals to participate.

In traditional political participation, citizens from higher SES backgrounds tend to participate more than those from lower SES backgrounds (Best and Krueger 2005). As political participation is now also materialized through digital means, we assume that the opportunity to participate and be involved in various political activities is different than in conventional sphere. It is unclear how SES backgrounds remain influential in digital political participation, since the distribution of internet access is more lenient than traditional access for political participation. Some scholars have suggested that the pattern of digital participation may be similar with traditional participation. Although it may seem that access has been widened by virtue of it being online, the internet may still reinforce disparities between individuals with higher and lower SES backgrounds (Murdock and Golding 1989). It is assumed that those who are already familiar with traditional political engagement already have the necessary resources to participate and will use these resources with the new medium. However, the resources needed to participate in traditional and online political activities differ significantly (Best and Krueger 2005). Thus, results may be different as to how certain factors, such as SES background, relate to digital participation nowadays.

Age is another factor that informs political engagement. Studies have shown that young citizens engage in politics at much lower levels compared to older citizens (Verba, Schlozman et al. 1995, Carpini 2000, Putnam 2000). However, in the context of digital participation, younger individuals have more means and internet skills to engage in online political activity that should increase the likelihood of their participation (Best and Krueger 2005). We can speculate that the use of internet in political participation might incline to youth compared to older generations.

3 METHODOLOGY

This research aspires to gain a broad understanding about the usage of Qlue, Peta Jakarta, and Waze; and at the same time, we also seek to gain an in-depth, and more nuanced information about the data generated by the three applications in relation to Jakarta Smart City initiative. In designing the research methodology, we employed a mixed-method approach, combining qualitative and quantitative approaches. We use the quantitative approach to obtain statistics that portrays the dynamics of users and non-users of the applications. This will serve as the main tool of inquiry about how citizens use the applications and how the applications generate citizen reports to the government. The qualitative approach employed an array of methods for collecting data – including interviews, focus group discussions, workshops, ethnography, observation, and literature review (Cassell and Symon, 2004, Creswell, 2003). The qualitative approach bridges the particular objectives of this method to the overall objectives of this research, i.e. to reveal the context of open data in Jakarta Smart City initiative and the three applications connected with it.

We briefly explain our research strategy below.

3.1 Survey

This research uses stratified sampling method, dividing the overall population into subgroups, then creating a composite sample by drawing subsamples from each of these subgroups. This sampling method is used because stratification provides a more refined degree to which preselected subgroups in the population are represented in the sample (Morgan 2008). In this research, the population was stratified according to internet penetration, since the applications rely on internet access and infrastructure. The samples from subgroups were gathered using two methods: online and offline survey. Mirroring the 56% internet penetration in Jakarta (APJII and UI 2015), the proportion of responses collected from online and offline surveys was set at 50:50.

The subsamples are gathered with convenience sampling – respondents were selected based on their availability (Saumure and Given 2008), which means that they are individuals who were most ready, willing, and able to participate in the study. In the offline survey, questionnaires were distributed in public places, such as city parks, universities, city tour buses, buses and train stations. These locations were chosen to represent the diversity of respondent backgrounds to reflect that of the general population. The online survey was distributed through social media (Twitter, Facebook, websites, blog), as well as through our organisation (CIPG) networks.

The survey was conducted from 16 November 2015 to 11 December 2015 with the following respondent detail:

1. n for user: 139
2. n for non-user: 261

There were a number of challenges in conducting the survey, especially in distributing the online questionnaire – tracking the form online and making sure that it is completed correctly was particularly challenging. This has resulted in incomplete questionnaires that had to be taken out of the survey result. We addressed this challenge by collecting online response as much as possible, and, as part of the protocol, we asked respondents to leave their contact information, if they desired. However, in the end, we managed to collect a sufficient number of online and offline questionnaires, and there was no need to follow up any of the incomplete responses.

3.2 Focus group discussion

To gain a deeper insight from user and non-user respondents, we held two confirmatory focus group discussions (FGD). This method is particularly useful for exploring people's knowledge and experiences and can be used to examine not only what people think, but also how they think and why they think that way (Kitzinger, 1995).

Since the FGDs were confirmatory, participants were chosen from existing survey respondents, i.e., from questionnaires that had contact information and were further screened based on the validity of answers. We contacted the respondents through text message and email, and follow up communication was conducted through text messages and phone calls. In the email we attached the Terms of Reference of this research and allowed 7-10 days for respondents to confirm their attendance. Below is the recap of the FGD process.

Table 3.1 FGD process

	Numbers of participants contacted	Numbers of participants confirmed	Numbers of participant actually attend
FGD with non-user	19	6	3
FGD with user	41	6	2

3.2.1 FGD with non-user respondents

The first FGD (with non-users) was held on 22 December 2015 and attended by three participants. The FGD was opened with an explanation about the ongoing research and the protocol of the session. We asked the following five questions in this FGD:

Table 3.2 FGD questions for non-user

1. Why do citizens not utilize public service applications? 2. Are citizens willing to voice their aspirations to the government through public service applications? 3. What features do citizens need? 4. What important service(s) that is/are not yet included in the existing public service applications? 5. What is the most suitable communication method for the government to increase the socialization of public service applications?	*1. Mengapa masyarakat tidak menggunakan aplikasi pelayanan publik?* *2. Apakah masyarakat mau menyampaikan aspirasi kepada pemerintah melalui aplikasi pelayanan publik?* *3. Fitur apa yang dibutuhkan oleh masyarakat?* *4. Layanan apa yang penting tapi belum tercakup oleh aplikasi pelayanan publik yang ada saat ini?* *5. Bagaimana metode komunikasi yang harus dilakukan pemerintah untuk meningkatkan sosialisasi pelayanan publik?*

The discussion used Chatham House Rule[2] and lasted for 3 (three) hours, conducted over two sessions with a 15-minute break between sessions. Session one addressed the first three questions, while session two discussed the last two questions. Responses from the three participants were rich and gave insight both for the application and the government from the non-user point of view.

3.2.2 FGD with user respondents

The second FGD was with user respondents – those who use at least one of the applications among Qlue, Waze, and @petajkt.org. Learning from the previous discussion, we contacted more respondents to get more participants. The questions for this FGD were as follows.

[2] When a meeting, or part thereof, is held under the Chatham House Rule, participants are free to use the information received, but neither the identity nor the affiliation of the speaker(s), nor that of any other participant, may be revealed. https://www.chathamhouse.org/About - Last accessed February 4, 2016

Table 3.3 FGD questions for user

1. How did you find out about the application(s) that you use? 2. What is your motivation in using the application(s)? 3. What benefits do you get from using the application(s)? 4. What important features are not yet included in the existing application(s)?	*1. Dari mana anda mengetahui keberadaan aplikasi/layanan publik yang anda pakai?* *2. Mengapa anda mau menggunakan aplikasi tersebut?* *3. Keuntungan apa yang anda dapatkan dari menggunakan aplikasi ini?* *4. Fitur apa yang penting namun belum tersedia di dalam aplikasi-aplikasi ini?*

The discussion lasted for 3 (three) hours and the same protocol was applied during the discussion: we used Chatham House Rule and divided the discussion into two sessions with each session covering two questions. Only two participants attended the discussion. In spite of that, we argue that the inputs from these participants were rich, diverse, and all four questions were answered properly.

3.3 In-depth interview

To understand how each application works, we conducted individual in-depth interviews with key actors involved in the development of Jakarta Smart City Initiative (e.g. Jakarta city administration' official, data manager, administration officer), application developers, open data practitioners and data scientists. With this strategy, we focused on answering the following issues: (i) the process of Jakarta Smart City, (ii) what were the significant factors that affected the development of the initiative, (iii) the role of open data in the initiative and how it is managed, and (iv) the constraints for the initiative. With the consent of our respondents, we recorded all interviews and transcribed them for content analysis.

We interviewed seven respondents regarding the development process of each application as well as the workings of Jakarta Smart City as an integrated platform. Below is the profile of respondents that we managed to gather for the interviews.

Table 3.4 Interview respondents

Respondents	Number of interviewees
Jakarta Smart City	2
Work Units	1
Application developers	3
Data Scientist & Open Data Practitioner	2

3.4 Constraints

During this research, we encountered several methodological challenges. Concerning interviews, we had difficulties to contact Waze representatives in Indonesia. Our efforts to contact them directly through various channels, including their office in Israel, did not materialize. Since information from Waze is important for this research, we investigated information on Waze from third party sources, including news, reports, and an interview with Terralogiq – the official Google Partner in Indonesia. We also collected some information from the Jakarta Smart City. We chose Terralogiq to get information on Waze because as a Google Partner, and having engaged with Waze representative from Israel, Terralogiq should have some awareness of the working process of Waze. While Jakarta Smart City was chosen since it uses Waze data in its platform, thus, it should be able to provide information on Waze data management.

In regards with FGDS, the particular challenge for was to get sufficient number of respondents. Despite our efforts to contact a reasonable number of respondents and having many of those confirmed, the actual number of respondents who attended the FGDs was below our expectations. Out of more than 20 respondents contacted, only less than five actually participated. It is worth noting, however, that despite the low turnout, the participants in both FGDs represented a range of views of both user and non-user respondents. With this in mind, we argue that both discussions were successful and useful. However, although the backgrounds of participants reflected were diverse, the data derived from the FGD sessions will not be generalized, and therefore could not be applied to all citizens.

4 PROFILING

This chapter explicates the public reporting channels available in Jakarta, particularly the applications that are currently connected to Jakarta Smart City. We focus on three channels in this inquiry, namely: Qlue, Waze, and the Twitter account @petajkt. These three channels are integrated with Jakarta Smart City and supply data to the platform. We will also overview the other public reporting tools available in Jakarta, such as LAPOR! and CROP (*Cepat Respon Opini Publik* – Public Opinion Response). While these two channels are not the focus of this research, it is nonetheless useful to mention them to enrich the context of public reporting tools in Jakarta.

Public service applications have emerged rapidly, both at national and sub-national levels, since the open data initiative was launched nationally in 2011.

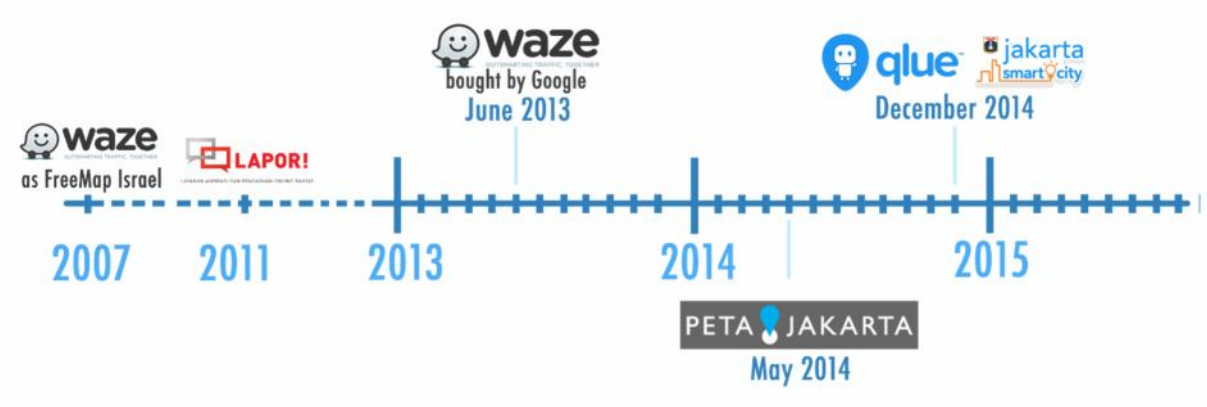


Figure 4.1 Application development timeline

The timeline above illustrates the journey of public service applications that followed the open government initiative. The first integrated public service application was *LAPOR!* initiated by the President' Office for Development Monitoring and Oversight (UKP4) that aimed to provide a national platform to convey public complaints. The development of LAPOR! triggered a number of other public reporting mechanisms in Indonesia. In 2014, Twitter account @petajkt started mapping floods in Jakarta, which lead to a cooperation between @petajkt and Jakarta Disaster Management Agency (BPBD). At the end of 2014, Governor Basuki Tjahaja Purnama launched Jakarta Smart City (JSC) as an integrated information platform; and in 2015, Qlue was appointed by the city government as its official partner to handle citizens' reports in JSC platform.

4.1 Profiling of public reporting channels

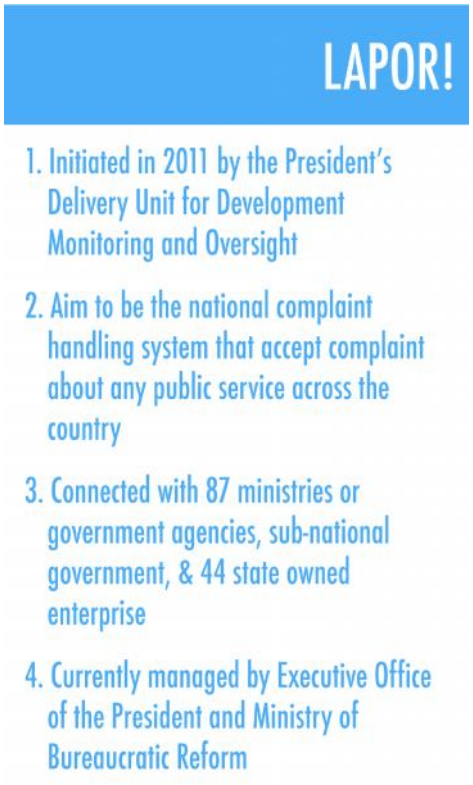
Besides the three applications that are the focus of this study, there are two other public reporting channels connected to the city administration of Jakarta, namely: LAPOR! and CROP (*Cepat Respon Opini Publik* – Public Response Opinion). The following is a summary of each public reporting channel, including Qlue, Waze, and Twitter account @petajkt that has become our focus.

Table 4.1 Elements of public reporting channels

Elements	LAPOR!	Qlue	Waze	@petajkt	JSC	CROP
Scope	National	Provincial	Specific issue: traffic condition	Specific issue: flood mapping	Provincial	Provincial
User Characteristics	Citizens, mostly lived in Java and age > 25 years	Citizens	Mostly citizens whose mobility is high	Citizens	Citizens	Citizens
Initiator	The President's Delivery Unit for Development Monitoring and Oversight	Terralogiq	Waze	SMART Infrastructure Facility, University of Wollongong, Australia	The city administration of Jakarta	The city administration of Jakarta
Currently managed by	The Executive Office of the President and Ministry of Bureaucracy Reform	Terralogiq	Google Inc.	SMART Infrastructure Facility, University of Wollongong, Australia	The city administration of Jakarta – Jakarta Smart City Unit	The city administration of Jakarta
Data Management	Data owned and stored in government server	Data owned and stored in Terralogiq server. Only data about citizens' reports are shared with the government, and flood report API is shared with @petajkt	Data owned by Waze. Government of Jakarta received the data through Google.	Data is available publicly in the form of API, including flood map. @petajkt does not stored any individual user profile nor data.	Data mostly owned by the applications' developer, such as Qlue, @petajkt, and Waze.	Data stored by the government, CROP Unit
Type of data	Citizen-generated data	Citizen-generated data	Citizen-generated data	Citizen-generated data	Citizen-generated data	Citizen-generated data
Application purpose	Report handling system	Report handling system	Providing real-time information on traffic condition based on citizens' report	Providing real-time information on flood based on citizens' report	Providing real-time information on the city based on citizens' report	Report handling system

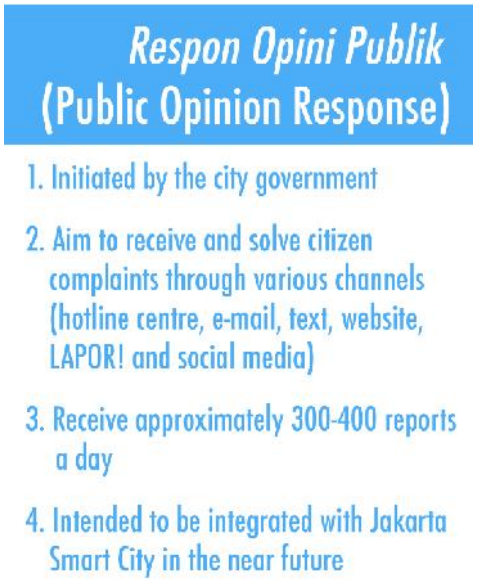
Elements	LAPOR!	Qlue	Waze	@petajkt	JSC	CROP
Partner in Jakarta City Administration	CROP (*Cepat Respon Opini Publik*)	CROP (*Cepat Respon Opini Publik*)	Jakarta Smart City Unit	Jakarta Disaster Agency	Qlue, Waze, @petajkt	LAPOR! and JSC
Report channel	Text message (SMS), E-mail, Website, application based	Application based, website.	Application based, website.	Twitter based	Qlue	Text message (SMS), E-mail, Website, call centre 164, Twitter, and Facebook
Motivation	Public service	Profit	Profit	Research project	Public service	Public Service

4.1.1 LAPOR! (to report)



LAPOR! was initiated in 2011 to handle aspirations, reports, and complaints at national level. LAPOR! is currently managed by The Executive Office of the President together with the Ministry for Bureaucracy Reform and connected to 87 ministries/ government agencies, 5 subnational governments, and 44 state-owned enterprises. *Daerah Khusus Ibukota* (DKI) Jakarta is one of the first subnational governments to connect with LAPOR!. Previously, Jakarta had CROP (*Cepat Respon Opini Publik* – Public Opinion Response) as their main public reporting tool, and LAPOR! is connected with the platform. This means that every report on DKI Jakarta that comes to LAPOR! is channelled directly to CROP. Technically, one dedicated person in the city's administration office handles all reports coming from LAPOR!.

4.1.2 *Cepat Respon Opini Publik* (Public Opinion Response)



CROP is the official public reporting channel owned by the city administration of Jakarta. The channel is responsible to gather citizen reports through hotline 164, the city administration's official email, text messages, Twitter, and Facebook accounts. CROP also collects reports from *LAPOR!* Despite the variety of channels available to report, according to statistics from CROP website, most reports came from the city's official Twitter account, with 7,946 reports until March 2016. While call centre 164 received 16 reports and only 1 report came from LAPOR![3] Although it serves various channels, the responsiveness rate of CROP is still low.

[3] http://prov.jakarta.go.id/opinipublik/statistik Last accessed 1 March 2016

> *"… We have CROP, but the responsiveness rate is low. That is because the system could not send notifications to SKPD (work units). [the SKPD] have to open the system [to view the reports], and so on. That is why we would like to change the system. All reports will have notification in CROP (the application in JSC)."* *(Undisclosed, JSC, Interview, November 2015)*

In order to improve the responsiveness and citizen participation in the city governance, the city administration of Jakarta developed Jakarta Smart City platform. Besides providing information on the city, JSC aims to complement CROP on citizens' report handling.

4.1.3 Jakarta Smart City

Jakarta Smart City (JSC) is the most integrated public reporting and information platform in Jakarta. Initiated in December 2014, Jakarta Smart City was developed to create one platform that provides public information about the city. The Jakarta Smart City Technical Executive Unit (UPT – *Unit Pelaksana Teknis*) was officially established in January 2015 to fill the gap between the needs and demand of data both from the government and citizens.

To accommodate citizens' reports, JSC partnered with Qlue, an application developed by a start-up company based in Jakarta, which has been an inseparable part of Jakarta Smart City ever since. Whereas Qlue is intended for citizens, public officials have their own application called CROP. This application is directly connected with Qlue from which public officials could receive citizens' complaints and respond accordingly. As JSC is also supported by Google Enterprise, it also connected to Waze – a traffic information application powered by Google.

Based on the Gubernatorial Regulation No. 181/2014, each work units are obliged to disclose their data. The JSC Unit is assisting the work units to disclose their data. At first, it was not easy to have all Work Units (*SKPD – Satuan Kerja Perangkat Dinas*) on board. Many resisted disclosing their data because Work Units did not have reliable data management system. Much of the data are scattered and not recorded well. This created confusion when data is needed.

> *"At first, the movement to gather data (from work units) was somewhat difficult. Work Units were keeping (the data) for themselves. Fortunately, the Governor stick to his three magical words: Fire, fire, fire! (if work units are not following the instruction)… And work units have signed the public data sharing commitment that obligated them to open its data, so it is now easier for JSC (to ask for data)".* *(Undisclosed, Jakarta Smart City Unit, Interview, November 2015)*

Since there was special instruction from the Governor to each SKPD, currently 26 out of 35 SKPD[4] are already using CROP and integrate their data to Jakarta Smart City. With the open data commitment signed in 2015, the city administration of Jakarta is obliged to open their official data, especially those related to public goods and services.

> *"… We have numbers of KPI (Key Performance Indicators) for the SKPD (work units), but in relation to Jakarta Smart City, our KPI (for work units) is just data integration. Those (data integration) from 22 SKPD (is the current KPI)… because we're (the unit) still new, we are still refining the Smart City grand design."* (Undisclosed, Jakarta Smart City Unit, Interview, November 2015)

The intended users of Jakarta Smart City are the citizens. However, as it is still web-based and smartphone-based, many citizens are still left out from accessing this platform. In addition to that, the city administration has CROP that is still not yet integrated with JSC. It does appear that the city has two different public reporting channels; JSC and CROP. JSC is currently in the process of integrating CROP to its platform in order to create an integrated information centre.

> *"… Citizen Relationship Management. That is what we aimed for (with the integration of JSC and CROP)… to become an integrated canal, from SMS and other channels… We want to provide as much channels to receive and handle citizens' reports, no matter how small (the report is)."* (Undisclosed, Jakarta Smart City Unit, Interview, November 2015)

The city administration recognizes that there are a number of challenges in integrating the two public reporting channels, mainly in terms of human resources. Since the main purpose of integrating data is to increase responsiveness, its notification mechanism needs to be improved and ensure that the responsible officials in respective work units are ready to increase their responsiveness.

> *"We hope that all the notifications could be integrated, and we can make records, because that is important, records (of the reports). We can analyse the records, what problem do we have in this month… Actually, the number of reports is not the main important. The less the reports (from the citizens), the better it is. We are not playing management by exception. That is what we aimed for (with the integration)."* (Undisclosed, Jakarta Smart City Unit, November, 2015).

Besides platform integration, JSC also launched its command centre – the *Jakarta Smart City Lounge* – in December 2015, to monitor all aspects of Jakarta Smart City. This command centre is open for public. Citizens could visit and see the workings behind Jakarta Smart City. The presence of Command Center enhances the perception that the city government is more open.

[4] Numbers of SKPD according to Library and Archive Agency (*Badan Perpustakaan dan Arsip Daerah*), http://www.bpadjakarta.net/index.php/informasi/website-skpd-dki-jakarta - Last accessed February 3, 2016

Data management

Reports from citizens are one of the main sources of data in JSC. This data is being feed directly for weekly evaluation meetings held by both the mayors of the capital's municipalities and the governor. This data serves as the basis for the mayors and the governor in the city officials' performance assessment.

Most of the data in JSC, especially those originating from applications (Qlue, Waze, and @petajkt Twitter account) belong to developer.

> *"Data is still belongs to provider and developer. (For example) all data originated from Waze still belongs to Waze, but we can get those data… it is open and we can keep and use the data for development planning and other (government-related) purpose… The same (data ownership mechanism) is applied to @petajkt."* *(Undisclosed, Jakarta Smart City Unit, Interview, November 2015).*

Data from Waze is embedded in the JSC platform as part of the partnership with Google Enterprise. @petajkt and Qlue provide their data as API (Application Performance Interface). Jakarta Smart City receives the API on citizens' report from both applications but does not have direct access to the data. However, the API of JSC is not open for public yet and only available based on specific request and purposes.

The JSC Unit has a dedicated data scientist. However, the unit still needs to increase its data scientists' capacity in order to properly understand, manage, and utilize all the data available.

> *"... It is a disappointment… I can say that there is almost no data utilization (in JSC unit). So far, the data is only being displayed (without being utilized properly)."* *(Undisclosed, data scientist, Jakarta Smart City, Interview, February 2016)*

Data governance seems to be a substantial problem that needs to be addressed within the government.

4.1.4 @petajkt (Twitter account)

@petajkt is a Twitter account that manages information specifically about flood in Jakarta. The data collected via Twitter is then linked to Jakarta Smart City and could be accessed through Jakarta Smart City portal. @petajkt is officially launched in 2014 as a research project, it is a first-in-the-world collaboration between Twitter, a university (SMART Infrastructure Facility, University of Wollongong) and a government disaster management agency that use social data to build a working model and provide real-time response to natural disasters. The project is owned by the University of Wollongong and it received great support from Twitter. The data collected from @petajkt is used by the city

government of Jakarta to locate flood sensors. In 2016, @petajkt also has additional data supply from Qlue and *pasangmata.detik.com* – a citizens-generated information hub that enables citizens to report any kind of interesting events in their surroundings, including flood report.

The first prototype of @petajkt in 2013 located 28 million flood sensor in only 24 hours. The team from @petajkt gave the prototype to the government (BPBD) and offered a cooperation where the information derived from @petajkt could be useful to support BPBD in handling the flood.

The motivation behind @petajkt is to use existing platform (in this case, Twitter) to spread useful information on flooding condition. Twitter is deemed as relevant platform since it has a very large user base in Jakarta. During monsoon season, citizens actively share the flood condition through Twitter. @petajkt collects all tweets and uses hashtag (#)*banjir* and *#petajkt* to map flood location in real-time.

> *".. @petajkt.org is all about the idea that during emergency such as flooding, we don't necessarily need to build a specific application just for that emergency… What we already have is a network of citizens, people in Jakarta, who are already collecting information about flooding in real time, they just don't know it yet… The concept that we came up with is how we can use that information that people are talking about flooding on twitter, how we can use that system to collect information to support BPBD (the Disaster Agency) understanding where the floods in real time."* *(T. Holderness, Co-Principal Investigator of @petajkt.org, Interview, November 2015)*

This information is used to support BPBD in their monitoring and emergency response.

> *"… We (BPBD) use the data (from @petajkt) firstly for emergency response. Aside from giving feedback, we also collect the information into a library. We use this library to cater to policy needs. For example, we map the locations where structural problems were identified. Then we give the data to technical agencies such as wards and sub-district heads… We also utilize the data for economic needs, for example, to determine the risk level of one area. This kind of data is usually harnessed by insurance companies.* *(Undisclosed, Pusdalops BPBD Jakarta, Interview, December 2015)*

The data library in BPBD is managed by internal staff that continuously update the agency's Twitter account based on the collected data. BPBD posts information on flood locations, its emergency response, as well as other information related to flooding.

Figure 4.2 depicts the working of Peta Jakarta on social media Twitter and how it connects with BPBD and citizens.

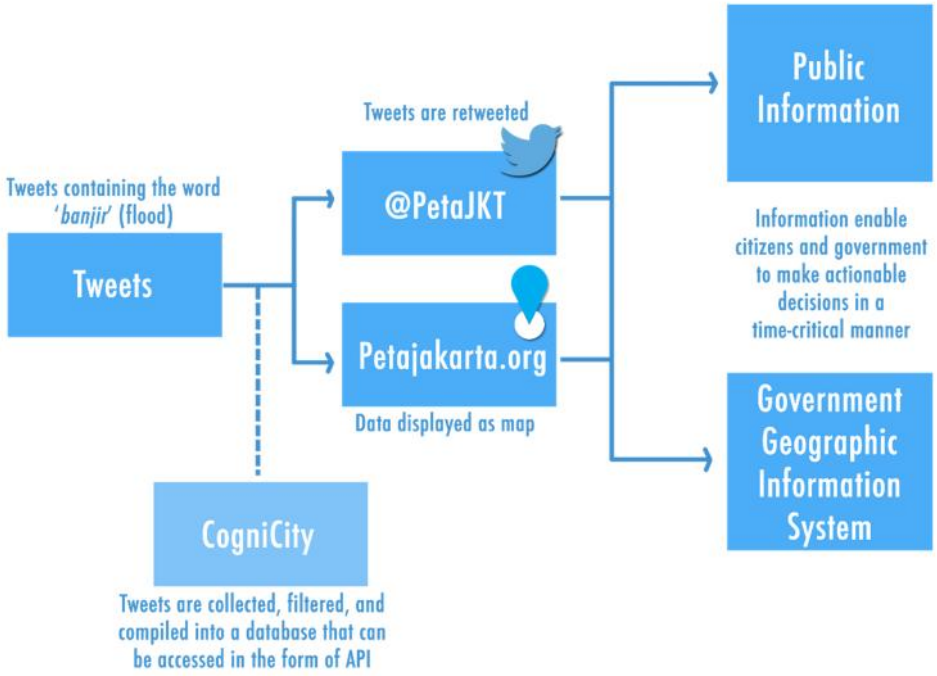


Figure 4.2 Business process of @petajkt

Flood reports in @petajkt derived from tweets that are sent to Twitter account @petajkt. When citizens see flood, they can tweet using the hashtag (#)*banjir* and mention twitter account @petajkt. The administrator of @petajkt will confirm the report to the respective citizens/Twitter user. Confirmation comprises of time and place of flood to ensure that it is happening in real-time. Once the report is confirmed, it will be retweeted by @petajkt and automatically displayed as flood map. Citizens could access this flood map and tweets to monitor flood condition in the city. The disaster agency also monitors this flood map as some of the tweets requests for help and evacuation support.

Data management

@petajkt.org uses *cognicity*[5], an open source platform as its basic platform that enables the government and the public to access data easily. This geo-social intelligence framework allows data to be collected and disseminated by citizens through their location-enabled mobile devices to map flooding and water infrastructure in real-time.[6] The use of an open source platform is considered key to having the government on board in this project.

[5] Cognicity is an open source platform for harnesses the power of social media by gathering, sorting and displaying real-time situational reports from urgent urban infrastructure issues such as flooding or traffic congestion.
[6] https://info.petajakarta.org/about/ - Last accessed January 25, 2016

> *"… The software is all open source and open data as much as possible, and that probably was a key driver for BPBD (to be on board). They (BPBD) can then say that it (the software) is not locked in, we (BPBD) can make changes for the software, but also for us (@petajkt.org), that's a research project, so it's the prototype that we're trying to test of."* *(T. Holderness, Co-Principal Investigator of @petajkt.org, Interview, November 2015)*

In terms of data privacy, @petajkt.org only maps reports as informed by data providers (in this case Twitter, *pasangmata*, and Qlue users). @petajkt.org does not store any information on individual users and uses Creative Commons Attribution 4.0 International License[7] for all of their data.

@petajkt sends data in the form of API to JSC Unit and the unit may keep and use this data for development, planning, evaluation, and other government purposes. As @petajkt.org is using an open source basic platform, it is the most open application among the three studied in this report.

4.1.5 Qlue

Qlue is an application that connects individuals with their neighbourhood and city officials through which they can report information about their surroundings. Qlue is developed by Terralogiq – an official Google Partner Corporation in Indonesia. The idea of this application is to figure out how problems in Jakarta could be managed and solved with citizens' participation. Qlue was launched in December 2014, and it has a sister application called CROP (*Cepat Respon Opini Publik*), an application that officials use to respond to reports from Qlue. The two applications bridge citizens and officials, thereby facilitating officials to provide services and address complaints from citizens. Qlue intends to include all citizens as its user base and aims to expand its partnership to other cities.

Besides running the application, Terralogiq also provides technical training on CROP for officials from the city administration office down to the sub-district level. CROP is available both for handheld and desktop platform, which makes it easier for sub-district heads to track citizens' complaints.

Qlue crowdsources data and delivers real-time reports directly to officials in every jurisdiction. With social networking features, citizens are able to follow text and picture feeds posted by fellow users about what goes on in their surroundings. In mid-2015, Qlue launched the private company report feature where

[7] Creative Commons 4.0 International License allows public to share and adapt the data provided as long as they give appropriate credit, provide a link to the license, and indicate if changes were made in the data. http://creativecommons.org/licenses/by/4.0/ - Last accessed February 3, 2016

citizens could file reports to private company such as restaurants, banks, shopping malls, and the like as an expansion of their service. As Qlue is a corporation, the expansion of their service to private sector could also be seen as a back-up plan for sustainability.

> *"Supposedly, whoever the government, they still can use (Qlue). But we still have to prepare a back-up plan. That's where this private sector reports fill in. It's basically gathered all reports from restaurants, banks, providers, and other companies from small to multi-enterprises. (They can have) their own dashboard and help desk. So it (the reports platform) could be integrated with Twitter, call center, every channel that they have. Qlue have location, analysis… We can provide all of that… some kind of a dashboard. That's actually where the business is come."* *(R. Raditya, CEO Qlue, Interview, Desember 2015)*

Qlue is positioned as a business by Terralogiq. As such, the company also run a number of online and offline marketing activities. The online marketing activities consist of updating their Twitter feed and send updates to user' email. While the offline marketing is conducted through roadshows, media visits, and create public event with hashtag (#)*beraniberubah*. In 2016, Qlue will be focusing on their on-the-ground marketing to increase citizen' participation.

Below is the working process of Qlue and CROP.

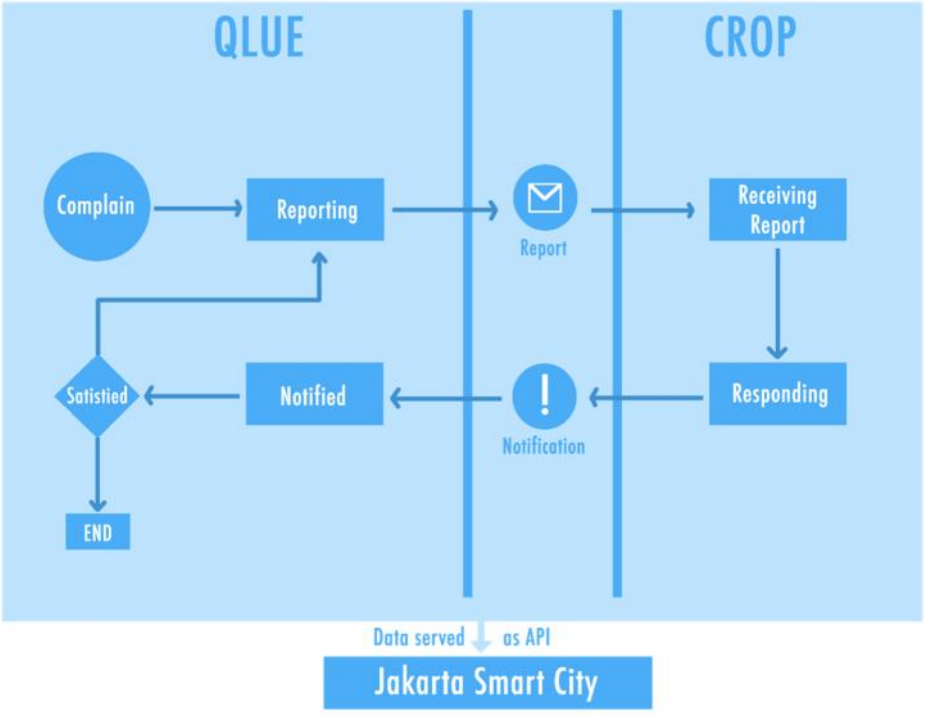


Figure 4.3 The working of Qlue and CROP

The working mechanism between the two applications is straightforward: citizens submit their reports through Qlue and these reports are directly relayed to CROP. Officials get the reports through CROP and address the complaint. The officials then notify citizens on the progress, and citizens can monitor their report status. Other users could also comment and support the report. Reports are marked red, yellow or

green to indicate the status – awaiting response, in progress or completed, respectively. However, in cases where an issue is not resolved, there is rarely reason or explanation given.

Data management

Qlue shares its citizens' report data in the form of API to Jakarta Smart City. Qlue only shares the report data, while user profiles and details are managed and stored by Qlue in its cloud storage. As such, privacy of users (citizens) is protected by the privacy policy agreement between users and Qlue.

> *"Our policy is, we try our best to protect user. We do not share anything (user profile) at all, even to the city administration… We only share the username, that's it. We never share the full profile. Anything that they (the government) can see in Qlue, that's the only data we share (on user)" (R. Raditya, CEO Qlue, Interview, December 2015)*

According to Terralogiq, the city administration never asks details of citizens/specific users. However, the city administration would often request additional data regarding the performance of its work units and officials.

> *"… There's a special request, for example, Pak Ahok (the governor of Jakarta) would request: 'I want to have the details (of performance) of this sub-district' then we will send it… Our Sales will send the analytical data."*

> *"… Every week, every months, every year, end of year, we give them (city administration) the data (of sub-district performance)… It is because they (the city administration) need to perform career rotation… and it is based on the ranking (of officials' performance) in Qlue". (R.Raditya, CEO Qlue, Interview, December 2015)*

In the application, Qlue provides sub-district ranking based on their performance in handling citizens' reports. It seems that the city government also uses the data from Qlue as a KPI for public officials' performance assessment. However, this has raised concerns among sub-district heads because sometimes they receive complaints outside their jurisdiction, for example, complaints on illegal parking that falls outside their remit. On the one hand, the sub-district head could not do anything about issues beyond their jurisdiction; they can only refer the problem to the relevant agency, in this case, the city's Transportation Service (*Dinas Perhubungan*). On the other hand, the complaint would remain red or yellow, indicating that the sub-district head could not solve the problem. As the governor used rankings to promote and demote officials, the unresolved complaints reflect badly on the performance of sub-district heads.

Regarding data sharing, according to Qlue, although they are responsible for integrating all data to Jakarta Smart City platform, they do not actually keep the data for their own use. For example, if the Jakarta Tourism Agency needs to integrate their data to Jakarta Smart City, Terralogiq will provide the technical support. However, they are not allowed to reuse the data for the company's benefit.

There is some redundancy of reports with other applications integrated with JSC. For example, Qlue and @petajkt both provide reports on floods. Based on our interview, Qlue argues that the flood report coming to their application are those which needed to be followed-up by the government, and not necessarily provide a specific flood map location as Peta Jakarta does. Only recently in 2016 that the API on flood reports from Qlue is integrated with @petajkt as additional data.

4.1.6 Waze

Waze is an application that provides a mapping service to enable its users to share real-time traffic and road information. Its operation is based in Israel and originally made to create a free digital map of Israel. The cooperation between Jakarta Smart City and Waze is derived from the partnership between the Jakarta Government and Google Partner in Indonesia.

> *"… We utilize Google, Google map as a basis (for Jakarta Smart City platform), it also facilitates us to cooperate with Waze, since Waze also belongs to Google Inc. So we get a bonus, we get access to information on Waze and that could be integrated with Smart City [platform]… That is our benefit in utilizing Google."* *(Undisclosed, Jakarta Smart City Unit, Interview, November 2015)*.

Waze

1. Established in 2007 as FreeMap Israel, bought by Google in 2013
2. Aim to enable its users to share real-time traffic and road information.
3. Has reached more than 750,000 users in Indonesia since 2013
4. Available in website, iOS, Android, and Windows Phone

Below is the working process of Waze.

Figure 4.4 The working of Waze

Traffic information provided by Waze circulates mainly among citizens. In this case, direct interaction between citizens and the government is not necessary. Citizens report traffic and road conditions to other Wazers (the term used to identify Waze user). In return, they get an aggregated map with traffic information and use of the information according to their needs. Waze is also able to provide real-time routes that users can choose when they travel from one point to another.

Data management

Waze shares its data with Jakarta Smart City as part of its Google Enterprise data package. The Jakarta Smart City unit does not have direct access to Waze's data but they could use the data for development planning, although this has yet to be done.

> *"… Waze data is very rich. We can get a lot of information from it. For example, on a particular road, at particular hour, how many kilometres long is the traffic? It [the data] is available from Waze, we can actually use the data. Why the road is always jammed at that particular hour in that particular road? We can alert respective officials before the traffic jam occurs. If traffic jam still occurs, it means something is wrong – perhaps the road [is damaged], or street vendors (are blocking the road), or other reasons. With that data, we can develop some kind of intervention. This [data analysis] is what we (JSC unit) are going to focus on in 2016."* (Undisclosed, Jakarta Smart City Unit, Interview, November 2015).

The Jakarta Smart City Unit will be recruiting data scientists and data analysts in 2016, not just to analyse Waze data, but also all data available on its smart city platform.

4.2 Synthesis

The applications and public reporting channels described above have different characteristics between one another. Some applications gather data on a range of topics and features to make them more comprehensive, while others focus on one particular topic. In relation to open data, it is important to note that while some applications offer channels for government to communicate with citizens – thus creating a more open environment – not all applications could be considered "open". For example, some applications only share their data to relevant government agencies, and not for the public. Among all the applications addressed in this report, only @petajkt deliberately open its data and API since it uses open-source platform.

One characteristic that all applications and channels share is their crowdsourcing of information – all data derived from the applications and channels are citizen-generated data and not government data. Thus, the government actually has plenty of citizen-generated data that could be used for development planning purposes. However, since most of the data is owned by third-parties (developers, applications' owner) data sustainability becomes an important concern. Furthermore, while the data could be used to evaluate and create a citizen-oriented regulation, the government still lacks the capacity to manage, organise, and use the available data.

In order to understand the citizens and how they use these applications, we will elaborate the user and non-user characteristics and dynamics in Chapter 5.

5 PROFILE OF RESPONDENTS

As the initiative aims to target all citizens in Jakarta, it is imperative to understand the characteristics of citizens, both those who are users and non-users of the various applications and platforms. In order to do that, we conducted surveys and organized two FGDs with a sample of users and non-users.

Users are defined as individuals who currently use one of the applications integrated with Jakarta Smart City. Consequently, non-users are the individuals who have never used any of the applications integrated with Jakarta Smart City.

5.1 Demography of users and non-users

The survey found that there is no material difference between users and non-users in demographic aspects such as gender, age, education, and occupation; both have a similar demographic profile.

Among users, the proportion of male and female respondents is 44% and 56% respectively. Meanwhile, among non-users the composition of male and female respondents is 46% and 54%. This indicates that gender is not a factor in the use the applications.

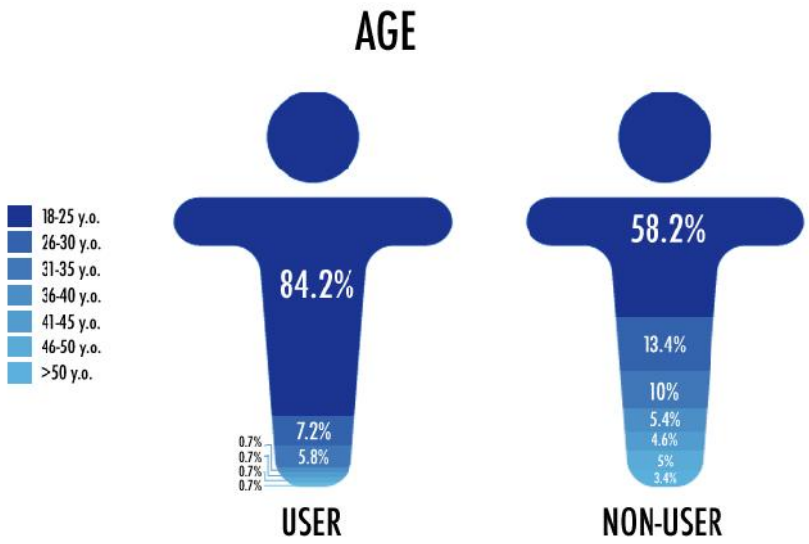


Figure 5.1 Age distributions between user and non-user

Age distribution between users and non-users is also similar, i.e. the majority of both groups are young and young adults (age 18-25), although the proportion of young and young adults in the user category is bigger compared to that of non-user. This finding affirms the view that younger generations seem to be more active because of resources that they have for online participation (Best and Krueger 2005). The

proximity of younger generation to digital technology and Internet skills seemed to be the resources that are relevant to the context of digital participation nowadays.

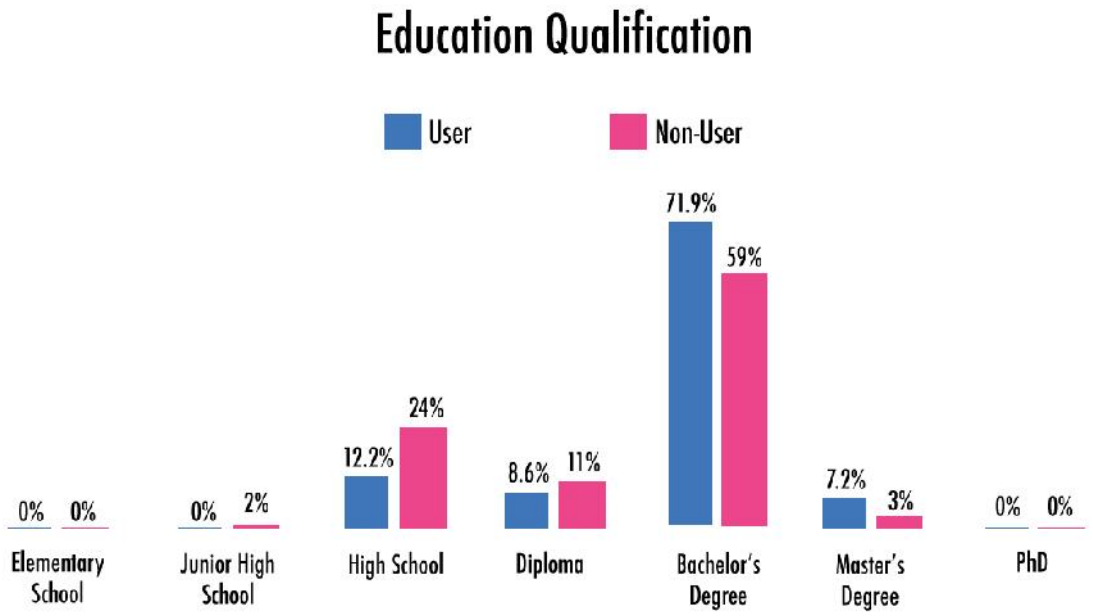


Figure 5.2 Education qualifications of user and non-user

The survey shows that the majority of both users and non-users have undergraduate education or a bachelor's degree. Similar to the case of age distribution, users have much higher percentage even though the trends are alike. In total, 79% of users currently attend or have a Bachelor's or higher degree compared to 62% of non-users in the same group. As such, this suggests that education is a non-factor in the adoption of these applications.

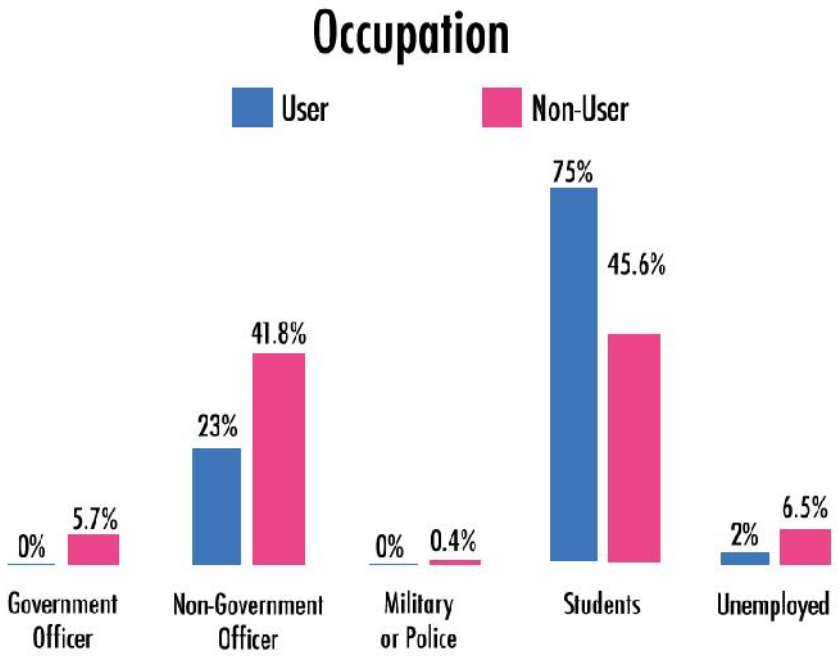


Figure 5.3 Occupation of user and non-user

The majority of users are students (75%), and a large proportion of non-users are also students (46%) and non-government employee (42%). The survey found no government officers use the application. This can be explained by the proximity of government officers with the services being reported, thus the lack of need to report the problems they encounter through applications.

5.2 Users and non-users media activities

In this section we elaborate slight differences between User and Non-User media activities. The media activities examined include smartphone usage, access to social media, and access to mass media.

All Users have smartphones and internet access, and all use smartphones as the main medium to access the internet, and laptops as the second main medium (see Figure 5.4). In comparison, most Non-Users also have smartphones (99%) and internet access (96%). Like Users, most Non-Users use smartphone to access internet. The prevalence smartphone usage to access the internet is consistent with APJII and PUSKAKOM UI finding in their 2014 report regarding Indonesia Internet User profile. The survey found that Jakarta has the highest internet penetration in Indonesia, with 5.6 million people (56% of the population) having access to the internet, with smartphones as the most-used device to access the internet (APJII and UI 2015).

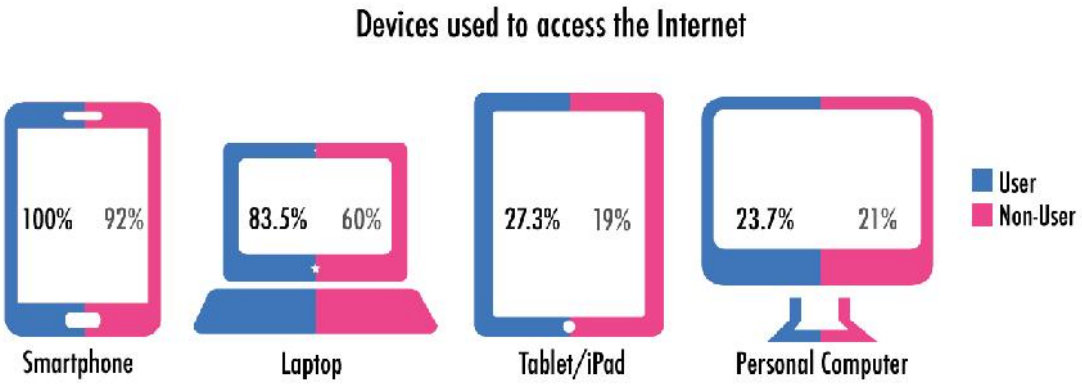


Figure 5.4 Similarities in used Internet device of user and non-user (multiple answers possible)

We offer two possible analyses. First, it is possible that the high usage of smartphone that enables individuals to access Internet with low cost and ease causes high Internet penetration. Second, the high mobility of user and non-user justify the use of mobile phone to access Internet. From this finding, it is apparent that both user and non-user have sufficient infrastructure to adopt the application.

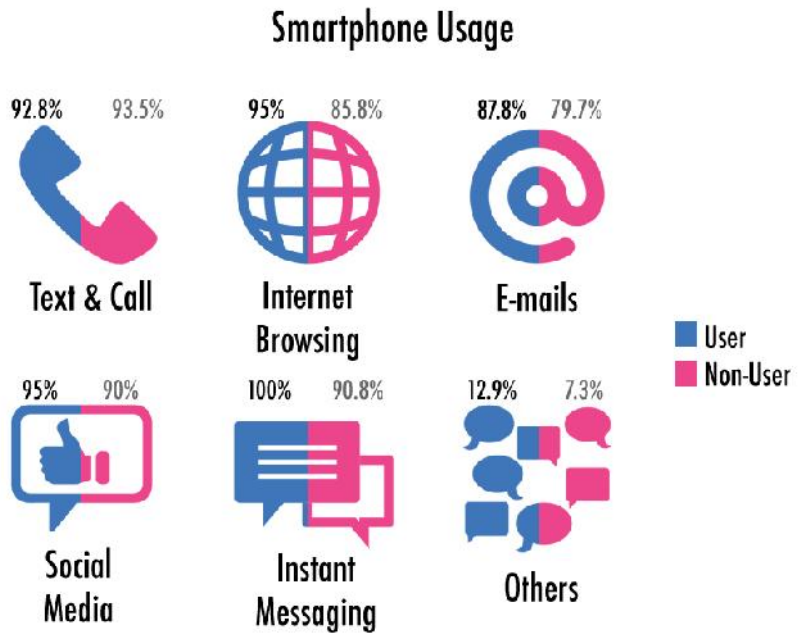


Figure 5.5 Smartphone usage of user and nonuUser (multiple answers possible)

Moreover, all users use internet messaging. Following other smartphone usages (>90%), the majority use their phone to text and place calls, browse the internet, and access social media. Meanwhile, non-users are generally less active in using their cellular phone. They mostly use cellular phones to text and call (93%) with instant messaging a close second activity (91%).

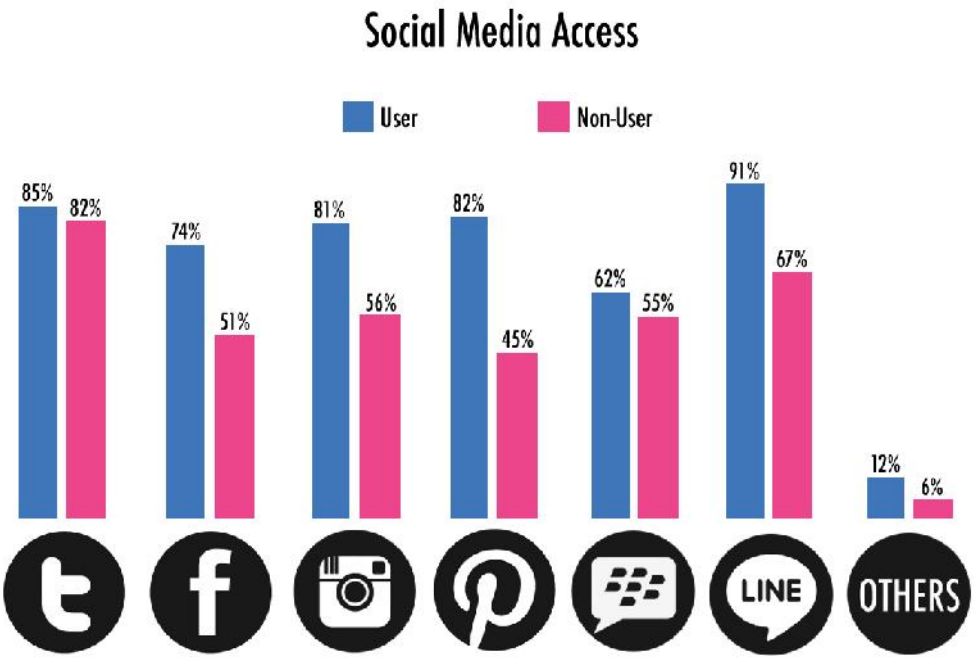


Figure 5.6 Social media used by user and non-user (multiple answers possible)

Almost all users also use social media with Line as the most used compared to others (91%). As for non-users, majority of them use social media, with Facebook as the most used out of all non-users (82%). Based on the difference of percentage in social media usage, we gathered that users re more active in various social media compared to non-users (see Figure 5.6). This means that users is more likely to have more than one social media accounts at one time. Consequently, even though the usage of cellular phone for social media is similar between users (95%) and non-users (90%) (see Figure 5.5), many users have multiple accounts in different social media. This increases the likelihood of them getting more information than non-users.

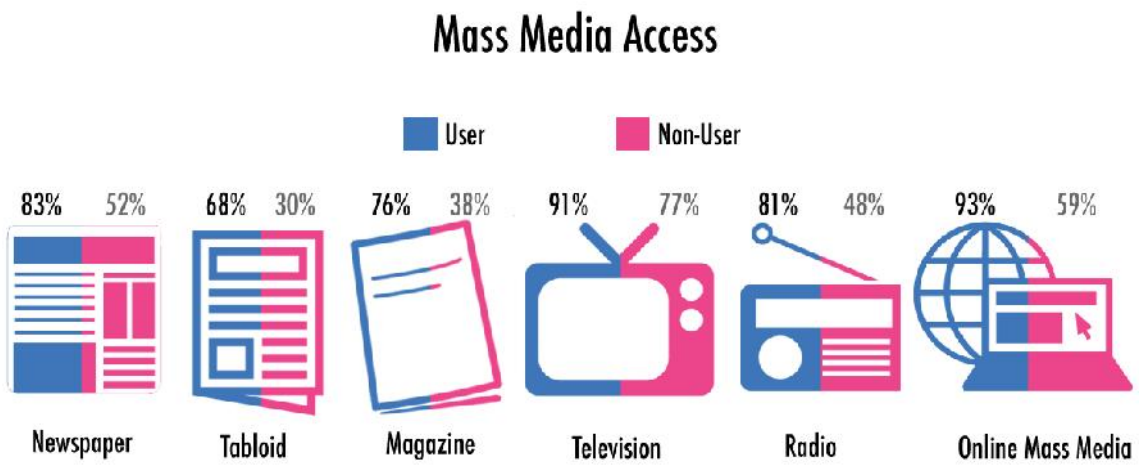


Figure 5.7 Mass media usage of user and non-user (multiple answers possible)

Moving on to mass media, television is the most used media by non-user. Online mass media come in second, but there is a relatively big gap between the two. User's usage of mass media is similar with Non-User: their access of mass media is dominated by online mass media and followed by television. Although it differs in the amount of use, top two of mass media used by both user and non-user are 1) television and 2) online mass media. However, we can see that the percentages of general use of mass media usage are higher for users than non-users. Consistent with finding regarding social media usage, this finding indicates that the User seemed to be more exposed to information than non-users.

Considering the media habits of users and non-users above, it is evident that even though they have equal access to infrastructure, their habits in engaging with media are different, resulting in different exposure to information. This is presumably one of the reasons why non-users have not used the applications studied in this report. Thus, information exposure might be one of the factors determining a person's online participation in the context of Jakarta Smart City initiatives.

5.3 Knowledge and usage of Jakarta Smart City and its application

In terms of knowledge of Jakarta Smart City initiative, the majority of users and non-users say that they are not aware of Jakarta Smart City, as illustrated in Figure 5.8. However, the percentage of non-users

who are not aware is much higher than the percentage of users. It is likely that being a User of other public reporting application/channel provides a greater tendency to be aware of Jakarta Smart City.

Figure 5.8 Knowledge regarding Jakarta Smart City

Among the three applications connected with Jakarta Smart City, the most popular application is Waze (see Figure 5.9), with traffic jam being the most reported and searched issue. This is also consistent among non-users for whom traffic jam is also the main concern (see Figure 5.10, 5.11, and 5.12.)

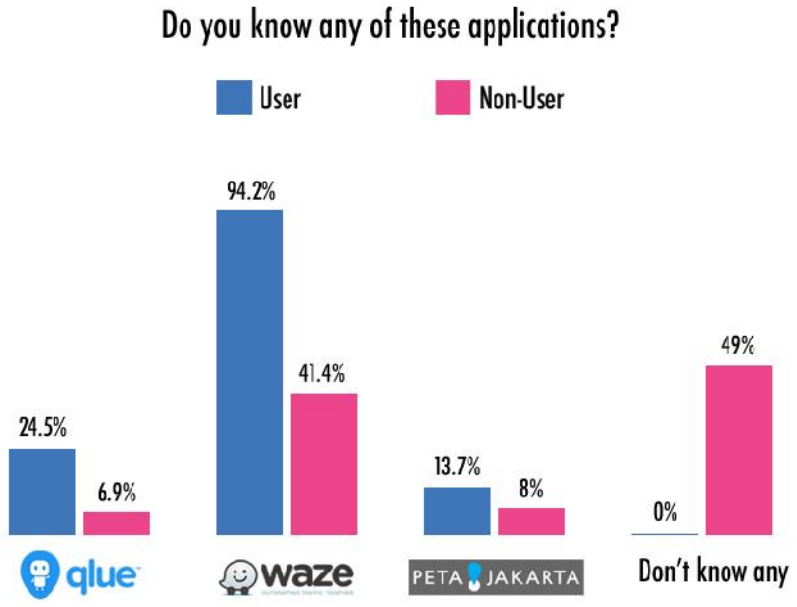


Figure 5.9 Knowledge regarding applications of Jakarta Smart City (multiple answers possible)

Waze is more relevant to respondents needs as it provides traffic information. The popularity of Waze is not just apparent among users but also non-users who emphasized the relevance of Waze to the respondents' daily problem.

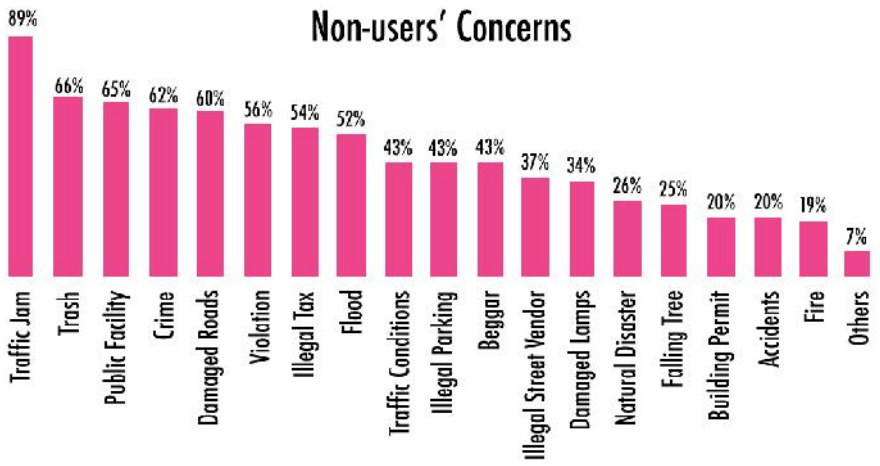


Figure 5.10 Non-user's concerns (multiple answers possible)

Traffic jam as Non-User's main concern is related to the state of Jakarta and their necessity of mobilization. People commute every day in Jakarta; including those who live outside Jakarta but commute to Jakarta for work or other activities, traffic is a daily reality that non-users have to face. As it is relevant to their daily experience, it becomes their main concern.

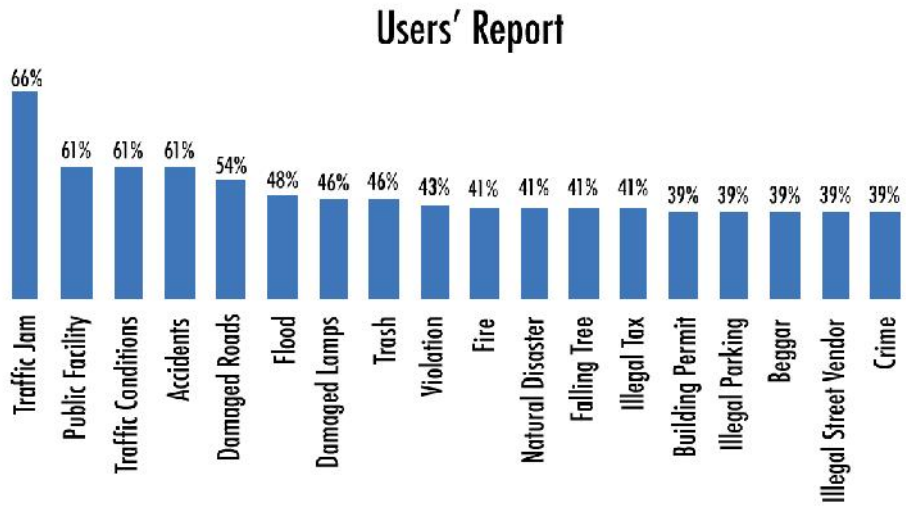


Figure 5.11 User's report topic (multiple answers possible)

Users have similar concerns with non-users, with the most reported topic is traffic jam, and top four topics are all traffic-related.

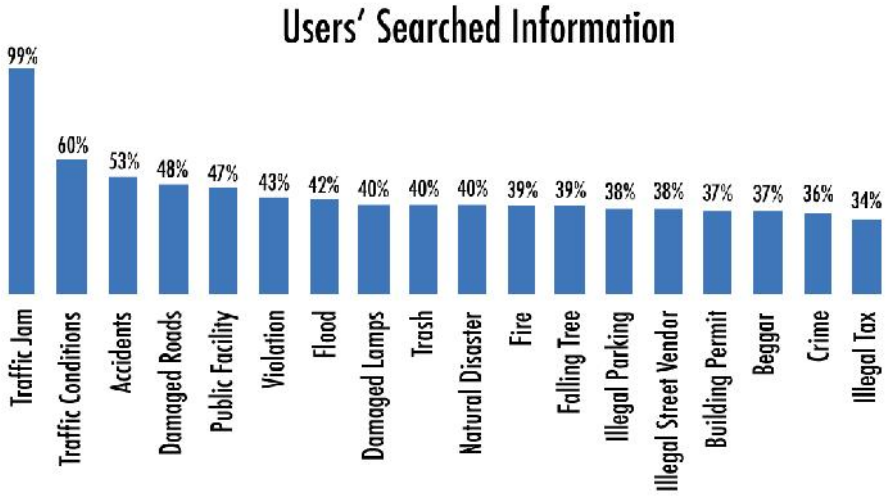


Figure 5.12 User's searched information topic (multiple answers possible)

The consistency between User's searched and reported topic and Non-User major concern is explained by the proximity of the problem to the general citizens of Jakarta. It is notable that traffic jam problem affected all citizens, both users and non-users. The concern towards traffic condition is also supported by the high loss of profit and time-spent caused by traffic jam in Jakarta (Srihadi 2010).

5.4 Benefits from initiatives

From the political perspective, the government's open data initiative has increased transparency and accountability. Citizens of Jakarta are able to access data through *data.jakarta.go.id*. The portal helps citizens supervise government conduct and participate in it. Open data lowers the threshold for citizen's participation and creates more opportunity to build better relationship between the government and citizens. The crowdsourcing method employed by Qlue, Waze, and @petajkt channels citizens report to the government and back to citizens. It enables citizens to feel heard and to contribute to improve public services.

There are three major factors that Users have identified as influential in their use of the applications; (1) ease of use, (2) relevance to their interest, (3) ability to search for information (See Figure 5.13). These factors correlate closely with one's personal motivation. For example, a User shared how her dislike towards the conduct of police has led her to report locations of the police on the streets through Waze to inform other Users with the same concern. A large proportion of Users emphasize searching for information as their motivation to use the applications. The number of Users who use the applications to search for information is actually bigger than those who use them to report issues. We can thus conclude that most Users consume information passively rather than produce reports actively.

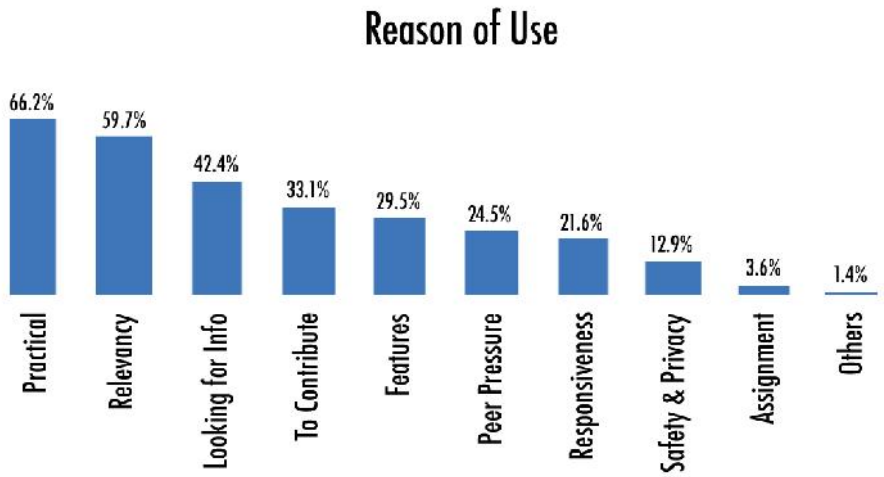


Figure 5.13 User's reason of use (multiple answers possible)

In terms of contributing factors, one notable finding relates to responsiveness. We found that users do not see responsiveness as important as non-users do. It may be driven by the apathy towards the government. To prevent themselves from getting frustrated waiting for a respond from the government, user reports out of the personal need to complain or heard by others.

> *"I think everyone has the instinct to complain [...] I mean, everyone has the instinct to complain and ask for help when faced with things that are unpleasant. I personally just like to complain."* *(User, Focus Group Discussion, January 2016)*

Some users feel that the information they get from the applications is beneficial enough, and that responsiveness is not a benefit that they seek. This is confirmed in FGD where participants explained why they did not feel that responsiveness was particularly important.

> *"The important thing is that I have done my share of work: I have tried to report. Whether it's responded or not, I will keep reporting."* *(User, Focus Group Discussion, January 2016)*

> *"I don't think the responsiveness can be quantified in my case (Waze), because the information is already available (without having to wait for response)."* *(User, Focus Group Discussion, January 2016)*

From the interviews and FGDs conducted, we identified the following four benefits of the applications:

1. **To mediate** the interaction between citizens and government. The findings found that respondents are generally hesitant to interact with the government, and these applications provide them with means to voice their concerns without having to directly interact with the government, which traditionally has been seen as frustrating. A User shared her experience interacting directly with the government.

   > *"It is very complicated. They asked us to come everyday, and after three days of coming there are still no output."* *(User, Focus Group Discussion, January 2016)*

It is evident that these applications have reduced the barrier for citizens to file complaints. Reports are cascaded to the relevant work units and communicated down to the neighbourhood unit level through Qlue. This mechanism enables complaints and problems to be addressed and for the process to be monitored by the complainant. With the complainant's privacy guaranteed, citizens feel safer when they report their concerns.

2. **To increase citizens' participation** by means of crowdsourcing information. Citizens are able to share information and get information relevant to their concern. Through easily accessible channels, citizens could are able to convey their concerns, complaints, and suggestions to the government with ease.

> *"There is more space to give information. We know where to ask and complain when we are not treated well or encounter problems. It feels like we can collaborate with the government. Government used to be unreachable and we used to be ignored. Now, whenever we feel uncomfortable, we can directly complain. (User, Focus Group Discussion, January 2016)*

The openness and involvement of government in the applications contributes to the increase citizens' participation because they are able to be involved indirectly to improve government services and to identify areas for improvement.

3. **To increase the citizens' sense of belonging to the city**, as citizens feel they are acknowledged as part of development as the government opens its doors and enables citizens' involvement. The applications have created a means for people to 'digitally' cooperate for a better urban life.

> *"I think there are two benefits—long term benefits. First, people's sense of belonging towards the city... they care about it more than before. Second, people cooperate because they are facing the same problem." (User, Focus Group Discussion, January 2016)*

4. **To help citizens assert their rights**. As reflected from FGDs, citizens are aware that they are entitled to have decent public facilities because they have contributed to the economic development of the city and have paid taxes. The initiatives and applications facilitate users to assert their rights and demand improvements in public facilities, as stated by one of FGD participants.

> *"The point is, it is a form of defending the rights as a citizen who lives there (in the city). I mean, we live there, and make economic transaction. If the region (city) became rich, then that means I also contribute to that. So if I have contributed, how come I do not get the right to access decent public facilities?" (User, Focus Group Discussion, January 2016)*

5.5 Methods of engagement

Methods of engagement are informed by two aspects: 1) Channel of engagement and 2) Continuity. The desired engagement channels according to respondents are as follows:

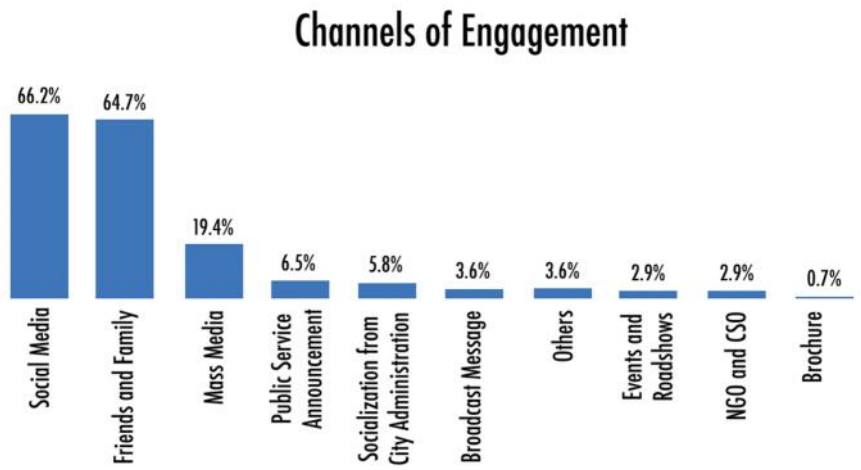


Figure 5.14 Channels of engagement

First, the study found that most users became aware of the applications through **social media**. Compared to non-users, users are more active on social media and use it to get and search information. Whereas non-users, although they also use social media, they mostly lurk and are less active. Nevertheless, non-users are still exposed to information circulating in social media. Thus why social media is the most popular channel of communication.

Second, **word of mouth** is another potent channel to get people to use the applications. Success stories from friends, family, and personal networks are effective since citizens' trust that such information is reliable.

> *"A friend use the Qlue and she reported the broken street lamp in her neighbourhood. A few days afterwards, it was fixed. Nowadays people believe those kind of things (stories from friend) compared to news on television." (User, Focus Group Discussion, January 2016)*

There has been numerous research regarding word-of-mouth showing that word of mouth was 1) more effective than newspaper, magazine, and personal advertising; 2) converting negative and neutral attitudes into positive ones; and 3) stimulating purchase (Katz & Lazarsfeld, 1955; Day, 1971; Morin, 1983 in (Iuliana-Raluca 2012). We argue that the use of social media to disseminate success story may improve the level of participation.

Third, non-users who are not as active on social media still consider that the best mode of engagement is through **mass media** (such as television, as the most used media).

> *"…there is a generation that does not use social media. So if they use television (as method of engagement), those people can develop interest and move to social media."* *(Non-User, Focus Group Discussion, December 2016)*

Mass media plays a role especially when it delivers news consistently. However, the current news coverage regarding Jakarta Smart City is apparently not as consistent as it is needed since not many citizens are aware about it from mass media.

Fourth, public service announcements through **socialization in schools** could be another means to engage with the younger population due to their proximity with digital technology. Their proximity with technology means that it is easier for them to adopt the applications. Another benefit of this mode of engagement is to promote democratic values where students are encouraged to participate in overseeing government conduct and to make government accountable.

> *"…Smartphone users are mostly youth, so I think instead of advertisement on television that mostly watched by older people, it is better to socialize through schools [...] So the student understand that they can report (to the government)."* *(User, Focus Group Discussion, January 2016)*

This can be done in various ways, such as socialization by teachers or lecturers, roadshows, or event with campus organization.

Lastly, to reach the older generation, it is suggested that there should be **socializations in neighbourhood or community unit *(Rukun Warga* and *Rukun Tetangga)***. Neighbourhood and community unit are obligated to use Qlue to report about their neighbourhood. Currently, there is no obligation to RT or RW to further disseminate Qlue to citizens. We argue that RT/RW may become a potential channel to engage citizens who are not digital natives. The closeness that still exists in the neighbourhood might be effective not just for communal activity but also socialization of the application.

> *"I think this way (asking neighbourhood units to socialize about the application) can be used to target citizens who do not get any information—those who do not use Internet."* *(User, Focus Group Discussion, January 2016)*

Other than the channel, continuity of engagement needs to be addressed. Continuity relates to consistency of the publication in terms of spreading its information and values as well as keeping people informed about developments regarding the initiatives. We argue that regardless of the channel of communication, the publication should be done continuously in order to be effective. Continuity helps build familiarity. When the citizens are familiar with the application, it will be easier to gain credibility. Gradually, this will help the initiatives to sustain and attract more User as it deemed as credible by citizens.

5.6 Non-user's constraints

Infrastructure has been perceived as the main constraint hindering citizens using the application and not aware of the application. However, we found that the constraints are not infrastructure, but more on the

poor communication between the government, the citizens, and the application developers. This is suggested by our findings as the non-user encounters no problem with the needed infrastructure, but there are a number of citizens that are not aware of the existence of JSC platform or the three applications connected with it. The lack of awareness possibly caused by the lack of information exposure that was explained previously, nevertheless the government has the responsibility to communicate to the citizens regarding the Jakarta Smart City initiatives. We argue that poor communication leads to unawareness and citizens end up not reporting any problems, even if they have the desire to do it. Poor communication also causes doubts, as we found that some of those who are aware of the applications still not using the application. They are sceptical that they report will actually be useful both for them and the government hence the lack of usage (see Figure 5.15).

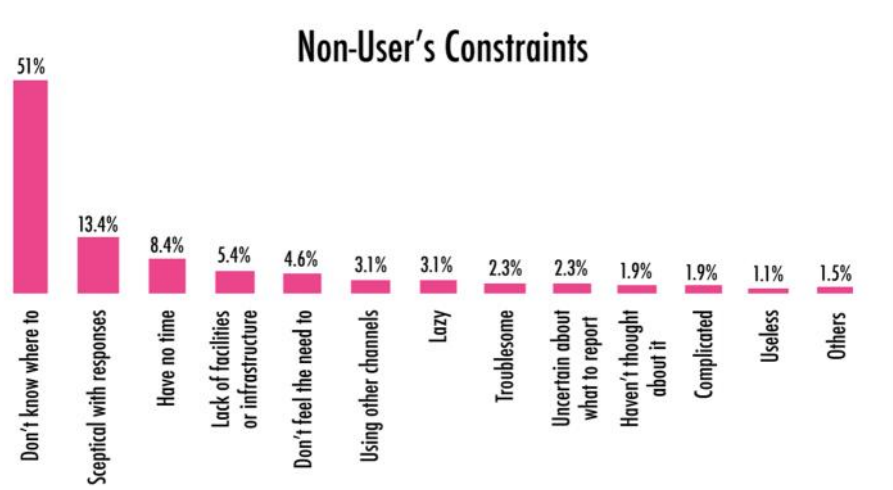


Figure 5.15 Non-user's constraints

Reflecting from our findings, there are four constraints that have prevented non-users from using the application. The first is **lack of socialization of service and application.** Citizens agreed that the benefits of using the applications are lacking visibility: the local officials do not show themselves to be actively responding to reports. Furthermore, their environment does not seem to be actively participate in reporting – here we can also see that *peer pressure* play a big part in socialization. Despite the roadshows and online campaigns conducted by application developers, most citizens still not aware on how to use the application and what benefits the citizens can get using the application.

> *"…I think there is no clear information regarding what is going to happen after (reporting). The steps to report are unclear as well as its general publication. We become sceptical whether it will be in vain or useless effort, if in the end it is not going to be responded."* *(Non-User, Focus Group Discussion, December 2015)*

Related to the previous constraint, there is also **lack of socialization regarding response mechanism from the government.** This lack of information create doubts among citizens about whether these public service channels actually work. The scepticism towards governance is also one of the factors that affect

this view. Citizens need evidence that this initiative works and that it contributes to the betterment of their daily life.

Third, there is **privacy concern.** Although the issue of privacy did not appear on the statistics, both Non-User and User addressed it in the FGD. They are questioning the privacy of complainant.

> *"I am uncertain about personal data. They would know automatically who wants what, or they would know my phone number, and (I am afraid) it will become complicated. Imagine that I initially just want to report, but then I will get involved in disadvantageous situation."* *(Non-User, Focus Group Discussion, December 2015)*

> *"I think it (privacy) is important. If it is not (protected), your house can be marked. This is a safety issue."* *(User, Focus Group Discussion, January 2016)*

With years of bad experiences in dealing with government, it is understandable that privacy is becoming a notable concern. While we understand that citizens' privacy will be protected, but again, the lack of socialization of such mechanism in the initiative hindered citizens to participate.

Lastly, there are also few challenges that are coming from **digital divide** in the city. The application and services are smartphone based and needed Internet access, but there are still neighbourhood units or community that cannot afford it.

> *"If you think about it, the chief of neighbourhood unit in slum area can't possibly afford the technology and Internet access (just for the sake of using the application), that's just too much."* *(User, Focus Group Discussion, January 2016)*

At the same time, neighbourhood units is obligated to use Qlue. The concern would be how to provide the infrastructure for neighbourhood units to prevent the initiatives in further creating disparity between the citizens. As number of Non-User is high, addressing these constraints may become a strategy to gain potential User and increase the number of citizens' participation in the initiatives.

5.7 Synthesis

Our analysis shows that there are no major differences between users and non-users of the three applications – both users and non-users are similar in almost all aspects of demography and have similar access to media. However, we find that there is a difference in degree of information exposure, where Users are slightly more active in using media compared to Non-User. Information exposure informs the extent to which these applications are adopted by citizens.

We also found that both Users and Non-Users are concerned with the same main issue: traffic jam. This concern is reflected in both the Users' most searched and reported topic as well as the Non-Users' main concern. The concern towards the issue is explained by the proximity of it with the citizen. Proximity also plays an important role in the adoption of application as we find that the general motivations of using the

applications for User are closely related to personal interest. Users find the application relevant to their interest and beneficial. Non-users also admit that they find the application beneficial and that they would willingly report and use the application. However, they are not aware of the channels and the response system of the initiatives.

Consequently, lack of knowledge regarding the open data initiatives is the main constraint for non-users. This issue may be managed with better method of engagement. This study also found that social media and information from family, friends and acquaintances is more effective as it attracts current users into knowing and using the application. Improving how existing channels are used to socialize the initiatives might help increase citizens' participation by adopting the applications.

6 ENABLING FACTORS & BARRIERS

Qlue, Waze, and @petajkt has no doubt opened more communication channels between Jakarta government and its citizens. The integration with Jakarta Smart City platform has made it more reliable because data collected be these applications is managed not only by developers (private companies) but also by the government. The government's openness and strong political will to improve public services are two of the enabling factors contributing to the success of the initiative. However, there are also some barriers and challenges in the implementation of Jakarta Smart City initiative, including the capacity and capability of government officials as well as citizens in adopting these new tools.

This chapter will further elaborate the enabling factors, barriers, and challenges in the implementation of the JSC initiative.

6.1 Enabling factors

There are four factors that have enabled the implementation of open data initiative in Jakarta.

First, **strong leadership and political will** that have enabled the establishment of JSC, as well as the city's partnership with non-government actors, such as the developer of Qlue, to support this platform.

> *"It is definitely a collaboration, between Governor's will so we can have a better service. [...] From the very start the Governor already had a lot of ideas to create a Smart City, but the development is just emphasized recently."* *(Undisclosed, Jakarta Smart City Unit, Interview, November 2015)*

Another example of such collaboration is the City's Disaster Mitigation Agency's willingness to partner with University of Wollongong in managing @petajkt Twitter account. This partnership was possible because the government is willing to open and cooperate with other stakeholders outside the government. This has widened the opportunity to create an enabling environment for open data development, particularly in Jakarta.

The second factor is **regulation**. Jakarta is the only city in Indonesia that has specific regulation on data and information management. The Governor Regulation on System and Procedure of Development Data and Information Management (*Peraturan Gubernur* No. 181/2014 *tentang Sistem dan Prosedur Pengelolaan Data dan Informasi Pembangunan*) has made it mandatory for work units to open its public-related data and to respond to every citizens' report.

> *"And there are also commitment; everyone signed together. Commitment with the work units (SKPD), signed that I am obligated to open data for public interest and etc."* *(Undisclosed, Jakarta Smart City Unit, Interview, November 2015)*

The regulations for open data are backed up with a workflow and response system that aims to ensure all elements are working towards the same goal.

Third, **better work management** that is reflected in the government's working mechanism. In Qlue, all reports are tracked and citizens could monitor the progress of the report. Reports that are not solved by the sub-district apparatus will be marked red, which is used for the city administration to monitor the performance of each sub-district. Furthermore, the Jakarta Smart City unit encourages the City's other work units to submit their public data.

> *"… We (JSC Unit) approach work units, we constantly ask for the data. We do not get the data instantly, since the data is usually scattered. That is one of the obstacles. But with personal and intensive approach and series of meetings, and by approaching the Head of Work Units, we can handle it (the obstacle). At first, we have to constantly ask for the data, now work units are willing to give their data without us having to ask."* *(Undisclosed, Jakarta Smart City Unit, Interview, November 2015)*

Work units were initially hesitant to share their data since they were not familiar about data management. However, through a series of workshops, work units are now willing to share their data without hesitation.

Fourth, **citizens' participation** in reporting and contributing information through the applications. Since the information is generated from citizens, it is considered relevant to public. Although the rate of reporting is lower than the rate of information searches, citizens have been eager to participate and have increased awareness of their surroundings. The fact that citizens can be involved in development by contributing information to the government creates better relationship between the government and the citizens. This is evident from our FGD.

> *"The application is beneficial for me. At least I do not have to report to Ombudsman (Ombudsman Commission) and wait (for the follow-up) for days. I don't have to talk tough with the officials. I just have to file a report (through the application), I don't have to interact with the officials and I will stay anonymous."* *(User, FGD, January 2016)*

Furthermore, the applications have helped citizens to understand the city better. Better understanding could develop citizen's sense of belonging to the city in the long term.

> *"…(the application) has increase citizens' sense of belonging to the city… and it will increase citizens' cooperation since they have the same concerns such as traffic jam… So the cooperation is formed digitally… After all this years, Jakartans are seem to be individualistic. So I think this (applications) is good. The long-term effect will be good."* *(User, FGD, January 2016)*

Fifth, **high smartphone usage and internet penetration.** The high usage of smartphone and high internet penetration based on survey results have facilitated Jakarta citizens to adopt the application. As citizens are exposed to technology, there are less barriers for them to use the applications.

6.2 Concerns and barriers

There are six concerns and barriers in the process of establishing the initiatives. These concerns and barriers are poor data management, sustainability, synergy, conservative culture, citizen's apathy and digital divide.

The first challenge is **data management**. The Jakarta Smart City unit has abundant data at its disposal that can be used to address city problems. However, the capacity to process this data into meaningful analysis is yet to be developed. Besides using Qlue data to perform periodical evaluation, we did not find much evidence that the JSC unit has used the data for development. Our finding suggest that the poor data handling is caused by the staffs' lack of technical skills and training. Our findings also suggest that the unit has vague job divisions for its staff that have resulted in work inefficiency.

> *"… They do not know whose responsibility it was (to utilize the data), whether it really was the agency's responsibility or the JSC Unit. So, they just collect the data (without further utilizing it)."* *(Undisclosed, data scientist, Jakarta Smart City, Interview, February 2016)*

The second concern is the **sustainability** of the initiatives as highlighted by both the developers and FGD respondents. There are concerns about the role of the current government and whether the initiatives will sustain. The scepticism towards the government is still apparent in the surveys and FGDs. Citizens doubt that the current initiatives will continue if there are changes in the government structure.

> *"… We have to be concerned about maintenance in terms that if the application will still be accessible even though there are more people using it. Worse case, if the Governor changes, it (the initiative) will not be continued. That is what we have to prevent from happening."* *(Non-User, Focus Group Discussion, December 2015)*

Furthermore, the fact that the applications connected with Jakarta Smart City are developed by private corporations and non-government actors raises the possibility that such services may be replaced in the event of a change in the government—which could cause ongoing projects unfinished and current projects unsustainable. This could be avoided if the reporting mechanism is handed over to the government. However, we have no evidence that Qlue intends to handover its reporting mechanism to Jakarta Smart City unit. In fact, as stated in previous chapter, Qlue added the private sector report feature as one of their business sustainability plan, as they find many uncertainties in cooperating with the government.

> *"We can see that (the cooperation) with the government is a very risky business for our vision."* *(R. Raditya, Qlue, Interview, December 2015)*

@petajkt's approach is different from Qlue. The project also conducts capacity building for BPBD officials to prepare the agency to eventually take over the flood mapping mechanism. @petajkt also has an ongoing relationship with University of Indonesia to facilitate Australian students doing flood research in Jakarta.

The third concern is **cooperation between public officials** to promote synergy between all elements of the government. The biggest challenge has been disseminating the open government and open data drive to the sub-district level. Findings show that sub-district officials have struggled to use the application. Qlue has created a simpler desktop version of CROP and a more elaborate interface for officials. However, some of the officials still need more time to master the application. Some officials have also suggested that using the application and opening the data is an additional burden for them. There have been cases of fraudulence, rigging data to increase the performance of sub-districts and get good ranking, as suggested by one of our interviewee.

> *"… They (officials) are very smart with finding loopholes. We have to monitor them continuously. We found loopholes not long ago… They (officials) uses picture from Google street view as evidence that reports have been resolved, while in reality it is not resolved yet. Can you imagine (the creativity)? … After we found out, we reported to Pak Ahok (the Governor), and citizens still complained, saying the official is a swindler. We have evidence… it was bad. Fortunately, Pak Ahok is very supportive. After we report the fraud, he asked us to list down the frauds for him to further assess."* *(R. Raditya, Qlue, Interview, December 2015)*

There have also been cases where neighbourhood units struggled to fulfil the obligation to report a certain number of cases per day. Consequently, some neighbourhood units have been reporting unsubstantial cases, such as broken pens, just to fill the quota.

Fourth, the **conservative culture in the government**. The open data initiative in Jakarta has been introduced fairly recently, as Open Government Indonesia just established in 2012. Accordingly, the government units and agency will need some time to fully adopt the idea of being open and transparent. Some work units might find open data management unfamiliar, hindering adoption.

> *"At first we don't understand how the sub-districts wanted to adopt the program. It is better now as we have connected with 267 sub-districts. At first, we have taught them for more than 17 times and they still didn't comprehend it. I am certain that it was not because they are lacking in understanding, but because they don't want to (adopt the application)."* *(R. Raditya, Qlue, Interview, December 2015)*

Neighbourhood units in slum areas who most likely do not have adequate infrastructure and training will have the hardest time to function compare to others. This lack of readiness in adopting technology and the cultural barrier is an obstacle in the process of implementing open data.

The fifth issue is **apathy**. Although it seems that there are no real challenges in bringing citizen on board to participate in the initiatives (as most suggest their willingness to use the application), we found an indication that there are citizens who are still apathetic towards the government. Apathetic citizens are those who have the capacity and capability to use and access the data and applications, but choosing not to use it out of apathy.

> *"Our bureaucracy focuses on the figures and (sometimes) it is not a favourable figure for some (of the citizens). [...] If out bureaucracy has (clear) orders and organization, we won't have any (bad) sentiments towards it."* *(Non-User, Focus Group Discussion, December 2015)*

Lastly, **digital divide.** Although the usage of smartphone and the penetration of Internet is high, there are concerns about digital divide in the city. The social and economic disparity in Jakarta (Sedayu, 2015; Rudi, 2015) means that some citizens lack the resources to participate in the city's development.

> *"For example, the neighbourhood unit in Tambora has a lot of problems, but how do they report? The unit is so crowded, I don't think that even phone signal is available."* *(User, Focus Group Discussion, January 2016)*

As we noted earlier, there might be different results on how certain characteristics affect digital participation. This is evident in cases where citizens in slum area have no infrastructure to access open data or use applications. Therefore these citizens likely lack the capability and capacity to participate in the city's development through the existing applications.

7 CONCLUSION AND RECOMMENDATION

It is evident that Jakarta Smart City Initiative – to some extent – has been able to bring citizens closer to the government. Through the applications connected with the initiative, Jakarta Smart City has provided various channels for citizen reports, thus gathering significant amounts of citizen-generated data. While this was made possible by the openness of the government, technology has played a big role for opening up this data in urban governance. Best and Krueger (2005) suggested that traditional and online political participation is influenced by the resources that enables citizens to participate, and technology has been key in enabling citizens to partake in development and communicate with the government. Through Jakarta Smart City initiative, technology has helped bridge the relations between citizens and the government. However, issues about inclusiveness remain since the initiative relies heavily on smart-phone based applications, potentially excluding those who are not privy to such technology. There are also concerns that the government has not been 'marketing' its Smart City initiative and the supporting applications enough to encourage a wider adoption of the technology among its citizens.

This chapter synthesizes the study of Jakarta Smart City and its initiatives, particularly in relation to the outreach mechanism, data management, and areas of improvement for government and the application developers. There are three main areas for our synthesis: (1) The development of applications and Jakarta Smart City; (2) Citizens' participation; and (3) Government readiness.

7.1 The development of applications and Jakarta Smart City

The three applications that are the focus of this study have various backgrounds of development. Qlue aimed to provide a tool to collect citizen reports and bridge the communication between government and citizens. As a business entity, Terralogiq as developer of Qlue also has several other business lines that still uses citizens' report as its main data. Like Qlue, Waze also uses crowdsourced to provide traffic information for its users. These two applications could be seen as business-oriented since they are developed and maintained by private companies. Unlike the previous two applications, @petajkt was developed as a research project by University of Wollongong, Australia. The project aimed to use GIS as a tool for crowd-sourcing information, in this case about floods. As a research project, @petajkt uses open-source for their platform as much as possible. Citizens could easily download the API of @petajkt map (with complete instructions) in their website.

Qlue, @petajkt, and Waze have so far collaborated smoothly with the city government of Jakarta. All are the main applications connected with Jakarta Smart City. Qlue and Waze is mostly connected with the JSC Unit, while @petajkt is connected with Jakarta Disaster Mitigation Agency and Social Agency. In terms of data sharing, except for @petajkt whose data is open publicly, the developers of Qlue and Waze

retain most of the data. As such, there are concerns about vulnerability and sustainability of the initiatives since the government depends on third party providers to collect and manage citizens' data.

7.2 Citizen participation

Involvement and participation of the citizens, together with the government and other stakeholders, is necessary for the open government and its initiatives to work. In this study, citizen participation is assessed from how citizens are engaged with the government through applications connected with Jakarta Smart City. This research shows that the applications have opened up a new mode of communication between citizens and the government.

Considering that there are no major difference between users and non-users of the three applications, both users and non-users are similar in almost all aspects of demography and have similar capability to access media. The non-users also admit that they do find the application beneficial and that they would willingly report and use the application, but they are not aware of the available channels to report, and they are not sure whether their reports will be handled by the government. Therefore, the main constraint for non-users is the lack of knowledge regarding the open data initiatives performed by the government.

Changing the methods of engagement is also an important focus of improvement as many citizens are still not yet aware of the existing initiative. Our findings indicate that citizens have turned to using these applications based on *success stories* from their friends, family, and networks in social media. Word-of-mouth is considered more effective as true stories and first-hand experiences are deemed more reliable. The more success stories they know, the more likely citizens would use the application. Since the findings show that most of respondents are attached to social media, the government might need to boost its campaign on social media. However, it is also important to enhance offline engagement to target those who are not active online.

Furthermore, we found that relevancy is one important aspect for citizen participation. Most users actively use the application for personal motivation, and if the initiative/application is not relevant to their daily life, chances are they will feel less interested to participate. A lack of interest may also be caused by the lack of understanding of benefits that could be gained from using the applications.

One issue that has to be taken into consideration is digital divide. Although internet and smartphone penetration is the highest in Jakarta compared to other cities in Indonesia, there are still neighbourhoods and population segments that may not have the necessary infrastructure to be able to use the applications and benefit from the open data initiative. Although the CROP channel can address this gap, since it is not yet integrated with the JSC platform, the disparity still remains.

7.3 Government readiness

Open data in general indicates trust and transparency that is key to building a better relationship between citizens and the government. The open government and open data initiative and the development it entails will be successful if the government is willing to open itself and make sure that all elements of government partake in it to serve the citizens.

Our observations indicate a fundamental concern in data governance within the government, namely in regard to increasing the capacity of city officials. Sub-district officials are struggling to adapt to CROP application, and work units are struggling to manage public data required to be open. The city administration officials lack the capacity to use data available through Jakarta Smart City. In addition to data usage, government officials also need to improve their capacity. Most of government officials are not familiar with and find it difficult to use big data. As such, the use of data for public purposes has been very low.

Another issue regarding data governance is data sharing mechanism between the providers and government. Most data in Jakarta Smart City platform are still owned by the developers. Although the government could use the data for development planning, they do not have direct access to it. Therefore, we suggest the notion of data philanthropy should be introduced in order to have providers and developers open their data. The data sharing process can also be clarified through the clause in the contract between government and providers to make it more accessible for the government.

To address these issues, the government can increase capacity building programs for their officials, particularly on data governance and management. Proper socialization is also needed to enhance the understanding and ensure that work units accept the notion of open data as a system that can help improve their performance, instead of an additional burden.

7.4 Conclusion

There are five points of conclusion from this study. Most are related to data management, as it is one of the most important aspects in the initiative that seems to be overlooked by the government.

1. In relation to open data, the study shows that although the applications have helped citizens to understand and – to some extent – to be involved in government' public services, not all applications could be considered *open*. @petajkt could be considered open since it uses open source platform and all data could be accessed by public. However, Qlue's API is not accessible by public and is only shared with the city government of Jakarta. It is therefore important to acknowledge that the term *open* in the discussion of Jakarta Smart City is limited by the nature of each of the applications.
2. The Jakarta Smart City initiative is aimed to create a smart, integrated, and a more liveable city for its citizens. The study shows that while the initiative has been quite successful in creating an

integrated smart platform, the notion of open city is still far from reality. There are still several steps to be taken to transform a smart city into an open city. One of the fundamental steps is related to data governance and citizens' awareness.

3. The applications have not necessarily enhanced the implementation of open data. Most of the data available could be categorized as citizen-generated data rather than government-generated data. This means that although the applications have helped bridge the communication and increase citizen participation, it has not necessarily influenced the government to open more of its data.
4. The notion of supplier and user of data cannot be rigidly divided. In the case of Jakarta Smart City and its applications, for example, the citizens are both users and suppliers of data – reports are collected from citizens through Qlue, Waze and @petajkt, at the same time citizens also uses the information from Qlue, Waze and @petajkt. Similar case with the government where they responsible in providing information in Jakarta Smart City platform and uses information from the three applications to create an integrated map.
5. Since it could be said that supply and demand of data is blurred as illustrated in previous point, intermediaries play a big role in bridging the supply and demand of data. Government and citizens get most of the data through applications, interfaces, and platforms that are configured and organized by software developers. This leads to concerns about the sustainability as the government heavily relies on these intermediaries to collect and maintain the data.

7.5 Recommendations

As the open data initiative has been developing rapidly, it has helped not only in establishing new communication channels, but also in ensuring the government's accountability as well as increasing citizen participation in urban governance. The recommendations that follow are derived from findings on the implication at practical and policy level. Below is the summary of our recommendations, both for the government and the application developers.

Table 7.1 Recommendations for Government and Developer

Issue	Government	Developers
Accessibility	Establish law to ensure inclusivity for the initiatives.	Provide additional features for disabled community or non-citizens and foreigners.
System	Improve service through better engagement with private sector, increase capacity of the officials, and adapt with citizens' need.	Add features related to the current needs of the citizens.
Engagement Strategy	Publish how inputs from citizens are used for the city development. e.g.: how infrastructure is improved based on citizen reports.	Increase visibility on social media.
Data Sharing Mechanism	Improve data quality and ease of access in the established platform.	Practice data philanthropy.

The implication at practical and policy level will be provided below.

7.5.1 Practical

At the practical level, we offer the following recommendations and ideas.

1. **Increase the accessibility of Jakarta Smart City and its application.** This improvement includes making it friendlier for persons with disabilities and foreigners. We suggest adding audio features for those with visual impairment and bilingual features to improve accessibility for foreigners. Broadening the audience will increase the exposure of open data that can be used more effectively by citizens across backgrounds and capabilities. Other method of engagement could be by setting up JSC platforms/booths in bus shelters and train stations. This booth will help provide access to JSC to citizens who do not use smartphones and computers.
2. **Provide additional information.** It will be useful if Jakarta Smart City platform provides information about public transportation routes, specifically to enable citizens to decide which public transportation options to use to get to their destination. Providing such information can potentially encourage citizens to switch to using public transportation. Additional information could also be implemented in a form of guidelines or procedures about what to do in certain situations inside Jakarta Smart City applications. This will enable users to be active bystanders and give a chance for them to actively participate in an incident and help, instead of just passively reporting, for instance, to provide first aid until arrival of medical professionals, or important safety information in the event of flooding, fires or terrorist attacks.

3. **Make it flexibile.** Jakarta Smart City and its applications have to be flexible and able to adapt according to the shift of citizen's needs or concerns. They should be able to evolve and be modified to ensure the sustainability of the platform. Qlue provided a good example, where they immediately provide a Terrorist Potential topic just three days after the Sarinah[8] incident.
4. **Ensure privacy.** Privacy is one of the concerns identified by users and non-users. Other than protecting the identity of users, an additional features should accommodate choices for users to publish or not to publish their report – a feature that enables them to directly report to their respective officials without showing the report on public timeline.
5. **Additional features.** Features that should be added in the applications include Panic Button, Push Notification, and On Notification.
    a. Panic button is one of the main features identified by both non-users and users. Responding to this, TerralogiQ has just released an application called Qlue Safe in February 2016 that addressed the safety issue. Qlue Safe has two features: SOS Panic Button to alert friends and family through the application about one's safety and Share Feeling and Safety Score to rate places based on their safety. This can be one topic to be explored since among many potential issues regarding citizens' safety.
    b. Push notification enables users to get information in real time and real location without having to actively search for it. In relation to Jakarta Smart City, this can be the extension of the suggestion based on specific needs or location of users.
    c. On notification. Users should also be able to set their notification regarding the reports – whether they want to get the follow up of the reports or not. This is relevant when users report cases that occur in neighbourhoods other than their own or deemed less important for them to get follow up notification.

7.5.2 Policy

At the policy level we offer the following recommendations:

1. **Ensure inclusiveness**. The government should establish a policy to ensure accessibility for all, especially for persons with disabilities. This should be made mandatory to fulfil the rights of persons with disabilities and make the initiatives inclusive.
2. **Cooperation between agencies**. There should be a policy to facilitate cooperation between agencies in order to make better improvements. For example, to create information routes of public transportation, the government and public transportation companies should be able to interact without constraint.
3. **Thorough assessment.** Avoid a *numbers game* as a basis for officials' performance review. The performance evaluation should not be based on just the number of cases resolved, since citizens

[8] On January 14th 2016, there are multiple explosions and gunfire near the Sarinah shopping mall in central Jakarta, Indonesia. ISIL claimed responsible for this incident.

do not always address reports to proper jurisdictions or office. Moreover, in the case where no citizens' report were recorded, the numbers-game assessment could lead to false conclusion on sub-districts/neighbourhood unit performance.

Cases should also be weighed differently. More complicated cases sometimes have to involve multiple agencies within the government, and such cases will take more time and effort to solve compared to soft reports (e.g. vandalism or graffiti in public schools). The quality or weight of cases should also be taken into consideration to assess sub-district performance. This will prevent sub-district officials from purposely falsifying reports to get a high rating.

4. Privacy issues. Privacy should be protected not only by the related service provider but also by law. The law should focus less on the visibility in the applications, but more on regulating the distribution of personal information of the citizens.

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