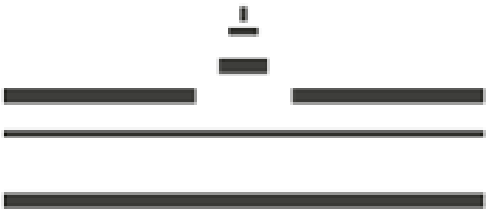

Emmy Chirchir

How Open is Open Government Data in Developing Countries?

An Evaluation of Open Government Data in Kenya using a Case Study of Open Goverment Health Data

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"Data is the fuel of the information age revolution"

Jetzek Thorhilder, Avital Michel & Bjorn-Andersen Niels (2012) p.1

ABSTRACT

In July 2011, Kenya joined Morocco to become the second country in Africa to launch an Open Government Data initiative called the Kenya Open Data Initiative (KODI). Open government data (OGD) is now widely regarded as a measure of good governance by enabling transparency, accountability and participation as well as social and economic growth by creating jobs and spurring innovation. For OGD initiatives to realize these objectives, it will not be enough to just publish data in open formats. It must be available, accessible and relevant in order to lead to action. In addition the users must be equipped with the capacity and skills such as digital literacy to effectively harness value from the data. They must make the connection between the information available to them as data sets and their participation in governance as 'insiders' rather than 'outsiders' acting in an 'invited space' or 'invented space'. Furthermore the citizen should embrace co-decision-making by taking advantage of new participatory instruments resulting from more OGD. Beyond publishing OGD, the context in which OGD exists in and participation happens must be considered and efforts made to create a conducive and sustainable OGD ecosystem.

This PhD research advances the understanding of OGD in developing countries by asking the core question: How open is the Kenya Open Government Data Initiative? Given the very nascent nature of OGD research, this study starts by analyzing the OGD ecosystem in order to understand what infrastructure, actors, institutions and their relationships support OGD in Kenya. It draws on in-depth qualitative expert interviews to describe the Kenya OGD ecosystem and the interaction of its various components. The research also presents a case study on the government health sector open data. Specifically, the case study illuminates how data is used and the extent to which its use by various actors' influences government decision- and policy-making.

The findings of this PhD research establish that the ecosystem is mature. However it is not sustainable due to weaknesses in the legal and policy frameworks, institutions that support OGD and the capacity of the actors both on the supply (government/public sector) and demand side to fully utilize OGD. This research reveals that OGD is available and accessible but there is not enough actionable data (i.e. of sufficient quality and quantity to enable non-state actors to meaningfully

engage with government) to enhance/increase participation in government policy- and decision-making. The Government does not fully understand its own data and what the citizenry's data needs are and is therefore unwilling, and to some extent unable, to respond and supply data to satisfy the increasing demand for data. Within government, civil servants are not aware of the data they have or the value that it has or could add to their work. As a result, the level of openness of data is restricted and government only releases what it feels is safe to release. Additionally a lot of datasets that have been made available by government are not in machine-readable formats. Notably, the OGD ecosystem in Kenya is characterized by a strong political influence, which is a barrier to the release of government data - a reality that is exacerbated by a lack of champions at the senior levels of government to push the OGD agenda. Furthermore, political participation using new and online as well as offline forms of co-decision making are partly developed and predominantly introduced by ‚invented spaces'. Finally, the public service culture that exists is one where people do not feel obligated to serve the public with data and this is compounded by bureaucratic and slow government operational systems. This affects the use of OGD whereby people rely on good relations and networks within government to access the kind of data (quality, quantity, format) that they want. In essence, OGD is only as open as one's networks. Ultimately, this affects the level of participation.

Despite these challenges and limitations, OGD as it exists in Kenya today is being used by non-state actors within the civil society, private sector and even development partners to influence government decision- and policy–making processes and outcomes. In this regards, the OGD ecosystem in Kenya demonstrates the untapped potential of open data in catalyzing the attainment of the participation goals of OGD. This thesis recommends that some of the potential could be unlocked by devolving OGD, focusing on users from the design to the implementation of OGD initiatives, all with a consideration of the existing contextual factors that inherently affect the implementation of OGD.

Declaration

I certify that the thesis I have presented for examination for the PhD degree of the Graduate School of Politics, Wilhelms Westfälische-Universität Münster is solely my own work other than where I have clearly indicated that it is the work of others (in which case the extent of any work carried out jointly by me and any other person is clearly identified in it).

Some of the ideas in this thesis appear in the following paper, written during the PhD in Chirchir, E. and Kersting, N. (2014) The Politics of Open Government Data. In: Parycek, P. and Edelman, N. (eds.)(2014). CeDEM14 Proceedings of the International Conference for E-Democracy and Open Government 2014.

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LIST OF ABBREVIATIONS

ADC	Africa Data Consensus
AIDS	Acquired Immunodeficiency Syndrome
API	Application Program Interface
CAK	Communications Authority of Kenya
CIPESA	Collaboration on International ICT Policy in East and Southern Africa
CSO	Civil Society Organization
DHIS	District Health Information Software
DP	Development Partner
FAO	Food And Agriculture Organization
FOIA	Freedom of Information Act
GDP	Gross Domestic Product
GOV	Government or Public Sector
GPSDD	Global Partnership for Sustainable Development Data
HIS	Health Information System
ICT	Information Communication and Technology
KES	Kenya Shillings
KODI	Kenya Open Data Initiative
KNBS	Kenya National Bureau of Statistics
MDG	Millenium Development Goals
MFL	Master Facility List
MoH	Ministry of Health
N.D.	No Date
NDA	Non-disclosure Agreement
NGO	Non-governmental Organization
NOFBI	National Optic Fiber Backbone Infrastructure
OD	Open Data
OGD	Open Government Data
OGP	Open Government Partnership
PVT	Private Sector
PSI	Public Sector Information
SDG	Sustainable Development Goals

TECH	Technology
USA	United States of America
UN	United Nations
UNECA	United Nations Economic Commission for Africa
UNDESA	United Nations Department of Economic and Social Affairs
UNICEF	United Nations Children's Fund
UK	United Kingdom
USAID	United States Agency for International Development
WHO	World Health Organization

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1. INTRODUCTION

Background to the study and context

This past decade has witnessed a growing demand for more Open Government Data (OGD) from within government itself, the public, private and civil society sectors. As a result more governments are commissioning data and publishing previously 'locked up' data such as government budgets and spending on online platforms (Davies, 2014). If published according to open data standards, the assumption is that open data should result in more government transparency and accountability, more innovation, a contribution to economic activities, and a more participatory public (Davies 2014; Avital, 2013; Manyika et al., 2011). Open standards dictate that data must be accessible and usable, re-usable and re-distributable to enable transparency and accountability and at the same time encourage participation, innovation and economic activities (Open Knowledge Foundation, 2016). Advocates of OGD propose that access to and use of data increases opportunities for the public to interact with the government not just during elections/voting but also during policy and decision-making (Davies, 2010; Jetzek et al., 2012; Meijer et al., 2012; Huijboom et al., 2011). This requires that governments open up this 'arena' where the citizen's voices are heard and their input considered.

Definition of terms

In order to adequately frame the debate, it is important to clearly define each of the terms and trace the development of open government data from different perspectives. Open data is a part of public sector information (PSI) but a discussion on PSI alone is not sufficient in understanding open (government) data. The inclusion of the word 'open' leads to another level of discussion inadequately covered by PSI discussions as not all PSI is open data but all open data is PSI (Lemma, 2012; Huijboom and Van den Broek, 2011). Another perspective traces the convergence of open government and open data as two different concepts that developed separately at different times and as such need to be unpacked first as separate concepts and then as one concept – OGD - to avoid any ambiguity. For example: if one takes open as the descriptive word, then the main subject would be government data (open) government data, if the adjective is government, then the main subject would be open data as in open (government) data and lastly; if the

adjective is data then what would be in focus would be open government (data). Yet from other viewpoints, open government data is considered a part of or equated to the larger e-government spectrum and it is regarded as having developed within this context first as open government and then with the introduction of open data, as open government data (Harrison et al., 2011, Geiger & Von Lucke, 2012).

Open Government

Open Government is an 'old' concept starting as far back as the 1800's notably in older democracies such as Sweden and the United States of America (USA) (Wraith, 1977). Sweden established the concepts of open government within their constitutions as early as 1812 whilst in the USA this was in 1974 (Wraith, 1977). In the USA, the earliest discussion on the Freedom of Information Act (FOIA) began with the Moss Committee, which was later passed into law in 1966 (Yu & Robinson, 2012). In the 1960s, the United Kingdom (UK) experienced liberalizing trends that supported the development of open government and increased access to information by the public, namely through administrative decisions, legislation and court judgments (Wraith, 1977). The OGD movement in the UK picked up momementum again in the mid-2000's as demand grew from a strong civil society who had a strong online presence (Bates, 2013).

In history an open government often meant giving the public access to previously undisclosed government information (Wraith, 1977). More recently the terms has gained renewed interest, meaning and attention in combination with the concept of open data. (Pizicanella n.d; Harrison et al., 2012). Harrison et al. (2011) place open government within the academic context of e-government; between e-democracy (the relationship between technology, democracy and government) and e-government. Wraith (1977) notes that the political decisions, more than anything best explain the move towards open government. Evans and Campos (2011) claim that the origins of open government lie in the e-government movement starting in the mid-1990s.

Open government is geared towards transparency and citizen participation (co-decision making in government). These efforts are driven largely by more access to government information by citizens, now enabled by advances in Information Communication and Technology (ICT) (Evans and Campos, 2013, Hilgers, 2010).

Perhaps this research relates more closely to Meijer et al's (2012) definition of open government where they see it as see it as the extent to which citizens can monitor and influence government processes through access to government information and decision-making arenas with the belief that citizen participation enhances the quality of decision made (Wirtz & Birkmeyer, 2015; Kersting et al., 2009)

Literature draws attention towards the push on government to not only open up its information to its citizens but also itself as an institution where participants can 'get in' and actively participate. This requires a willingness to change traditional government's secretive culture and organization and to open political and administrative process o new and external actors (and knowledge) (Geiger & Von Lucke, 2012). It means cooperation or collaboration of the state or the public sector with non-state actors such as citizens, civil society organizations - an inclusion of new actors. Notably, Kersting et al. (2009) and Kersting (2012) further enhances the definition of open government by pointing out ‚new' governance models and the inclusivity of multiple actors such as the private and civil society sectors and by introducing concepts such as "consensus, compromise and bargaining" as part of the decision-making process (p.16) and 'invited spaces' used by government as new deliberative instruments to widen citizen participation and are characteristics of an open government (Kersting, 2013). This is comprehensively discussed in Chapter 4. This inclusion of formerly blocked or even marginalized groups has developed to become a central element of government strategy referred to as network-governance or regulatory multilevel-governance by some scholars (Kersting, 2004; Kersting 2013; Kersting et al. 2009; Pierre and Peters, 2000)

Open Data

The earliest form of open data could have been the US OpenSecrets.org, launched in 1998 by non-state actors. The site allowed users to search and analyze campaign financial disclosures and reuse the data. This data was machine-readable and published for the purpose of promoting government transparency and accountability. Later on different open data projects took off combining government data and data from other actors. These included GovTrack, OpenCongresss and MAPLight.org. Open Knowledge Foundation (OKF) defines open data as "… data that can be freely used, reused and redistributed by anyone subject only at most, to the requirement to

attribute and share alike" (Open Knowledge Foundation, 2016). This means that data qualifies as open when it is freely (at no more than a reasonable reproduction cost) available and accessible to anyone without any barriers, restrictions or discrimination for re-use and re-distribution by anyone without the need for justifying under its terms and conditions. Open Data could be statistics, geo-data, statistics, traffic data, publications or even multimedia such as radio and television programs but does not include personal data (Halonen 2012).

The combination of the words 'open' and 'data' introduces multiple perspectives when defining open data. This is also replicated when defining OGD and describing the OGD ecosystem as will be shown in the coming chapters. The use of ICT tools introduces a technological aspect (Yu & Robinson 2012, p.188). Being technically open involves ensuring that data is in formats that allow re-use and redistribution and as a complete dataset. Data can be also defined as open in legal terms. Applying a licence allows for commercial and non-commercial use, re-use and redistribution without restrictions e.g. open licences such as what is used in the UK. Politically, it is defined as "democratization of data that enables citizens to access and create value through the reuse of public sector information" (Rahemtulla, n.d.). This reflects the desired effects of open data where citizens are more participative fostering a "two-way transparency" and a wider freedom of information continuum (Yu & Robinson 2012, p.189; Halonen, 2012). Heusser & Felipe (n.d.) regard OGD as a policy, a movement and a market depending on the main stakeholder in question and their objectives.

Open Government + Open Data = Open Government Data?

In principle, the elements of technology, democracy and government apply to OGD, however a clear distinction is necessary as equating it to e-government, directly or indirectly, would be incorrect. OGD came into the limelight following a publication of eight principles known as the 'Sebastopol Principles' of open government (www.opengovdata.org). Before this, there were different forms of open government information such as the US Census provided for the public on the Census.gov website in 1996 (Yu & David 2012). The 'Sebastopol Principles' were formulated by thirty advocates of open government to develop a better understanding of the value of open government to democracy (www.opengovdata.org). They stipulated

that data must be complete, primary, timely, accessible, machine-readable, non-discriminatory, non-proprietary and licence-free. The Sunlight Foundation later expanded these principles to 10 to include permanence and usage costs. More recently, US President Barack Obama's Open Government Directive on releasing government data in 2009 underlined OGD and brought it back to the forefront of discussion on governance (Davies and Lithwick, 2010). This was followed by the landmark launch of the US OGD portal in 2009 as other countries followed suit such as UK (2010), Kenya (2011).

Open government data is mostly government data that is published or made available to all by the government in a specific format as outlined by the Open Data Handbook (http://opendatahandbook.org) whilst e-government is information in general and government services that are made available electronically to the public (Mayer-Schönberger and Lazer, 2007; Tolbert and Mossberger, 2006; Schuppan, 2008). Davies et al. (2007) also caution against confusing information with data. Information is a product of processed, analysed or interpreted data. For example, data on transport systems can be converted into information such as maps showing the shortest connections or bus timetables. Data is the raw material for developing information and knowledge. There are different types of data, each of value to different users. In the context of open data, some datasets are more valuable for citizen engagement such as data on budget and government spending while others are raw materials for generating social and economic value such as demographic data, data on health, transport and so on (United Nations, p.29). Three broad categories can be identified:

1. Infrastructural data - data held about the state of the world - for example, on transport networks, structures of government, weather measurements and so on. This group of data has very little privacy concern.
2. Public service data - data about the activities of government - ranging from the locations of public services and their budgets through to public registers, and detailed performance statistics on schools, hospitals and other facilities. Some data in this category can present grey areas for determining privacy for example a medical record about an operation and its outcome is data about the patient, or about the doctor?

3. Personal data - data about individuals, and usually things that an individual would have a legitimate right to manage access to - such as information on their sexuality or their health. Available at: (http://www.opendataresearch.org/content/2013/501/open-data-privacy-discussion-notes).

Yu & Robinson (2012) emphasize the importance of separating the technology from the policy. Technology enhances the opportunities and ways of improving civil activity, government activity and the interaction of different stakeholders. It makes public information adaptable but alone it is no substitute for participation, or accountability. For example, open data or open government as a policy builds on the values of accountability while as a technology aspect it can be adapted by anyone with little or no implications for accountability. Yu & Robinson (2012) claim that by interchanging these two terms, governments can take credit for public accountability simply by using or applying open data technologies with little to no change in policy.

What is the 'open' in OGD?

A common factor among all these terms is the word 'open'. What does it mean in combination with the words government data? OKF defines work as open: "if its manner of distribution is accessible, reusable, can be redistributed, and allows for universal participation …" (Open Knowledge Foundation, 2016). The expected implication of openness of government is that publishing government information or data gives the citizens a view of what is going on and an opportunity to use this information to amplify their voices and opinions. The meaning of 'openness' of government has expanded to include the extent to which citizens can monitor and influence government processes through access to government information and access to decision- making arenas" (Meijer et al 2012 p.13 and Wojcik, 2012, p.128). According to Meijjer (2012), this can described as transparency (vision) and participation (voice) aspects of open government. This may be difficult in more authoritative states where government has absolute power. Citizens in authoritarian regimes may have either the vision or the vision or none at all. Citizens could be able to see what is going on within government (transparency), but have no channels to use their voices. In such regimes, it might also be worth questioning what is being

visualized (what is being opened up to the citizens) and whose voice is being heard? (Meijer et al, 2012 p.11).

The notion of open government therefore is grounded in the principle that citizens are allowed to participate actively in government through the information that they have (access to) and importantly through their voice in decision-making. The commonality of the word open does not however mean that open data and open government are dependant on each other. For example open government can exist without open data or OGD and vice versa although they complement each other hence in the absence of open government, OGD becomes challenging to implement, as the findings will show later. This means that a government does not necessarily have to have open data or OGD initiatives to be termed as an open government; it can still be described as open, using other criteria such as having media freedom. Countries such as South Africa are described as open although they do not have an open government data initiative.

The definition of OGD explicitly and implicitly depending on how a county defines it identifies citizen participation as one of its goals as well as drivers. This research, examining the context in Kenya where the description of OGD explicitly describes increased citizen participation as one of its goals, views citizen participation as being at the core of the OGD. The main research question – how open is open government data – directly relates to how citizens access and use OGD in Kenya to advance their participation in government as will be outlined in the coming chapters.

Research Problem

If published according to open data standards, the assumption is that OGD should result in more government transparency and accountability, more innovation, an increase in economic activities, and a more participatory public. Open standards dictate that data must be accessible and usable, re-usable and re-distributable to enable political, social and economic value such as transparency, accountability, participation and innovation.

This research acknowledges aspects of open as being transparent/visible but most importantly it understands open in OGD as being directly linked to 'use' which is dependant on availability, access and more importantly on action (social, economic

or political) resulting from using data. It makes the proposition that the value locked up in (government) data can only be realized when the datasets are used and only then can the openness of government data be measurable. Therefore the extent to which OGD is open can only be established by its use. This is because availability and accessibility are not enough; putting the data into action demonstrates use and hence data's openness. Governments can easily claim to have open data by just having data available in open formats on a website. Further, they can make the next step and make data more accessible by use of ICT and other innovative mechanisms and claim to have open government data. These two levels of open data are valid in their own rights, however meaningful and relevant open data goes beyond the technical, legal and social economic factors to truly enable citizens/public to take data in whichever form and use it to enhance transparency and accountability, to more active participate in government decision-making processes and to create more opportunities to drive economic gains

Advocates of OGD propose that access to and use of data increases opportunities for the public to interact with the government not just during elections/voting but also during policy and decision-making (Wirtz & Birkmeyer, 2015; Evans and Campos, 2013; Meijer et al., 2012). This requires that governments open up this 'arena' where the citizen's voices are heard (invited space) and their input considered and at the same time that citizens will leverage on OGD as a tool to participate in government either directly or indirectly. In some cases, in the absence of an opening of public arenas or 'invited spaces' citizens will create their own platforms to participate through 'invented spaces' (Kersting, 2012). Based on literature so far one can draw the conclusion that increased opportunities to access OGD also increases the chances for the public to participate in government processes by using the data to realize various benefits. The question though is to what extent does OGD use by citizens' influence what kind of spaces we are seeing and how are citizens participating in decision-making in government as a result of OGD use?

Participation as one of the principles of OGD has received little attention from scholars in literature and research (Wirtz & Birkmeyer, 2015). There is substantial evidence on the use and re-use of OGD on innovation and its impact on the economy (Capgemini 2013, Houghton 2011, Deloitte 2012), although most of the literature is based on open data and open government initiatives found in Europe and

North America. Most of this research assumes that potential users have the capacity to access and use online data. Even then, the direct link between OGD and its desired impacts especially on the social and political spheres has yet to be clearly established and remains contentious. In developing countries, research is scanty but beginning to grow with a lot of research on readiness being carried out. This can be explained by the fact that most of the initiatives in developing countries are still at their infancy stages with the oldest in Morocco and Kenya being a little over 5 years old.

This research argues that the benefits or effects of OGD can only be realized when there is broader participation in OGD demonstrated through use of the data hence the question: How open is OGD? The first challenge for OGD and indeed a prevailing challenge is agreeing or having a unified definition and understanding of open government data. There seems to be no consensus on the meaning of 'open' in arriving at a definition. Consequently, it becomes a challenge – to measure open (data, government) and OGD. By defining 'open' or 'openness' of open government data and by attempting to unravel the ambiguity of open data, open government and (open) (government) (data) only then can we begin to measure how open OGD is.

In order to measure and establish the effects or benefits of OGD use one has to consider the context or the ecosystem within which OGD exists. To get to understand the impact of OGD on participation we must first understand what or who drives the use of OGD - what infrastructures, institutions and actors, how do they relate to each other and under what conditions? What enables or disables OGD existence and how do these conditions affect use of OGD? This research proposes to use an ecosystem understanding that offers a framework to structure and explain the contextual factors as well as offer pointers on what infrastructures, actors and institutions exist and to what extent they support OGD use. The ecosystem framework is described in detail in Chapter 3. Therefore in this research we explore OGD in the context of Kenya and dig deeper to understand the kinds of data (available, accessible and actionable) and how they are affect use and eventual impact on bringing citizens back through increased participation of different actors in government.

Research Questions

The main research question seeks to understand how open OGD is with the theoretical assumption that open infrastructures support broader access and therefore greater use and eventually generates value or benefits to the users. This assumption is distilled into two broad areas that form the main research questions: the infrastructure (also later referred to as the ecosystem) and the use of OGD as a tool to increase public participation in policy/decision-making.

RQ 1. What is the structure of OGD in Kenya and to what extent does it support OGD in Kenya?

- What kind of infrastructure (environment or ecosystem) is needed to enable broad use of OGD in Kenya?
- How does the OGD ecosystem look like in Kenya?
- How do the different actors (private, CSO, government) use the data in Kenya?
- What capacities do they have for using the data? /What skills are needed for harnessing OGD?
- What factors promote or limit the use of OGD in Kenya?
- What value or benefits have users derived from their use of OGD (direct/indirect)?

RQ 2. To what extent has the use of OGD influenced participation in government decision or policy-making using the health sector in Kenya as a case study?

- How has the use of OGD influenced how government responds to state and non-state users of OGD in government decision or policy-making?
- To what extent are the voices of users being heard in policy and decision-making in government because of their use of OGD?

Research purpose

The main purpose of this research is to better understand and describe the use and the users of Kenya's open government data and by doing so gain new insight into this phenomenon. As a basic form of research, the overarching purpose is to add to existing but scarce research and knowledge on the topic. It will expand the existing

models that describe OGD and contribute to literature on governance, participation, democracy, transparency and information, communication technologies (ICT). The results of the research will also be relevant for informing policy as well as for the global OGD community.

This study addresses the gap in the literature by understanding and exploring the OGD and participation processes as well as how these two phenomena relate to each other in order to learn how it can be used effectively to encourage citizen participation as well as more OGD and government openness thereby providing meaningful contribution to the field of political science.

Finally, this research prescribes strategies for government in developing and implementing successful OGD initiatives by proposing and testing key elements in the infrastructure, context and actors that need to be considered in laying the foundation for the initiatives and for sustaining use.

Research objective

The objective of this research is to collect comprehensive, systematic and in-depth information about the structure, use and benefits of OGD initiatives in Kenya. This research will explore the use and users of OGD in Kenya and describe how they use and why they use these government initiatives. Equally interesting for this research is to find out how contextual factors affect the use of OGD for different actors. Based on the findings to answer the main broad question: how open is open government data?

Kenya's OGD initiative is chosen because it was the first one in Sub-Sahara Africa to be established in 2011 and therefore the oldest existing one. In comparison to other African countries, it will offer some basis for data collection. Kenya and more specifically Nairobi, is also regarded as one of the ICT and innovation hubs in Africa. The central government is situated in the capital city and so are the main institutions of government and non-governmental sectors. In addition, the Internet penetration is deeper in the city hence more likelihood of people accessing the online portal as compared to the rural areas of the country.

Philosophical and methodological approach

OGD is a term laden with meanings and concepts. This research understands OGD as having two major sides: a political side and a technical side embedded in different socio-economic contexts. Literature on the topic is straddled between arguments for increased participation through innovation and information communication technologies (ICT) and critics of use of ICT to promote democracy and participation especially by governments. It would be difficult to understand how and why people use OGD without taking into account the social and technical aspects.

This research is focused on the case of OGD use in Kenya. It is intrinsically cross-disciplined, combining elements from political science, social sciences and information sciences among others. This research deductively draws on existing theories and concepts already established. It does not question the existence of OGD and it assumes that OGD in the Kenyan context shares the same principles as OGD in other contexts. Based on literature review, it applies one main theory of participation as a starting point for research in explaining OGD structure, use and benefit. This theory will help to answer the questions of why the people participate or should participate in government issues such as in decision and policymaking? To what extent does access to OGD influence participation in government? How people participate and what benefits they have realized. It also uses participation theory to derive variables and indicators in the empirical section of this research. Additionally it applies an ecosystem framework with pre-determined factors that are assumed to influence use of OGD.

Organisation of the dissertation

Chapter one is an introduction to the topic of open government data and background to the study; the problem statement; purpose of the research presented in this dissertation; and the research questions. The significance of this study to the body of knowledge and application within the fields of open government data and public participation are also described. An overview of the development of OGD and operational definitions are also presented.

Chapter Two explores the available scholarly literature, summarizes key concepts and emerging trends and identifies the gaps in the literature that justify this research.

It includes a discussion of the theoretical foundations, notably on participation, that underpins this study.

The literature review informs the development of two proposals: a conceptual framework (presented in Chapter Three) to understand the concept and infrastructure of OGD in the Kenyan context; and a theoretical framework (presented in Chapter Four) to understand how the use of OGD relates to participation in government decision/policymaking. These two frameworks in turn inform the research agenda and establish the foundations for understanding OGD and how both state and non-state actors can use OGD to inform government decision/policymaking.

Chapter Five provides an overview of the qualitative methodologies applied in order to effectively answer the research questions. Each of the methods used, including the use of case studies, qualitative inquiry, and analysis, and their rationale are introduced and explained in detail. This chapter also provides an overview of the research design which is divided into two phases corresponding to the two main research questions, explanations of the samples, data collection, and analysis involving 24 interviews (20 formal and 4 informal), secondary quantitative data analysis, observations and document analysis.

Chapter Six presents the findings of this research. This chapter is organised according to the two phases of research and directly reflect the two main research questions. Further, the chapter discusses the emerging categories, properties and dimensions in the empirical data from this study. Chapter Seven is a discussion of the research findings as they relate to literature, the ecosystem framework and participation theory.

The final chapter concludes by assessing broader normative implications of OGD in research and in practice notably in developing countries. Based on the findings, this research offers recommendations to organizations and governments interested in setting up or developing OGD initiatives that are relevant and sustainable for use by various users. Limitations of this study and suggested areas for further research are also discussed.

2. LITERATURE REVIEW

OGD development on a global scale

Globally, the launch of the US (2009) and UK (2010) OGD initiatives were significant landmarks in the development as these were the first initiatives to be launched globally. Subsequently, international organisations such as the World Bank Group and the African Development bank have launched their own open data portals. In 2011, OGD proponent countries launched the Open Government Partnership (OGP), as a voluntary platform for countries to demonstrate commitment towards more openness, transparency, accountability and responsiveness to its citizens. Countries submit these commitments through national action plans and are subjected to assessments of their progress towards these goals through the Independent Reporting Mechanism. OGP has more than 70 countries that have joined, 8 of which are in Africa.

On a global scale, countries and international organizations are gradually recognizing the imperative role of data. The transition from Millenium Development Goals (MDGs) to Sustainable Development Goals (SDGs) recognized the critical need for data for decision-making as evidenced by initiatives such as the Global Partnership for Sustainable Development Data (GPSDD), which is aimed at developing partnerships with various stakeholders to strengthen data ecosystems and improve the use of data to inform development. Regional bodies are also consolidating their efforts towards more open government and open data. The European Union launched its OGD strategy in 2011, mainly with economic goals and targets. In March 2015 a joint African Union and United Nations Economic Commission for Africa (UNECA) conference developed and launched the Africa Data Consensus (ADC) following a request from African Heads of State to discuss the data revolution in Africa at their 23rd Ordinary Session of the African Union held in Malabo, Equatorial Guinea in June 2014. The ADC recognizes the importance of high-quality data and information for advancing development outcomes in light of Agenda 2063 and even the Sustainable Development Goals (SDGs). It underscores the significant role of technology, principles of openness, diverse data ecosystems and institutions such as statistical offices.

OGD in developing countries

So far more than 41 countries around the world have set up open data initiatives at national and subnational levels. More than a dozen of these are in developing countries in Africa including Morocco, Kenya, Ghana, Tanzania, Tunisia, Nigeria, Burkina Faso, South Africa to mention a few (Alais, 2015, Open Knowledge Foundation). In Asia and the Pacific examples include: China, India and Timor Leste; in Europe: UK, Germany, Italy and; in Latin America: Chile, Peru, Brazil, Mexico and Uruguay (with limited datasets). Also worth noting is the international organizations have launched their own open data platforms such the African Development Bank, the World Bank Group and the United Nations (UN). In addition these organizations have supported different OGD initiatives. In Kenya, the World Bank supported the development of Kenya's open data portal – the Kenya Open Data Initiative (KODI), while the UN has supported open data efforts in Tanzania, Rwanda and Uganda among others. In research and academia, not much has been done on developing countries for the simple reason that these initiatives are either yet to start or have just started. There is literature on feasibility and readiness of OGD in various developing countries and gradually an interest in examining the impacts of OGD in some developing countries such as Kenya, Moldova, Indonesia and others.

Although most of the OGD initiatives are still at their early stages, there is already some evidence to show how people are using data worldwide although these examples are not necessarily from government or accessible through OGD websites. Different activities from government and other organizations including the private sector such as hack days/hackathons, web or mobile application development competitions and so on have encouraged more widespread use of open data. There is a growing number of applications built using open government data and with this there is more demand for more up-to data, quality data. For example, in Brazil and Nigeria, citizens can use the data to track budgets and government spending but as emphasized in most research, including this one, concrete and reliable evidence on the actual impact of open data remains scarce. Also it is still unclear if OGD is delivering on transparency and accountability, participation and other promises. (Davies, Perini and Alonso, 2013 (p.3).

OGD's potential value for developing countries

Explanations of value in OGD are often derived from the desired impact for example economic value generated by innovation. OGD is expected to create value, which in turn leads to impact. Capgemini (2012) describes this as: "building a vision around the possible and tangible benefits of Open Data" (p.14). Increasingly various private sector and even public sector institutions are using data mining and analytics tools to explore the economic potential of big data (Manyika et al., 2011, GovLab Research, 2013). Big data can be described as a broad collection of large datasets with sizes beyond the ability of typical databases resulting from unlimited storage of various formats of data from digital technology advances e.g. Geospatial data, social media data, smart phone data (Manyika et al., 2011; GovLab Research, 2013). How it is generated and measured is however varied. These descriptions of value are often grouped into three main categories: economic value, social value and political value (Jetzek, 2012; Ubaldi, 2013). Similarly, many researchers have also proposed different methodologies to measure value. It is worth noting that despite the different proposals for measuring value, most of the research already concluded concretely measure economic value of OGD initiatives in developed countries such as the US, Australia, countries in the EU and the UK (Jetzek 2013; Meijjer, 2012; Deloitte 2011; Deloitte 2012; Tinholt, 2013; Jetzek et al., 2012).

The first question to ask at the beginning of evaluating OGD is if there is a need for data and hence a demand for OGD among the wider citizens. The consensus across all literature is that data on its own is of little value especially to the wider public leading to the assertion of this research that the wider public's need is not data rather the information derived from the data. Halonen (2012) lays emphasis on the value of OGD as being derived from how users engage with OGD. Irrespective of what the major desired goal of OGD is – economic, social or political, the most important thing is increased use because the value of open data will only be realized when such data is used to address the real needs of individuals and communities. For instance, the private sector such as technology entrepreneurs and enthusiasts will likely drive the demand for relevant data for economic value. In this regard, identifying data needs of the targeted users of OGD is essential to drive value. Less straightforward are the needs of the wider, heterogeneous public determined by a myriad of factors such as demographics. Answers to this question would indicate (potential) use of the

data, sustainability and which data is in demand and most useful. This would be an imperative question to ask when assessing OGD readiness but it is also an important question to ask when evaluating any OGD initiative. Some argue that there is need but not many people know about the existence of this kind of data from their government and that it could be useful to them (Harrison et al 2012, p.912). A World Bank research in Indonesia, Desa Ban village points to a different argument. Desa Ban is a remote village in Indonesia where interaction between data and the public is often offline. Researchers seeking to find out the demand for open financial data in Desa Ban established that "43% are familiar with the term "open data" (n=1480); 56% want access to public financial information (n=3332); and 30% have used public financial information (n=2523)" (Lee & Estefan 2013). The findings suggest that for communities that are mostly offline, publishing data online will not create value and drive impact. 65% of the world's population is offline – without Internet access majority of who are found in Africa (Internet World Stats, 2012).

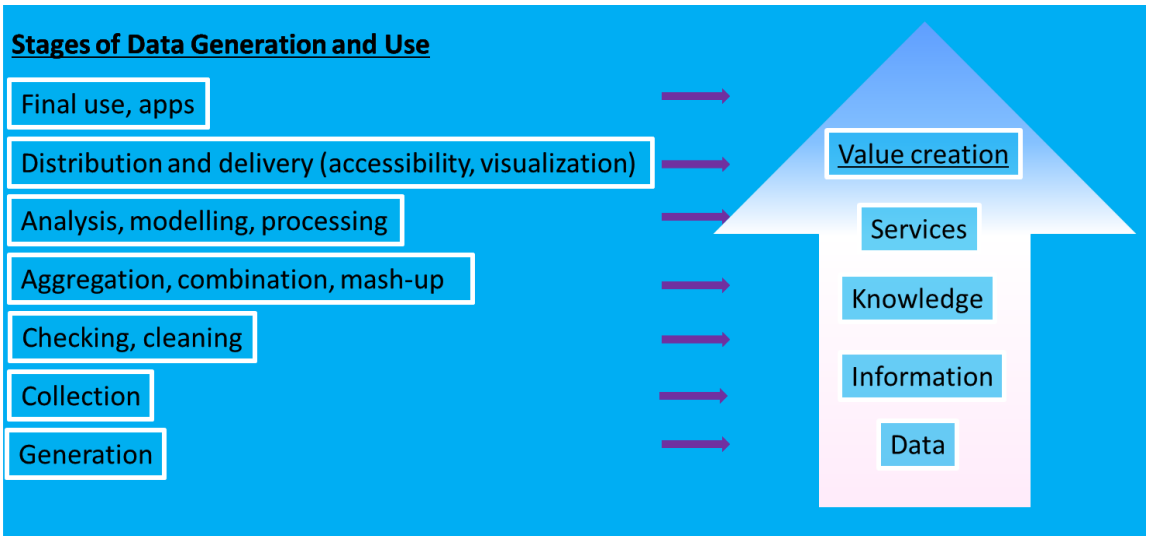


Figure 1: Stages of Data Generation and Use adapted from Ubaldi (2013)

An assumption of OGD is that government has the data ready and that OGD in its quality (format, quantity, online) is relevant for all users to achieve the desired impacts. Literature demonstrates that there are dissenting views on whether raw, machine-readable data is relevant and useful for the general public and policy makers. Some authors insist that the public is not interested in raw data (numbers) but rather in more applicable and practical information as demonstrated in the graphic above (Leadbeater, 2011; Vathana et al (n.d.); Ubaldi, 2013). In other

words, data that has been analysed, aggregated and even presented in one form or another. This could be in terms of visualizations, maps and mashups and apps, to mention a few common examples. In the Dessa Ban example from the World Bank the open financial data presented was already aggregated. OGD assumptions do not also address what skills users must be equipped with to analyse and derive information from the data in order to make use of it for decision or policy-making, often referred to as data-literacy. Fioretti (2010) adequately describes these skills as " a combination of computer, digital media and traditional math skills necessary to correctly give context to sources, numbers and other information and to interpret everything as objectively as possible." (p.28). In considerations of these required skills, it is possible to assume that a big population in devcloping countries will not be able to directly access and make use of OGD.

On the other hand, some literature supports the view that citizens are able to use the data without further aggregation or analysis. Yet still some literature supports both views assuming that if the citizens cannot process the data, there is ready capacity within the private and civil society sectors to analyse, interpret data for example through infomediaries. The standard model suggests, contrary to the assumptions of OGD and OD, that intermediaries will play a significant role in deriving value of OGD in developing countries (Davies et al., 2013; Kenei, 2012). This means that they could use OGD to generate information or services that are more relevant to a wider array of citizens as illustrated in Figure 1. There are advantages and disadvantages in having third party interpretations of raw data through infomediaries. Robinson et al (2009) states that the emergence of advanced features beyond simple delivery of data for example visualized data mashups; more interactions on discussion fora and wikis are more beneficial than raw data. Meanwhile, Davies (2013) cautions that intermediaries may compromise the validity of data as data in other form other than raw data is interpreted according to a subjective experience.

OGD readiness evaluations and suggestions from OGD 'experts' advise that the target groups be contacted first to identify what data they need (United Nations, 2013; World Bank, 2016; Jetzek 2012). This will help data suppliers in this case the government to priorities relevant data through the right channels. Jetzek et al. (2012) states that value is likely to be created if: government identifies what value it would

like to derive from the data; the required input (resources, investment) needed to generate that value sustainably; and strengthens enablers and reduces inhibitors throughout the process. This logical flow is not always the case. In the Kenyan example, the needs were not identified first rather the Kenyan government went for the "low-hanging fruits" at that time by publishing data that was already published and digital at that time including data from the World Bank (Rahemtulla, 2011, p.9). Questions on Kenya's data needs remain unanswered although this could be derived from who uses the data and how they use the data, however this might not be a complete and representative picture. A more valuable question at this point would be: what kind of data will lead to a more transparent and accountable government and how does this reflect against: the data and hence information needs of the country; the kind of data available on OGD; and the data accessed from the platform? Reversing the questions also raises issues on OGD for example which datasets are available and accessible on the platform and how is this related to the desired impacts e.g. transparency and accountability? Are the needs met or does the wider public have different needs from what the government perceives as important to its citizens?

The Social Value of OGD

Social value of OGD can be generated by political and economic value generating mechanisms therefore cutting across both value propositions. For instance OGD innovations that are developed to enhance participation e.g. budget trackers such as BudgIT in Nigeria could lead to savings in public expenditure (economic value) and at the same time efficient public spending that could boost society's wellbeing. Other examples include OGD's potential to guide how resources are distributed and spent.

The Political Value of OGD

Good governance principles such as transparency, accountability and citizen participations are some of the most prominent benefits of OGD that lead to increased value to public administration. OGD is regarded as a democratic tool enhancing participatory governance, transparency and accountability. When government opens up data on budgets, spending, processes and systems such as parliament proceedings, it sends a message that it is more transparent and ready to

be accountable thereby gaining legitimacy and credibility from citizens. Further, the opening of political systems includes an inclusion of new actors who were previously unable to access these information for instance marginalized groups (Kersting 2004 and Pierre/Peters 2000 in Kersting, p.274). Advocates of OGD posit that if well implemented, the release of government data could lead to more trust in government by its citizens, however no empirical evidence has conclusively shown this. In addition, scholars argue that a more informed citizen is likely to make better political decisions (Ubaldi, 2013; Granickas, 2013; Florini, 2007)

The value is therefore beneficial to government itself, CSO, citizens and even private sector that can benefit from better efficiencies and improved government services built around OGD. For instance, in California USA, "the state transparency portal (that cost around $21,000 to implement) saved the state over $20 million when visitors identified unnecessary expenditure" (Tinholt 2013, p.11). The OD barometer confirms that there is a strong correlation between the accessibility/availability of datasets that facilitate government's accountability and a country's ranking on political impact (Davies, 2013).

The Economic Value of OGD

Recent economic analyses have additionally shown that when information is provided to the public free of charge or at very low cost, individuals, developers and private enterprises are more likely to take that information and create added-value products that they can then market (Jetzek et al, 2012). This can increase the volume of private sector activities, which can stimulate the national economy and also provide revenue to the government in the form of taxes. In addition, data made available free of charge from public bodies can be used for civil society projects. This is particularly true for data that have broader potential value include mapping, meteorological, legal, traffic, financial, and economic data. Value created is likely to outweigh the costs (Jetzek at al 2012, p.7). The European Commission claims that a European open data strategy can lead to a yearly economic value of 70-140 billion euros in the European Union alone (Veenstra and Van den Broek in Wimmer at al., 2013). Much of this raw data are used for, or integrated into new data-enabled products, apps and services that individuals use on a daily basis, such as car navigation systems, weather forecasts, or financial and insurance services. For users,

particularly the private sector and the general public, value is derived by going beyond the data sets. For example for businesses with equal access to the data, how they harness data will generate business opportunities. Ubaldi (2013) puts it well: "Competitive advantage has to come from offering innovative value-added services on top of data, and providing opportunities for business start-ups. The private sector (technology developers) is expected to be amongst the primary users of datasets to pursue commercial exploitation of OGD" (p.12).

According to a Finnish Study, businesses that re-use geographical data grew 15% more per annum in countries where governments released such information freely, compared with countries that price such information in order to recover production costs." The end-user will therefore not use the (open) raw data rather what has been processed. Can we then say that this data is still open? Should this group or this process be termed as value addition?

Some indicators of OGD's economical benefits to private and public sector as captured by Capgemini (2012) and Houghton (2011) include: development of new businesses, products and services; revenue and tax from charging from these new services and products; time and cost savings for example, "Open Data and access to real-time information saved over $1 million for the city of San Francisco in the US." (p.11); and creation of jobs.

Barriers and enablers of OGD in developing countries

Deeper, underlying and perhaps unique issues pose as barriers and at the same time as enablers of OGD (Veenstra and Van den Broek in Wimmer at al., 2013). These are highlighted in the assumptions on OGD such as the expected value it brings socially, economically and politically, the ideal environment or context for OGD to exists, the actors (users, suppliers, beneficiaries) and even the role of politics and government institutions. Research on OGD has not given enough attention to the context within which OGD operates. Context is often mentioned as critical in evaluating OGD; however this is rarely described in detail or expounded on. Sometimes these are described as challenges or as enablers and barriers. Although these contextual factors may not be unique to developing countries, identifying the contextual factors at play raises questions (and answers) not only on what the possible impacts of OGD could be but also on the relevance of OGD in developing

countries. For example, implementing OGD initiatives in countries where there is neither freedom of information law and nor concrete internet/data sharing and security policies presents a unique context for research. Ideally, these laws and policies are key in implementing OGD. Nonetheless in countries like Kenya, OGD has been implemented without the existence of these laws. Does this have an impact on use and re-use of data? What kind of ecosystem therefore exists in such contexts?

Political influences

Government as an institution is political by nature. Likewise, OGD is a political process because policy making is a political processes making datasets "political objects" (Davies, 2013; Organisation for Economic Co-operation and Development (OECD), 2003). The Kenyan constitution provides for the right of citizens to access government information. However the main policy makers who assent to critical laws such as freedom of information are politically elected or appointed into office hence the influence of politics in opening up government data or government information in general is unavoidable.

As noted by Robinson et al. (2009) so long as government controls the supply of data it will influence the presentation and formatting of raw government data. This becomes evident in the OD barometer as different countries decide on how the data or where the data should have the greatest return on investment depending on its definition and perception of OGD and its benefits. Open Data Initiatives are not intended to be an extra budgetary expense because data is assumed to be available and integrated into the daily activities of government. Nonetheless, the process (technical, legal) has cost implications. This affects how the policies and strategies are formulated and how resources for OGD are distributed. It also determines which datasets are prioritized and the main target group. For example: the UK's emphasis has been on data that supports economic returns and innovation although the OGD movement in the UK was largely driven by the civil society with a different perception and objective for OGD (Bates, 2013). The OD barometer results on impact show that for the UK, its weakest point is generating social impact from data obviously because its emphasis and priority is on data for innovation and economic growth.

Another example is the US portal (http://www.data.gov/) with an emphasis placed on the communities' section reflecting its objective of increased engagement (Davies, 2013). The US emphasizes datasets that lead to innovation and increase engagement of citizen's with government. The question is should the government decide on which data to prioritise and how does it do this whilst ensuring that users' heterogeneous needs are met?

In addition, datasets are politically sensitive such as land and registry or budget and spending data. Because of their nature, they could cause governments to suppress the release of data because of hidden interests and the risk of losing face or political careers if exposed. In this case, the government may shy away from publishing more data especially if there is a chance that this may lead to backlash from civil society or citizens. The 2013 Open Data barometer and the Open Data Index show that almost all the countries score poorly on availability and accessibility of these kinds of datasets especially on land and company registry (Davies 2013: Open Knowledge Foundation, 2016). Key datasets such as government spending and company registries are least likely to be available (0% and 5% respectively) as open data, suggesting that OGD initiatives, for example in Kenya, are not yet releasing datasets that could be vital for holding governments and public officials accountable. Eventually this manifests itself in the value generated and the impacts. OGD's efforts to encourage transparency and participation through its data by giving citizens a voice on government issues may be meaningless or at worst impossible if the existing government is not open.

In such a scenario, the extent to which the data/information needs of the citizens or the potential users are aligned with those of government is worth questioning. This is not to say that users of data should be suspicious of their governments and the data rather that they should be aware of the motivation behind publishing data as this may explain why some datasets are open and others are not or how the datasets are structured and displayed.

In addition, it is worth noting that in most developing countries, the relationship between the public and private sectors or public and CSO is sometimes distorted by distrust. The two sectors are often presented as being on two opposite sides – one focused on profit making and the other on social goals. This tension between the

public and private sector is also reflected in OGD despite the private sector's critical role driving the demand-side of OGD and as an intermediary/infomediary (Jetzek, 2012). Tension is also seen in balancing government and governance for example in the participation of civil society organizations. Although CSOs also drive the demand-side of OGD, ultimately the government still wields a lot of power especially in the absence of mechanisms and policies that encourage more participatory governance. In emerging economies of Africa, public-private partnerships are just beginning to be implemented and are gradually gaining acceptance across sectors.

A third area of conflict is in the distinction between government and politics. The blurred borders mean that OGD will depend a lot on political goodwill and who is in power. Again, the assumption that government sees the value of OGD and is willing to release its data accurately and in a timely way comes into question. Information (data) is seen as a source of power especially in countries where governments have traditionally been secretive and wary of divulging information to its citizens. The ability of information to give citizens and CSO organizations a channel to questions its activities is viewed more as a threat because some political careers depend on information asymmetries (Hogge, P.15, Gigler n.d. p.23). In addition governments are constrained by some of the very challenges that transparency and accountability would reduce such as corruption, nepotisms and so on. Although the current Kenyan government that was elected into power on March 2013 has deployed technocrats to head ministries of government, the view that politics and government are inseparable is still deeply ingrained in the public sector culture and systems. This together with a culture of secretiveness found in traditional bureaucracies creates a "passive resistance" towards OGD (Gigler n.d., p24). Public servants are oriented to look inward and work in silos even amongst themselves as government agencies. This view is not only shared by the public civil servants and officials, but also by the wider public. This raises questions of legitimacy of data or information in general that is released from government. This distrust in government in an OGD ecosystem, where government is the supplier of data is highlighted by Govlab Research (2013); Ubaldi (2013). Despite the distrust, the responsibility of opening up government data relies almost entirely on government.

It is clear that although technology has 'disrupted' how governments communicate and release information, the application of information and communication technology to the development agenda depends on political goodwill and priorities. The Kenya Open Data Initiative's launch depended a lot on political goodwill. The then champion of Open Government Data, a government official himself, faced difficulties in acquiring data from the government ministries and agencies although he had approval for the initiative directly from the president (Majeed, 2012).

A culture of government secrecy

Traditionally governments are known to be secretive, highly bureaucratic and "inwardly oriented" institutions (Gigler et al., 2011 p.19). At the same time, they have been and continue to be the custodians of public sector information and data, therefore gate-keeping what becomes public and what does not – the case being no different for Kenya and other developing countries. This implies that OGD's effectiveness must start with an open system of government or a government that subscribes to the principles of openness. Specifically OGD relies on an "invited space" (Wojcik, 2012 p 128). Government enables broader access to data and information and equally provides opportunities for participation, which Meijer et al. (2012) refers to as 'vision' and 'voice'.

The meaning of 'openness' of government includes the extent to which citizens can monitor and influence government processes through access to government information and access to decision-making arenas (Meijer et al., 2012; Wojcik, 2012). Government should not only open up its information or data to its citizens but also itself as an institution where citizens can 'get in' and actively participate. It requires a transformation of the public sphere such that institutions and peoples open up to varied actors and discourses (Ritzi, 2014). This requires a willingness to change traditional government's secretive culture and organization.

Bates (2013) highlights the closed nature of government institutions as a reason for poor implementation of OGD terming them "institutional firewalls" that protect the interests of the powerful in society who fear the possible disruption of their activities by OGD (pp.135-136). OGD may exist in a closed, undemocratic system but it will not thrive and its impact will be thwarted by the very same agencies that implement it. More optimistic opinions will downplay the significance of an open government

system for the success of open government data. In reality, such contexts are the ones that are in need of open data in order to encourage more transparency. Research indicates that more democratic governments have more returns on OGD initiatives (Tinholt, 2013).

Financial challenges

Open Data Initiatives are not intended to be an extra budgetary expense nonetheless there is need for resources to implement the initiatives. Opening data requires an upfront and long-term investment in IT infrastructure, policy changes in law, regulatory frameworks, processes and human resource. For instance: the OGD technical infrastructure will need regular upgrading and maintenance; the collection, conversion and publishing of data so it remains open (timely, accessible, consistent and accurate) needs resources to sustain; and activities geared towards creating awareness within government and engaging citizens and target groups such as hackathons, app challenges, and conferences to create awareness will all need funding. OGD initiatives need to identify funds to maintain the initiative from the time of planning.

In light of the constraints/barriers often associated with technology and innovation uptake and use in developing countries such as digital and literacy gaps, lack of infrastructure and sufficient funding, researchers seem to agree on the fact that application of OGD in developing countries will differ from initiatives in developed countries and hence research into these initiatives must reflect this.

Sustainability and Impact of OGD Initiatives

The development and uptake of OGD worldwide has been, to a large extent, successful. Data has been available albeit in non-digital formats and the growth of ICT introduced more innovative ways of collecting and storing data. So far anyone intending to open up data, government or otherwise has enough options of platforms to choose from and can benefit from lessons learnt in other countries. A strong pool of OGD advocates also exists and research in this area is steadily growing. How does a sustainable OGD ecosystem look like and what does it take to nurture or build one?

The main challenge seen today is not so much in opening (government) data but rather in sustainability of OGD initiatives. This research posits that the sustainability challenge is closely linked to value and impact. Seeking ways to add value to OGD and to secure impact is a starting point for sustainability. The sustainability challenge just like the challenge of ensuring value and impact may be a bigger challenge for OGD and therefore more evident in government-led initiatives as compared to open data initiatives from private sector or NGOs. For example unpredictable changes in government and lack of resources are some factors that may starkly affect governments.

A conducive OGD ecosystem exists where a community is built and developed around OGD; one that is able to generate economic, social and political value. "Data catalogues around the world have launched and then realized that they now have to build a community of data users" Torkington (2010). Ultimately, it is not enough to just publish data online, this is the first step. Sustainability and realization of value of an OGD ecosystem depends on the existence of all elements within a conducive and supportive environment. They ecosystem should have sufficient laws that protect and regulate the end-user of data, the businesses built around OGD as well as the supplier of data. In addition, the ecosystem should balance the supply and demand of data because not only are the actors interdependent but this relationship also has an effect on the value and impact of the data. An imbalance such as a focus on one element or aspect at the expense of others has the risk of slowing down or stalling the ecosystem all together.

Helbig et al. (2012), highlight challenges of narrowing the focus in an OGD ecosystem. Three approaches that could limit the impact of OGD are a focus on political and social results, a dataset-centric and a technology cantered approach. When governments focus on data, they supply more and more data and expect that this will lead to the desired impacts. Data dominates in the OGD ecosystem at the expense of the other elements and governments feel accomplished supplying open data regularly. Davies (2010) explains that for governments this is "politically attractive" and can be used as a strategy to show evidence of good governance (p.8). In this case, communities are harder to build and there is also a risk of creating a data-divide and eventually an information gap. Bigger institutions and corporations often with more resources and capacity to make sense and harness data to their

advantage greatly benefit to the disadvantage of those with fewer or no resources (Fioretti, 2010; Heusser n.d.). Immediate impact evident in such an ecosystem is an increase in economic activities arising from data mining and exploitation mostly by business and entrepreneurs.

On the other hand, opening up data and focusing on the technology also undermines the value of open data as evidenced in the USA where this narrowed focus amounts to websites holding data with little or no significance. Helbig (2012) notes that, despite the effort made on using the best platforms or technology, most of these initiatives give little attention to the quality of data, the users or the content. The possible immediate but short term impact is that this may attract technology enthusiasts and entrepreneurs whose interest will wane when the quality of the data is not sustained because what they need and use is the data and not the platform or the technology. This is not to downplay the importance of a good, updated and solid platform rather it highlights that the initiators should focus more on how best to derive value from open data. Literature on different OGD strategies indicates that for such open data initiatives it was easier for them to deal with the technology and the data and then focus later on the users. Many initiatives including the Kenyan OGD initiative were quick to launch first. The stakeholders involved in the conceptualization and implementation took advantage of available datasets to first publish and are now coming back to strategize on how to ensure sustainability and use of the initiative. Despite the advantages of working with 'low hanging fruits' sustainability and impact may be compromised with such a start. This leads to an initial success but in the longer term, the 'quick wins' reduce and the interest and use of data diminishes.

Although there is agreement on the importance of creating sustainability and ensuring impact, there seems to be no right and wrong or rule-of-thumb for balancing the elements within the ecosystem. Helbig et al. (2012) states that some initiatives focused on the wider-reaching political and social outcomes and ignored the technological aspects necessary (p.9). The challenge is for governments to balance all three approaches within their OGD ecosystems. Literature and research focus is beginning to move away from looking at technology-centered aspects of OGD to more user-centered aspects in an effort to answer the sustainability and impact question. As more OGD initiatives mature, less worry and concern is

concentrated on data and technology as the fundamental lessons have been learnt. Advocates of OGD are encouraging governments opening up data to consider not just data and technology enthusiasts and entrepreneurs but also the wider public. There is also consensus on strengthening ecosystems using the following suggestions especially when taking a user-centered approach:

1. Seeing the bigger OGD ecosystem: understanding the diversity of users and their varied needs within the context of dynamic technology and the influences of social and political relationships within the ecosystem, (Zuiderwijk et al 2012. Helbig et al, 2012).
2. Governments should adopt 'strategic ecosystem thinking'. This involves identifying the main stakeholders within the ecosystem, the nature if interactions that takes place between them, identifying what resources they need for engaging them. (Harrison et al 2012, p. 910).
3. Because of the diversity of the users, the OGD ecosystem should encourage interconnectedness and exchange of information. (Zuiderwijk et al 2012, p. 160-170.) A sustainable OGD should enable all actors to have the ability to 'talk' to each other. These interactions reduce the dominance of one element over the other. For example in contexts where the citizens have little or no trust in government, the validity or accuracy of government data may be questioned hence limiting use. Interactivity contributes to sustainability by providing continuous feedback between the actors. The end-users of data can give direct feedback to the infomediaries and intermediaries on which data/data products are most useful.

Measuring Openness in Government Data

This chapter has demonstrated that OGD is a process of democratizing government information positioning it at the nexus of access to information, participation, ICT and (good) governance. It involves publishing data into specific formats that make it easier to access, easier to interpret for various target groups and easier to redistribute. However, the relevance of OGD in its strict definition to the targeted users besides the technically savvy groups remains contentious. How does OGD generate political, social and economic value? There are still many gaps in

establishing the linkages between OGD and increased citizen participation, transparency and accountability. Further, there is little empirical evidence to show that government is effectively involving 'data-savvy' citizens and thereby resulting in better government decision and policy-making.

This research argues that it is difficult to establish the impact or benefits of OGD without first establishing its use and understanding who the users are, why and how they use OGD in relation to the anticipated benefits. It proposes to take a step back to first understand who uses OGD and under what conditions all of which form the basis for evaluating impact. The logic is that one needs to understand what or who drives OGD first in order to establish and understand impact.

General research on OGD has not given enough attention to the context within which OGD operates. Context is often mentioned as critical in evaluating OGD, however this is hardly described in detail or expounded on. Sometimes these are described as challenges or enablers and barriers. Although these contextual factors may not be unique to developing countries, this research argues that appreciating the contextual factors at play in an OGD ecosystem explains the expected or emerging impact, especially in developing countries. These contextual issues raise questions not only on what the possible impacts of OGD could be but also on the relevance of OGD in developing countries. Indeed the hope by advocates of OGD is that it will reduce corruption in government often more rampant in developing countries and drive the much needed economic value through innovation and other ways of harnessing OGD. This in itself is already a unique context for implementing OGD and against this backdrop other contextual factors that are also at play.

The next chapter therefore has two objectives: to establish the theoretical and conceptual foundations that seek to understand the connection between OGD and the benefits or value of OGD using the participation theory lens. OGD use is expected to promote greater citizen participation. Participation theory already explains why and how OGD is able to move beyond just being informational and transactional. Applying a participation framework may go a step ahead to meet this research's objective to explain why and how OGD use could contribute to decision and policy-making in government. Secondly this chapter will explore with consideration for the context within which OGD exists and participation happens

resulting in a comprehensive theoretical and conceptual proposal for understanding OGD use.

3. CONCEPTUAL FOUNDATION

Opening up government data – an ecosystem understanding

Beyond publishing data online and the technology needed to do so, several other factors play a role in either enabling or inhibiting OGD. Gurnstein (2010) and Rahemtulla (2011) state that open data is often initiated in contexts that have inequities and which differ one from the other. There are models and metaphors that have been suggested and adapted to explain the relationships between OGD and the factors that either enable or impede it. Existing literature presents models depicting different interpretations of OGD actors and their roles as well as OGD use and value-chain. Some describe it simply as a 'system' (Helbig et al., 2013); or 'model' (Albano, 2013); and others as the OGD ecosystem (Davies et al., 2013; Harrison et al., 2012; Craig n.d.; Mutuku & Colaco 2012; Alonso 2010; Napolitano n.d.; Torkington, 2010). The different models and metaphors are adapted and created based on different interpretations and perspectives of OGD. Each depicts different elements as dominant or being the focus of the ecosystem. Some scholars stress the importance and interrelatedness of the actors i.e. how they interrelate with one another and their roles in creating value (Mutuku & Colaco 2012, Davies et al., 2010; Craig n.d. & Harrison et al 2012). Other models are more focused on the technology by showing how and what infrastructure and tools to use (Davies Tim n.d.) while others have data and data management processes as the center of interest (Albano 2013; Napolitano n.d.). Of particular interest to this research are those models that apply an ecosystem metaphor and focus on value/use, users as well as context.

Despite the differences in interpretation, some elements are common in all the ecosystems and this will be outlined in this chapter based on an analysis of a sample of the ecosystems. First, a short clarification of a biological ecosystem will be highlighted and why the adoption of an ecosystem metaphor is appropriate for explaining OGD. This will draw on the similarities between the characteristics of a biological ecosystem and OGD and propose an OGD ecosystem model that will be used as a framework on which the analysis of OGD in Kenya is premised. The proposed framework is tested for its applicability to OGD in Kenya during the empirical phase of the research presented in this dissertation.

Borrowing a biology metaphor

Metaphors are used to explain or describe less understood phenomena or subjects. From a biological point of view, an ecosystems approach "recognizes explicitly the complexity of ecosystems and the interconnections among its component parts" (Fisheries and Oceans Canada 2002, p. 36). The use of the ecosystem as a metaphor is frequently used to create an understanding of how the different actors and systems interact and their significance within the ecosystem. It has been used to convey "a sense of interdependent social systems of actors, organizations, material infrastructures, and symbolic resources that must be created in technology-enabled, information-intensive social systems." (Harrison et al 2012, p.904; Osenga 2013, p.42) More closely related to this research, the ecosystem has been used to describe organizations, business, the Internet, innovation and the digital revolution. Table 1 below outlines the similarities between biology and the OGD ecosystem.

Table 1. Borrowing a biology metaphor: Similarity between biology and the OGD ecosystem

Ecosystem - Biology	**OGD**
An ecosystem comprises different components with diverse needs, affected by various internal and external factors in a given environment. The ecosystem implies multiple different entities interacting with each simultaneously rather than being uni-directional or a two-way system. Mutualism is beneficial and diversity is essential.	Within OGD actors, institutions and infrastructures inevitably interact and influence the existence of each other while being influenced by several factor s in a given context. For example, the presence or lack of policy and regulation affect how the actors uses/do not use the data. The existing system of governance and political goodwill towards OGD is key because government is the main supplier of data. At the same time, factors related to the socioeconomical context affects how OGD is used. No matter how much data is of high quality and open, if the social and economic status of the people limits access to data, the use will be limited.

An ecosystem is dynamic with flows/processes/cycles (Garcia et al., 2003, FAO p.8)	Data processing and management follows a certain flow. The value-chain for OGD is also dynamic and flows in different directions between the suppliers and consumers of data. In OGD setting dynamism would be most effective in ensuring multidirectional flow of data and information. A desirable scenario would start from data collection and distribution, lead to data consumption and feedback and eventually this should result in a more engaged public using information to channel back feedback and action to government.
Draws support for intermediaries (keystone species) from ecological studies that showed the presence of mediators who bridge distances. They create value in their ecosystems.	Although this has not been sufficiently discussed in models that adopt the ecosystem approach, this research suggests that the actors who add value to OGD enabling wider usage could be likened to the keystone species. The role of intermediaries and infomediaries in the OGD value chain fit this description in as far as adding value to raw data turning and it into specific and relevant information or services with potential for use by anyone.
The locality within which the different components in the ecology operate is significant in understanding ecosystems. This is known as habitation	Habitation gives rise to specialized local knowledge found in a specific ecosystem that shapes the way technology works. OGD concepts that work in the UK may not necessarily work in another country simply because the elements/factors present in these two countries affect OGD depending on their diversity and intensity. Just as an example, FOI laws as well as an open data law exists in the UK but not in Kenya, yet both have national

	OGD initiatives. In addition the socioeconomic landscape in the UK is different than in Kenya. All these factors affect how OGD is implemented, absorbed in the ecosystem and used. Knowing the context will point towards the use and this can then give an indication of who uses data and why they use data (Garcia et al., 2003, FAO p.8)
An ecosystem ranges in size and scale. Larger ecosystems can therefore contain smaller ecosystems nested within it and exchanging matter and information with each other. (Garcia et al., 2003, FAO p.8)	In more developed/advanced OGD ecosystems, smaller localized ecosystems could exists within a geographical boundary for example OGD ecosystems for towns and cities found within larger national ecosystems such as in the UK or the USA. A smaller ecosystem existing within a larger ecosystem can also be defined according to its function for example an ecosystem nurtured by infomediaries or by users of OGD.

However, using metaphors comes with risks. Metaphors can easily divert attention from the main subject and take over the focus. Depending on the type of metaphor, it may also potentially leave out those without an understanding of the metaphor (Osenga, 2013). Adapting the metaphor should therefore be done with this awareness. An ecosystem does not offer an explanation for all activities within it, even in the biological ecosystem. Not all characteristics can or should be applied and hence the metaphor should only provide a framework for understanding and analyzing OGD. Nevertheless, applying this metaphor to OGD is appropriate because it recognizes the complexity of relationships within the community of actors as well as complexities related to the use of data and technology in the given environment (context). The use of an ecosystem to explain OGD reduces the risk of neutrality and accuracy that is likely with use of metaphors, while still allowing for flexibility. Therefore, the use of an ecosystem allows for the description of many characteristics without compromising concreteness of the specified phenomena

(Kristen 2013, p.50). In the next section, this research explains and applies the basic characteristics of an ecosystem framework to OGD.

An ecosystem framework

The ecosystem framework is also applied in evaluating the impact of participatory governance and to explain how different institutions function (Wampler 2007; Heller 2000, Wampler & McNulty, n.d.). Very similar to the elements in a framework, the different institutions and elements include: 1) government officials (and their political interests), the state, method of adoption (top-down, bottom-up) and level of fragmentation; 2) the configuration and involvement of civil society; 3) institutional rules; 4) the available resources; 5) party systems; 6) interactions between executive and legislative branches; and 7) the economic environment. The aforementioned elements show the diversity and dynamism that exist in any given ecosystem and the need to put into consideration these elements when evaluating OGD initiatives. Having access to large repositories of government data may not generate any value or impact if the surrounding environment – the OGD ecosystem – is not conducive and does not support open government data activities. This raises several pertinent questions. For example: what policies guide how government as the custodian/source of the data upholds open data and open government data principles? What mechanisms in law, organizational structure, policy and regulations, resources, and maybe even in its culture support the release of open data? The fact is that for data to be useful, to be harnessed for transparency, to encourage more engagement and participation by the public, the OGD ecosystem must have structures to support it throughout the process. For example, these structures could be laws and regulations on use, re-use and redistribution of data or provisions that ensure that the data is up-to-date and accurate to allow the participants (the public) to access the correct information.

Literature on the use of the ecosystem framework to explain OGD generally agrees on the existence of four broad groups of elements in an OGD ecosystem. These elements, which Lock & Sommerville (2010) refer to as 'key ingredients', are necessary for a conducive and sustainable OGD ecosystem. These four groups of elements are: data, technology, actors/community/stakeholders, institution/organizational elements and policy/legal elements. These elements have

mutual relationships in their specific social, economic and political contexts. For example, the government and the data they possess needs technology entrepreneurs just as much as technology entrepreneurs need the government to open up their data. Businesses that rely on OGD also have the same mutual relationship with the consumers of the technology developed from OGD e.g. applications, maps and so on. This implies that appropriate organizational and institutional frameworks need to be developed or revised to make OGD sustainable and enable it to generate the desired value. The ecosystem framework approach has been adopted in various forms by several organizations to explain OGD. For instance, The World Bank Group adopted the framework in developing the World Bank Open Data Readiness Assessment Toolkit. The focus of the toolkit is on the actors (academics, media, technology entrepreneur, government and the wider public). The toolkit recognizes the multiple roles government plays in supplying data, using data and engaging the stakeholders.

The context plays a crucial role just as much as the main actors do. This sometimes blurs the lines between factors and elements. In the ecosystem framework, OGD is understood as existing in a setting focused not only on the technology needed to put data online but also on how the different elements interact with the technology and with the other elements. The interactions between the elements themselves and with the contextual factors take place on multiple levels and at different stages in the flow of data. For instance, the economic factors affect the ecosystem multiple-fold. In the conceptual and implementation phase, the initiative requires finances to get started as well as to keep running. On a different level, the economic status of the actors such determines if and how they use the data. For instance are they able to afford access to the computers or smartphones in order to view or obtain the data or the by-products of data such as mobile applications? To add onto this complexity, in the case of OGD, the availability of funds to finance OGD initiatives is often dependent on political goodwill among the political elite who make decisions around expenditure of public funds.

Using an ecosystem approach offers a macro and micro-view and allows this research to illustrate these complex relationships where the government (the state, state agencies and civil servants) plays multiple roles sometimes in contradiction. Its roles as the source of data, users of data, conveners of data users as well as regulator

could sometimes work against the success of OGD in reality. This chapter will draw from ecosystem characteristics in ecology/biology domain to illustrate how the ecosystem framework applies to OGD. In the following paragraphs, the different components and contexts within the ecosystems framework will be outlined. Additionally, the roles of the different components in the ecosystem and the interactions between components will be discussed. Using the ecosystem framework, Kenya's OGD ecosystem is further tested, verified and described in detail in the empirical stage of this research.

The proposed ecosystem framework is a normative proposal on OGD initiatives developed from different theories and literature review. The components in the framework are subdivided into those that fall under the core and periphery ecosystem as outlined in Table 2 below.

Table 2: Core and Periphery ecosystem components

Core ecosystem	**Peripheral ecosystem**
Open data component – data that complies to open formats	Socio-economic context component e.g. literature levels
Actors – the people/communities using the data	Policy and legal frameworks component e.g. FOI
Technical component e.g. the platform	Institutional and governance component such as political will
	Exogenous factors component such as donors and development partners

The core ecosystem consists of elements without which the ecosystem would not exist. It would be impossible to have OGD without data. A lack of data would automatically collapse the system. Technical resources are needed to make data accessible and available in the correct formats. In contrast to peripheral ecosystem elements such as the laws and policies, these elements are described as core because these are what any user would directly interact with, at least in the first instance.

Elements at the periphery affect and are affected by how users interact with the data and the technology but from a user's perspective, these are elements that one may not come into direct contact or engage with. These are sometimes referred to as "environmental factors" such as policy and legal factors, social and economic factors, and organizational factors among others (Gigler, 2011, p.16). The OD barometer, an initiative that presents analysis of the prevalence and impact of open data initiatives around the world, describes these as dimensions of open data where the main variables are the government, citizens, CSO and entrepreneurs/businesses (Davies, 2013).

Exogenous factors are often not mentioned although they influence the ecosystem. Examples of exogenous factors are OGD ecosystems in other countries or cities, organizations and donors such as the World Bank Group. For example the US national OGD initiative is often recognized as emblematics to other initiatives having a 'peer-pressure' effect on other countries. The US initiative has also assisted other initiatives such as the India Open Government Data initiative. Other organizations that play a similar emblematic role include the Open Knowledge Foundation and the World Wide Web Foundation.

The proposed ecosystem framework, illustrated in Figure 2 is user-centered focusing on the user as the central element interacting with data and technology within a set of contextual factors/elements.

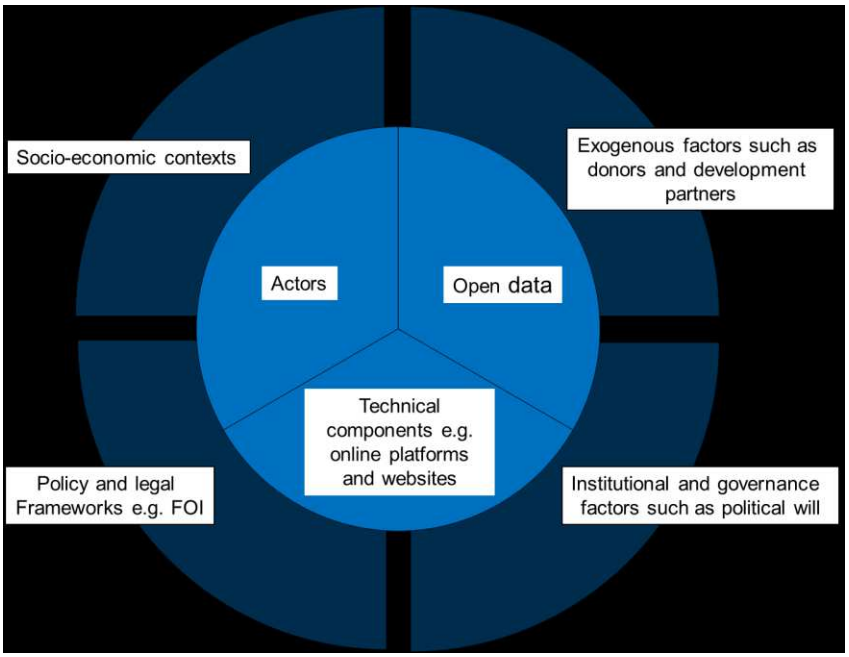


Figure 2: The OGD Ecosystem

Core ecosystem

The Technology

A big part of successful OGD implementation depends on the technological or Information Communication Technology (ICT) infrastructure available and the extent to which this infrastructure supports the OGD within a given context. This means that technology should play an end-to-end role from data collection to data use/re-use. Zuiderwijk et al., (2012) analysed three European open data infrastructures and realized that their functionalities range from: creating data; formatting and uploading open data; facilitating access to data; enabling use, re-use, re-distribution, feedback and monitoring of data (p.167).

In considering the ICT infrastructure, one should consider aspects that will affect access, use, re-use, distribution and re-distribution of data and data products and outcomes. Appropriate software and hardware that allows for standardization of collected data, access to API, metadata, whole datasets and machine-readable data form part of the technical considerations when building a platform.

Beyond the technology that is the online platform on which open data is published, the human resources and technical know-how play key roles just as the local supporting ICT industry does. The local ICT industry creates a conducive

environment and drives the demand for data. Available know-how is also critical in delivering a platform with quality data. Other factors that are centered on ICT and contribute significantly in the ecosystem include:

- Existing broadband and Internet penetration in the country/town
- ICT penetration – access to software, hardware

Literature on the role of technology in OGD suggests that, while technology plays an important role in OGD, the use of technology as an online platform to distribute data especially to the last mile is not entirely indispensable. Research from the World Bank in Indonesia and Kenya has shown that the platform may not be as essential as it was earlier suggested (Lee & WB white paper 2013, Fioretti, 2010). Jetzek et al (2012) in establishing the value of OGD have shown that technology is not so much a barrier to realizing value of OGD because even in countries with advanced technology; the use of OGD is not as widespread as expected and it still remains untapped. This suggests that challenges associated with Internet access and the digital divide should therefore not stop the development of OGD. Rather, the need for technology should be considered during planning and implementation of OGD initiatives and where necessary, ways to circumvent the absolute need for technology sought. For example 'middlemen' in the form of intermediaries/infomediaries can be introduced to the ecosystem to link those who have access to data/internet and data literacy with those who do not through options such as mobile phone, text and SMS use and thus solve the challenge brought about by the lack of adequate technological infrastructure.

Subsequent steps to ensure an effective OGD may require that key stakeholders include offline channels of interaction. An example is 'Question Box' which is a mobile phone tool that allows users to call or message operators who have access to a database of information on health, agriculture and education (Jetzek et al, 2012 p.7). However, with the introduction of middlemen, questions on verification of data (data by whom) and credibility of OGD (if this is still defined as open government data) may arise. Additionally, the presence of middlemen may introduce extra costs to the end-user and may create new divides as a result of differences in socio-economic status of the end users. As such, there is an increasing sense that a more holistic approach to the implementation if OGD is required - one that is not centered

on the development of infrastructure (technology) underlined by the mantra of 'build it and they will come' but one designed and implemented with the users in mind (Ubaldi, 2013).

Still these inequities exists differing from one context to another and greatly influence the publishers and users of OGD. For example, if there is no budget and human resource to publish open data, it is likely that an OGD initiative will not be consistent in publishing and may eventually cease to exist. On the other hand, if the users have little or no digital or data literacy, no matter how good the data is, the impact will not be evident if there is no one using the data. Overall other contextual factors within the ecosystem have a profound influence on the relevance of technology to OGD (World Wide Web Foundation, 2012, p.3). The Web Index results for 2012 show that use of Internet and technologies in general may not be driven by the absence or presence of technology but more from the user's need for a certain technology or products and services created from it. According to the Web Index 2012 results, in North Africa approximately 40% of the population uses the web, much lower than in countries with more robust infrastructures (World Wide Web Foundation, 2012). Nevertheless, it experiences greater impact especially politically than most countries with better infrastructure and better Internet penetration (World Wide Web Foundation, 2012). The influence of other contextual factors on the relevance of technology to OGD raises questions on what technological infrastructure would be most appropriate for OGD in developing countries such as Kenya. It also points to an important consideration – that of the need to focus more on filling a gap using open data and appropriate technology and less on technology-centered OGD implementation strategies.

Data

The combination of the words open, government and data introduces multiple perspectives when defining open data. Open data are "all stored data which could be made accessible without any restrictions for usage and distribution" (Halonen 2012, p.18). The Open Data Handbook defines it as "… data that can be freely used, reused and redistributed by anyone subject only at most, to the requirement to attribute and share alike" (Open Data Handbook, 2016). This can be education

material, geodata, statistics, traffic data, research publications, and government spending data but does not include personal data.

More comprehensive definitions dissect the description 'open' in open data as having a technological and legal aspect (technically and legally open data). These aspects imply that it must be accessible to potential users without technical or legal barriers. Technical openness means that data must be formatted in ways that allow use, re-use and redistribution while legal openness applies a licence for re-use and re-distribution without restrictions on how it is used and who uses it such as a freedom of information law or open data licence as is existent in the UK (Yu & Robinson 2012, p.188; Halonen 2012).

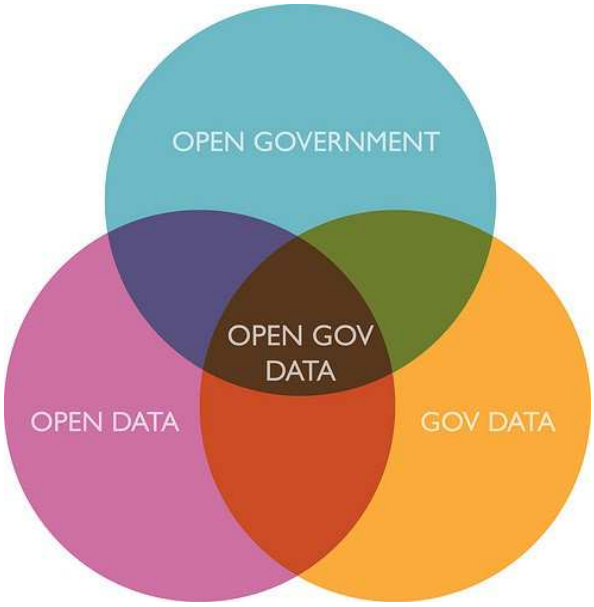


Figure 3. Defining Open Government Data (Grimes, 2012)

In an ecosystem data is the core component of the ecosystem. Similar to users who can also form an ecosystem of users within the larger OGD, data can also be viewed as a system or a process within the ecosystem (Zuiderwijk et al., 2012). However as the debate shifts towards the emerging impacts of OGD, there is a general agreement that value will not be realized from raw data alone. The assumption is that numbers or statistics available on an electronic file can be translated into information or knowledge that can be useful to everyone. Dawes (2012) presents a different view of the revolutionary optimism of open data by questioning the quality and uniformity or standardization of data and arguing that the data is not usually generated with public use in mind. Dawes (2012) states that often, different government agencies

will “use different techniques to collect data, representing different time frames and geographic units” (p.5). In addition to meeting open data standards, data should be accurate, relevant and timely. This argument resonates with Davies (n.d.) calling for increased standardization of data.

Still these attributes of open data are not sufficient on their own to drive use and value. Dawson (2012) states that OGD initiatives claim an unstated assumption that raw, structured, machine-readable data in electronic formats is superior and better suited than other forms of information such as datasets available offline. This narrowing of OGD and the attention on structural numerical forms may be irrelevant for the end-beneficiary (p.2.)

On the other hand, this kind of data – raw, structured, machine-readable and in electronic formats – is exactly what developers and technology entrepreneurs (in both public and private sectors) need in order to create value from the data. Several issues arise here: who should be the focus of OGD as the primary users? Unfortunately, the government has the task of serving a heterogeneous group of users both technical and non-technical users. A possible solution would be that government provides data that meets the needs of both the more technical as well as the less technical users. Unfortunately not all governments have these resources to develop maps, visualizations and apps effectively and at the same time offer quality data that meets open standards.

There is general consensus that data quality (the breadth, accuracy, recency and availability of data) matters and can inhibit value generation of the data. The significant influence of data quality on the use and re-use and thus the value of data has been established by the Capgemini study (2012). Where supply does not meet demand either in quality or quantity of data, it becomes challenging to sustain the ecosystem because there is no value generation from data. The OD Barometer 2013 also indicates that out of 113 datasets that were already meeting open data standards, researchers found 35 whose sustainability of use was in question as these were not up-to-date. For example the private sector will build businesses around open data if they are assured of its openness, quality and availability.

The observations made around data quality build on the argument that publishing data is not enough. The quality – the accuracy, the timeliness, the availability, access

and appropriateness of the data can make the data useful of useless. Data also needs to be consistent in order to lead to increased efficiency as well as drive economic value. Jetzek et al (2012).

Actors

The United Nations Economic Commission for Africa (UNECA, 2015) comprehensively describes actors as a community or a group of people with the similar interests, which could be social, economic or professional across the entire data value chain from its production, management, dissemination, archiving and use.

In open data literature use of open data and OGD are directly related to how much and what kind of value they generate. OGD is a resource for the private sector, public sector, civil society organizations (CSO) and the citizens in general. These are the actors or groups likely to experience change through OGD use and activities. An important step when considering use and users of OGD is establishing what their data/ information demands or needs are especially in relation to government data, which channels they mostly use to seek and receive government information and, importantly for OGD, what skills/capacity are needed to use or re-use OGD. Gould et al (2010) point out that identification of needs and how best to meet them is an even bigger problem than the lack of information in developing countries.

Each of these actors within the OGD ecosystem has different data needs and uses; hence each requires different data in different formats. Government will make use of statistics and numbers, the general public would prefer less statistics and more applicable numbers and secondary data to enable them participate and engage more with the government on relevant issues for example the number of schools in their counties, how they perform, teacher-student ratio, tuition fees and so on. The innovators and information technology (IT) specialists will make more use of raw data. The business community would most likely be interested in the re-usability of the data whilst the civil society would be demand more data that reveals activities of the government. Civil society views OGD as a sign of transparency, accountability and good governance. Data that would be of interest to them include government spending, government revenue, and salaries to politicians and civil servants and

similar data that would enable them hold the government accountable to their electorate.

The above description is based on the idealistic assumption that governments will willingly and consistently supply data, users will readily use, re-use and apply data in various domains (health, transport) and this will lead to impact. The validity of these assumptions vary from one context to another and depend on several variables that exist in an OGD ecosystem. Data intended for public use should make sense to the public and be useful to them too. A series of numbers published online enlisting the number of schools in a country may on one hand make sense but not be useful. As O'Reilly (2010) argues: "When government data is made available as a set of web services rather than a set of documents, computer applications can process that data, draw meaning from it, and make it relevant to the daily lives of citizens." Ubaldi (2009, p.18) reinforces this argument: "pushing out data is not enough to create value" rather designing with end-users in mind would lead to more efficient portals. Ubaldi (2013) further proposes that the public should be consulted to determine which datasets are relevant for them and this then should be released in formats that promote use and re-use.

For the users, particularly the private sector and the general public, value is derived by going beyond the datasets. Information promotes innovation and the entrepreneurs can use the information to start, develop and grow business. Ubaldi (2013) states that the value of data is in adding value to the data because the private sector is expected to exploit data for commercial purposes. Research from Manyika et al., (2013) claims that, globally, there is a possibility to generate between $3 trillion - $5 trillion a year additional value as a result of open data.

The role of intermediaries and infomediaries

Leadbeater (2011) argues that "government does not have the skills needed at the scale required" to effectively harness data (p.17). Actors such as the media, civil society organizations (CSOs) or technology enthusiasts usually have the capacity to interpret the data as it is originally availed by governments as numbers and statistics and present it to the general public in different formats such as through the development of applications or journalistic reports that are informed by data. These actors are often described as the intermediaries or "info-mediaries" and are viewed

as actors who add or create social and economic value to data in what Davies, Perini, Alonso (2013) describe as the "standard model" in developing countries (p.6). The fact is that neither government nor the actors on their own have the resources to effectively take advantage of OGD and the collaboration between government and other stakeholders or actors to deepen the use of OGD is encouraged. Akin to the biological 'keystone' species, intermediaries and infomediaries are crucial in bridging the data-divide as well as the digital-divide. Leadbeater (2011) refers to them as the "civic long tail of people" that governments, keen on the successful implementation of OGD, cannot afford to ignore because "government does not have the skills needed at the scale required" to effectively harness data (p.17).

A key strength to the argument on the importance of informediaries and intermediaries is the realization that 'it is not enough to publish'. This realization is informed by the fact that in order for data users to generate value out of data, they need to have a certain level of knowledge and technical skill to interpret data into meaningful information. In the absence of this knowledge and skill, intermediaries are needed to translate data into useful information to the public. Deloitte (2012) proposes that wider outcomes are realized after new products and services are derived from data. In the OGD marketplace the intermediary plays a key role between the suppliers and the consumers of data, converting raw data into impact by enriching data.

Interestingly, intermediaries and infomediaries can concurrently act as sources of data and consumers of data in what is referred to as an 'open data marketplace.' For instance, CSOs play the role of user, producer (generating data), intermediary and as advocates by keeping the government in check and pushing the OGD agenda. An example is in Uganda where the involvement of international non-governmental organizations (UNICEF) and civil societies as champions of OGD has seen successful effort (CIPESA, 2013). "Civil society occupies an important third space between the state, the market and the individual, in which people can debate and tackle issues directly with governments. While lacking the regulatory power of the state and the economic power of market actors, civil society wields power through its networks of people" (Rahemtulla 2011, p.34).

The Non-Government Organizations (NGOs) and CSOs can also leverage on their

relationships with governments in persuading them on the importance of OGD and even explicitly supporting OGD initiatives for example Datos Publicos in Argentina and the World Bank in Kenya and Moldova. An example of such collaboration is the Code4Kenya pilot program where the government, NGOs and the private sector joined together to create an awareness of open data and its potential use within their organizations. The program was a push from these different stakeholders to accelerate use of data and participation by the general public. One out of the four programs was by Twaweza (CSO), Ministry of Education (government), Africa Media Initiative (Media, CSO), iHub research (not-for profit) and individual technology experts. This resulted in an application (app) called findmyschool. Using data from the government, it provides users with information on schools in Kenya according to location, performance and so on. The information is presented in visualized, easy to understand forms. This encourages more participation of the general public, re-use and generation of new meaningful data. It drives demand for data as all actors including citizens experience the significance and use of OGD. Additionally, it provides vital feedback on data usage and even on educational issues to the government. Here the CSOs and the not-for-profit organization bridged the gap between government data from the Ministry of Education and the wider citizens for example parents looking for a suitable school for their children in a specific county/region. This example shows the bridging role of the intermediary between the suppliers and the consumers of data, converting raw data into impact by adding value in form of visualizations, maps or apps.

There are also examples of the value-addition role of infromediaries in developed economies. For instance, in the US, it is estimated that the use of data could generate economic value of up to USD 300 billion annually in the health care system (Jetzek et al., 2012, p.3). In Europe's public sector, it is estimated that intermediaries contribute to the generation of economic value of approximately EUR 250 billion annually" (Jetzek et al., 2012, p.3). Ubaldi (2013) puts it well: "competitive advantage has to come from offering innovative value-added services on top of data, and providing opportunities for business start-ups.

The role of intermediaries in the ecosystem brings along with it some complexities. The ecosystem framework assumes that intermediaries are always available and willing to innovatively put public data to use. A critical complexity is on the

objectivity of the intermediaries entrusted with interpreting and presenting data to the wider public. Despite the clear advantages of intermediaries/infomediaries their ability to analyse and report information to the end consumers – the citizens – objectively will always be in question. The process of analysis involves filtering, selecting and interpreting data in a way subjective to the one doing it. Intermediaries, depending on who they are and what their motivation behind using OGD is, will interpret and present data that will have a certain value e.g. civil society and NGOs might have a specific orientation or bias depending on their desired objectives and outcomes for example transparency and accountability (Ubaldi, 2013). The question to ask is: who is interpreting the data and what is their motivation? The answers to this question will enable end-users verify the processed data and interpret the presented data in the correct context.

This trend may also lead to negative impacts such as rise of a digital elite where only a certain section of users have access to the raw data and are therefore able to subjectively re-use, or manipulate the data (for propaganda), blurred accountability (data curation by whom, for who and how?), privacy and data security issues among others (Ubaldi, 2013). Who, how, and when data is collected and published should be guided by laws and policies. Policies should be developed or adjusted to promote open data processing right from data collection and curation to data consumption and storage.

Unlike other sources of data, government's data in general is valued for its reliability, scope and comprehensiveness (Lakomaa and Kallberg, 2013). CSOs, citizens and private sector players like the media will be motivated to look for data that works therefore governments should not view opening data as an end in itself but rather as a means to many other ends such as innovation and business growth. Sustainability and demand for data will be driven by evidence of data that has made an impact for example in seeking justice or confronting public authorities without fear of repression of users and under the protection of adequate laws.

Periphery ecosystem

Institutional and organizational factors

In an OGD initiative, the Government has a dynamic role as the source of data, the consumer of data and in some contexts as the convener of users. Governments especially in developing countries cannot successfully accomplish all these roles. Often, governments in these countries will only fulfill the task of setting up an initiative and will likely not have the capacity to carry out awareness or outreach activities. Despite these shortcomings, governments being the central institutions responsible for implementing OGD initiatives, significantly contribute to the success of OGD initiatives from the point of data collection to realizing impact. For example, governments are responsible for the formulation of policies and laws around OGD and it's financing, which affects the implementation and eventual impact. Similarly the system of government and how this reflects on the relationship between the state and non-state actors also plays a role in determining participation and collaboration, which are key to OGD success.

Government as a 'prosumer' and Government as a platform

Government's multiple roles are however discouraged by some advocates of OGD. Different approaches have been suggested to describe the role of government as an institution in OGD practice. Two opposing positions stand out: some argue that government should just publish the data and leave it for other stakeholders such as the private sector to re-use and create value from it because "government's role produces undesirable limits …" (Robinson et al 2009, p.163). Another group of advocates insist that government must go beyond publishing data and initiate engagement between the data and the targeted users especially the wider public for whom it has a public service obligation (Leadbeater 2011, Eaves, 2009). Although there is no agreement on the role of government in an OGD ecosystem, its impact on the use and re-use is undisputed because it is the main source of the data as well as the policies that guide open data initiatives. This can have a negative effect on the release of data because governments are known to be ''bureaucratic'' and ''inwardly oriented'' (Gigler et al., p.19). They have and continue to be the custodians of public sector information, therefore gate-keeping what becomes public and what does not – the case being no different for Kenya.

Green (2001) further debunks the role of governments as assumed by the ecosystem framework and some scholars: ‘‘the control of information is an index of powering contemporary societies since information allows policy makers and bureaucrats to regulate markets, institutions and individual behaviours’’ (p.78). This addresses an unstated assumption by OGD advocates that governments are ready and willing to open up previously ‘locked’ up information. The OD Barometer 2013 report claims that out of all the 821 datasets evaluated “less than 1 in 10 datasets are published as full open data (71 of 821)”. Even when available, they are not published as fully open but with restrictive laws (Davies 2013, p.14). The OD Barometer as well as the OD Index show that almost all the countries score poorly on availability and accessibility of sensitive datasets such as land and company registries. Governments because of hidden interests and potential of losing face or political popularity if exposed will not easily release datasets that are politically sensitive such as land, company registries, budgets and expenditure. The OD barometer scores for these specific datasets fall between 21.6 and 13.6 out of a possible 100. (Davies 2013).

Data should foster interactivity and have a focus on or linked to policy-making (Jetzek et al., 2012 p.5). For this reason, Eaves (2009) argues that “forward-looking governments and institutions – those that want an engaged citizenry, a 21st-century workforce and a creative, knowledge-based economy in their jurisdiction – will need to reach beyond the developer community and get their citizens using, visualizing, writing about and generally engaging with Open Data.” This will, it is argued, foster a sense of opportunity among a generation to interact and participate in this wave of innovation and change, thus empowering citizens to improve services, reduces costs and boost productivity”.

Robinson et al. (2009) have a different view of government’s role. They assert that where government has a role, it leads to undesirable limits because government influences the presentation and formatting of raw government data. Government should only ensure data is published in an open way and such that it ignites the public’s interest who then have to drive their own agenda from the information they have. O’Reilly in Lathrop and Ruma (2010) emphasizes the role of government as a “convener and an enabler rather than the first mover of civic action” a role that is left to citizens. This model suggests that government acts as a platform provider and to a certain extent suggests it is enough for government to publish the data using

open standards and thereafter leave it in the hands of secondary parties. This approach discourages the government from helping the citizens participate in any way and further reinforces the significance of intermediaries/infomediaries to add value to the data and connect the citizens to the data. This argument is further augmented by the notion of 'build it and they will come' which implies that those who want or need the data will drive data use, policy and practice (Fioretti, 2010). Although this is true, an inherent risk of this approach is the creation of a divide in data and information and limitation of access to data to the 'digital elite' (Usbald 202 P.18). If the government sets up an initiative such as OGD that is purely web-based with no extra effort or activities to encourage participation then its use and impact will be limited. Fioretti (2010) agrees that data on its own is not very useful comparing OGD to soil that on its own, without the plants germinating on it is not valuable to farmers.

Policy and legal frameworks

Data use and re-use guidelines that are aligned with open data principles should be provided for under the law. "Open government ecosystems are inevitably structured by existing policy and practice contexts which must be managed and reconfigured over time to support new cultures of innovation and citizen interaction" (Harrison et al 2012, p. 909). Relevant OGD policies and laws should be developed or adjusted so that they promote open data from data curation to data consumption. Who, how, when data is collected and published should be guided by existing laws. Often overlooked is the aftermath of data consumption. Sustainability and demand for data 'now' will be driven by evidence of data that has made an impact for example in seeking justice or confronting public authorities without fear of repression and under the protection of adequate laws. CSOs as well as citizens and the private sector such as the media will be motivated to look for data that works. This may have repercussions for example if government faces a scandal and may shy away from publishing more data. However if laws adequately cover data collection and procurement and are open to all, governments will be compelled to open up data to the public despite the risks associated with doing that.

Some of the most widely used pieces of legislation around OGD include Freedom of Information (FOI), Public Sector Information (PSI), Rights to Information / Access

to Information acts as well as Open Data Licences. FOI and PSI are common cornerstones of OGD in many countries although some countries have launched the platform without having these laws in place (Jetzek et al., 2012).

Socio-economic factors

Socio-economic factors affect the demand and supply forces around open data such as: people's expectations, interest and empowerment to engage in government issues, Internet access and use. Most of Kenya's Internet use is concentrated in the urban areas and there is an urban-rural gap in Internet use (Manyika et al., 2013). Exposure to ICT tools and knowledge is limited in rural areas. This is seen in the public's preference for offline methods of data dissemination - meetings, traditional media and other offline channels. Their choice is informed by what they have access to in terms of cost and availability.

One of the factors behind the success of M-Pesa (Kenya's largest mobile money platform by market share) that is lacking in OGD is the fact that users do not have to pay extra neither for the application nor for the phone. They also do not need special skills to use the application. How to achieve broad use of OGD with less expensive and accessible alternatives remains a challenge. The infrastructural improvements that are currently underway in Kenya is one way to improve the situation by increasing access to good quality Internet whilst reducing its cost.

Proliferation of OGD will need more than just improved technical infrastructure. Laying fibre optic cables across the country or having public data online will not improve or change the public's attitude on government information. In a case study exploration on the impact of Kenya's Open Data for effective public participation that focussed on urban slums and rural settlements carried out by Jesuit Hakimani in 2013, evidence showed that 17% of Kenyans agree that OGD has had little impact on the government-to-citizen relationship (Chiliswa, 2013). The public needs to have ICT skills even where offline methods are integrated to the dissemination of OGD. In addition, offline as well as online methods of data distribution should be explored. This will gradually bridge the information divides, encourage more participation and access as most government processes and information become digital and online. The development of ICT skills among the Kenyan population will also discourage the development of other divides such as data divides, participation

divides and rural-urban divides that may arise if the ICT literacy gaps are not addressed.

Socioeconomic factors also affect the supply side of OGD. Just as citizens would not spend money on the accessing the Internet or other ICT tools especially in the face of other basic needs such as food and education, so would any government with meagre resources. If a government were struggling with providing basic services such as health or education to its citizens, it would be unlikely that they would channel their already constrained resources towards ICT tools, infrastructure and skills needed to enhance OGD use.

Exogenous Factors

It is evident that the international NGOs play a significant role in pushing the open government data agenda in developing countries. This could be attributed to OGD's potential value in promoting good governance (accountability, transparency and more participative governance). Organizations such as the World Bank, the United Nations, the Africa Development Bank do not only have their own open data portals, they also offer support to their member countries in implementing OGD initiatives. They also significantly push the OGD agenda in these countries. This support could be advisory, monetary or skills/tools. The World Bank supported Kenya, Moldova and recently Rwanda (open data readiness assessment). Country OGD ecosystems influence each other. The US OGD supported the set-up of India's OGD. Kenya's OGD has also catalysed OGD initiatives in other countries such as in Rwanda who have plans of setting up.

In 2011, 62 countries formed the Open Government Partnership (OGP) as an international union of countries that are committed and working towards open government reforms. For countries to be eligible, they must publish documents in a timely way, have an access to information law either provided for in the constitution or as a law (also in draft form), have rules that require disclosure of income and assets of public officials, and encourage citizen engagement and participatory governance (Open Government Partnership, 2013). Participating countries also agree to an independent reporting mechanism (IRM) to track progress.

Overall, the ecosystem framework provides a useful structure in which to discuss, evaluate and study OGD in Kenya. The framework and indeed the correlations between OGD and biology describe the key components of OGD and the interrelations between components. Further, the framework also provides a clear visualization of OGD in Kenya and a conscientious yet comprehensive structure against which this research has identified the key aspects of OGD for investigation. Informed by the conceptual framework described in this chapter, this research investigates OGD in Kenya and, in the empirical chapters of this dissertation, provides new knowledge to the field of OGD and governance.

4. THEORETICAL FOUNDATION

Open Government Data (OGD) is a term loaded with many meanings and concepts as described in the Introduction Chapter. This research understands OGD as having two major sides: a political side and a technical side both embedded in different socio-economic contexts. The research is guided by two main questions:

RQ 1. What is the structure of OGD in Kenya and to what extent does it support OGD in Kenya?

RQ 2. To what extent has the use of OGD influenced public participation in decision-making or influenced policy-making in government?

Other sub-questions include:

- How has the use of OGD influenced how government responds to state and non-state users of OGD in government decision- or policy-making?
- To what extent are the voices of users being heard in policy and decision-making in government because of their use of OGD?

This research therefore draws on the theory of participation to understand the extent to which the use of OGD has influenced participation in decision or policy-making in government by both state and non-state actors. The definition of participation has diverse meanings in different contexts. During the 1980s participation started to become part of mainstream development practice promoted by non-governmental organizations (NGOs) and international agencies such as the World Bank Group. For some such as CSOs and citizens, it may mean empowerment and a change in how government communicates to its public (Wengert, 1976; Zittel & Fuchs, 2007; Kersting et al., 2009; Kersting 2012; Kersting 2014) while for others it may indicate an opportunity to contribute to government processes from the 'bottom-up' (Astrom et al., 2012; Terchek J. Ronald & Conte C. Thomas (Eds.), 2001). For the government and the public sector in general, it signifies trust and legitimization by their citizens as well as political support (Wengert, 1976, Rogers, 2008). Still to others, participation is limited to seasonal political processes such as during elections and voting only as in indirect participation (Schumpeter, 1942; Sartori, 1987).

Zittel and Fuchs (2007) state that the main focus of the participatory theory is for the majority of citizens to take part in decision-making by increasing opportunities for involvement through institutional reform (Zittel and Fuchs, 2007). Participation should directly or indirectly influence formulation, adoption, or implementation of government policies. It is an indication of the level of and quality of democracy (Dahl, 1998; Eisenstadt, 1999). Democratic participation is demonstrated and realized when people have confidence and trust in the participatory process as a public good – this means that they trust that their participation will lead to solutions for practical problems (Rogers, 2008). Barber (2003) states that this is a form where citizens directly participate in government not all the time but often and especially when basic decisions or policies are being decided or power is being deployed for example during elections. It is key to note however, that participation should not only be limited to voting – it should go beyond general elections and voter turnout, which has been claimed to have in the past turned citizens into "disinterested spectators" (Terchek J. Ronald & Conte C. Thomas (Eds.), 2001, p.165; Coppedge Michael, 2012).

A likely relevant and suitable definition of participation for this research is one that describes it as an "overarching category of political phenomena covering all kinds of relationships between citizens and political institutions allowing citizens to elect their representatives as well as to participate in decision-making processes" (Font 1998, p.2). This is applicable to this research because it takes into account the different actors, their interactions and the inclusion of these actors in decision-making processes. It also appreciates that participation includes, but is not limited to, voting and elections but, more in line with this research, is also concerned with decision-making processes.

This chapter outlines a normative appeal for OGD as a democratic and participatory instrument that will enable citizens to be more empowered to contribute more to government decision-making as well as an innovation tool. This research will broadly look at participation with an emphasis on participation in decision-making (Kersting 2008) and access to government data or information enabled by ICT. This

broad perspective is more relevant to this research because it indicates a more direct participation by "providing new arenas outside the traditional representative system …" (Teorel, J., 2006). In some other literature this is referred to as the 'participatory sphere' serving as arenas for "contestations and collaborations," (Cornwall and Cohen, 2007 p.2). In the context of this research, these arenas could be interpreted to be information platforms or channels such as OGD.

In addition, the fact that OGD is not fully matured in terms of widespread national / local development and adoption makes it challenging to specifically investigate participatory governance. A broader understanding of participation and participatory democracy will therefore be more useful in understanding the use of OGD. The proposal is that one cannot have participatory governance if there is no participation to begin with. Only then can one verify whether these interactions, if any, have influenced policies or decisions made in government by non-state actors such as CSOs, private sector actors or individual citizens.

Participation as the cornerstone of democracy

Participation is enshrined in the principles of democracy and good governance. Good governance is defined as effective, democratic form relying broadly on engagement (participation), accountability (control of power) and transparency (rationality) (Misuraca 2007 p.2). Participation of the public or citizens in government is the cornerstone of democracy (Arnstein, 1969, p. 216). Infact it is regarded as the true measure of the success of a democracy (Dahl, 1998; Eisenstadt (1999). In antique democracies, the people (demos) were directly involved in governance and could even be said to be governing themselves. Antique democracy emphasized equality of participation. Democracy can only be achieved through "continuous participation of large sectors of the population in political processes" (Eisenstadt 1999, p.7). The wider the participation, the more varied the opinions and thus a more strengthened democracy (Fuchs, 2007, p.49).

Barber's (2010) definition of a strong democracy suggests that people participate because they believe in the value of democracy. It suggests that despite different users and different motivations for engagement, the underpinning motivation is grounded in democratic values. According to Kaufman (1960), credited with being

the one who first coined the term 'participatory democracy', citizen participation is crucial because it contributes to 'the development of human powers of thought, feeling and action'. Participation should influence "directly or indirectly, the formulation, adoption, or implementation of government or policy choices" (Fishkin, 2009 p.45). Similarly, Pateman (1970, p.42) argues that: 'One might characterize the participatory model as one where maximum input (participation) is required and where output includes not just policies (decisions) but also the development of the social and political capacities of each individual, so that there is "feedback" from output to input.' This definition indicates that roles and responsibilities are two-way such that both parties – the citizen and the government – have a role to play. Citizens will offer their contribution 'input' while government has the role of empowering (developing) each individual with the help of the input provided by the citizen (feedback).

Wampler and McNulty (n.d.) point out that the third wave of democratization may have started the move towards more participatory forms of government. Following the wave, many countries seemed to struggle to implement democratic principles. At the same time representative democracy did not work as initially intended. Instead corruption, elitism and clientelism dominated politics, which led to a push for more citizen participation "to help to cure the ills facing some representative democracies and give interested citizens the right to reshape policy" (Wampler and McNulty, n.d). Therefore participatory governance was introduced and seen not only as a remedy to reduce corrupt power and its associated effects but also as a way of including non-state actors to genuinely and actively participate in policy development (Edwards, 2008). Here, the word 'active' is taken to mean that the ideas, feedback and input of citizens or 'non-state actors' are integrated into policy and decision-making in government (Welch, 2012).

In response governments also started to open up or widen their democratic space by introducing new forms of participation known as invited spaces (Barber, 1984; Budge, 1996; Kersting, 2008). However this was not enough for the dissatisfied people. Invited spaces maintained a top-down approach dominated by political

institutions e.g. referendums. CSOs in turn created invented spaces as counter instruments of participation such as demonstrations. These new forms of democracy are composed of a mix of democratic principles derived from representative, direct and deliberative forms to create a hybrid democracy (Kersting, 2014). Further, they blend online and offline instruments (blended democracy). In this regard, public participation is seen as a bridge between different democracy models and as a means of complementing and synergizing representative forms of democracy with active citizen engagement for the benefit of collective decision-making and action (Zittel and Fuchs, 2007; Hendriks, 2010; Fung, 2006).

Teorel, J., (2006) extends the participatory model by stating that it is the deliberative process by which interested or affected citizens, CSOs, and government actors are involved in policy-making before political decisions are taken, calling it "collaborative problem-solving" (Nanz & Dalfreth 2012 p.2). This participatory democrat's model relates more to this research because it indicates a more direct participation by "providing new arenas outside the traditional representative system …" (Teorel 2006, p.xx). In some other literature this is referred to as the 'participatory sphere' serving as arenas for "contestations and collaborations" (Cornwall and Coelho, 2007 p.2).

These definitions, similar to many others, highlight the involvement of the public or non-state actors in government. Secondly, the definitions emphasize the significance of participation in government as being able to influence decisions and policies beyond voicing opinion or choice. The authors point out that these 'new' actors must be deliberately included or allowed to participate in the 'sphere' or 'space' that was previously and almost entirely dominated by government. In other words government must invite the public into this space by using participatory instruments or creating channels for this to happen. From the definitions of participation / participatory governance, it is clear that both are allied to democracy and embedded in (good) governance hence these concepts will also be discussed in context. Taking these definitions therefore also cuts across different models of democracy although most of the arguments will weigh heavily on participatory democracy.

Nonetheless questions still remain as to whether these arenas are available and accessible and the level of interaction and participation within government and between the government and non-state actors. As Arnstein (1969) cautions, there is a critical difference between "going through the ritual" of participation and having the real power needed to affect the outcome of the process (p.176)

Participation Models

Arnstein's Ladder of Participation Model

Although strongly contested, as a starting point, Arnstein's ladder of participation proposes eight rungs of participation: manipulation, therapy, informing, consultation, placation, partnership, delegated power, and citizen control. The ladder of participation suggests that participation is valuable to the extent that it reduces power from those who wield it by redistributing it to the have-not citizens who need to be deliberately included. The first two levels (manipulation and therapy) are described as 'non-participation' levels while the next three levels (informing, consultation and placation) are descried as 'tokenism' levels where citizens may be heard but lack the power to ensure that their voice is heeded. Higher levels, starting from partnerships, are characterized by increasing degrees of citizen power. Several scholars such as Kersting (2008) do not agree with the differentiation of the categories and have criticized this model (including Arnstein herself) as being too simplistic cautioning that it should only be viewed as a normative model (Arnstein, 1969; Kersting 2008). Particularly challenging for this research, Arnstein's conceptualization of participation does not answer the three fundamental questions relating to who participates, models of communication and decision-making and it does not also clearly show the link between participation and policy / action.

Responsive and Deliberative Models

The responsive model of democracy defines participation as 'an attempt to influence those who have a say in government'. Participatory democrats state that it is to have a say in government while the deliberative model defines participation as a "way of finding out what to say" (Teorel 2006, p. 791). Participatory models proposed by

Pateman (1970); Edwards (2008); Wampler &. McNulty L (n.d.), are characterized by the development of the social and political capacities of each individual to have a voice and be part of the policy process. At the same time, the government is the one that is deliberate in including other actors, provides feedback and is responsive to the newly empowered public. Against this backdrop, it is not surprising that participatory democracy has often been faulted as a failure because of the lack of capacity among citizens to participate. Rogers (2008) argues that on the contrary, the participatory model of democracy has been failed by political, economic and technocratic elites.

Fung's Participation Continuum

Fung (2006) takes into account some of the shortcomings of the earlier models and describes six main modes of communication in terms of intensity – level of investment, knowledge and commitment of participants (Fung, 2006, pg.69). With reference to Fung's continuum (Figure 4 below), not many citizens will have the sufficient intensity to significantly participate hence leaving most of the decision-making in government in the hands of technical experts and technical working groups (TWGs) that are often composed of several stakeholders but rarely include citizens. At best CSOs representing different interest groups participate in these TWGs.

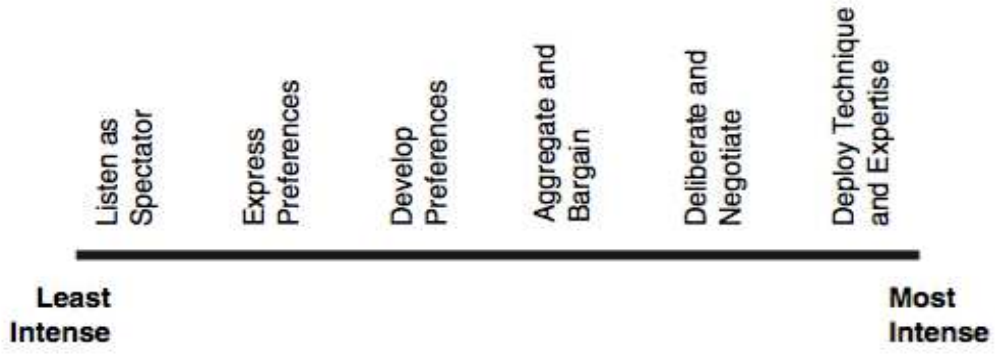


Figure 4: Continuum of participation according to Fung (2006, pg.69).

Despite the great potential of citizens' participation in governance, Fung (2006) asserts that most participants do not expect that their participation will necessarily translate into policy and action. Rather, citizens will participate in expectation of some personal benefits. In this light, Fung (2006) admits "the contemporary ways in which citizens make contributions assume neither the forms, purposes nor rationales of classical participatory democracy" (p.74).

Limited citizen participation can lead to political apathy and disinterest (Rogers (2008) where "governments are confronted by a growing indifference and lack of inertia towards political processes" (Tambouris et al., 2008, pp.000). Smith (2009) concurs with the observation of other scholars that the citizens' trust, support and interest in government has been on the decline as evidenced by reduced participation in political parties and in elections (voter turn out) although he is careful to note that much of the reference made to participation has been with regards to traditional forms of participation. For government this can also serve the purposes of ill-intentioned governments since a disengaged, uninformed or poorly informed public is easier to manipulate according to Fishkin (2009).

Increase in citizen participation is a demonstration of the level and quality of trust and legitimacy in a government. Vetter and Kersting (2003) demonstrate this by suggesting that democratic legitimacy needs input through political participation and output in the form of political efficiency. In instances where participation goes beyond election periods as in participatory democracy (Coppedge, 2012), citizens are transformed from disinterested spectators to active citizens interested and confident in the participatory process. Pateman (1970) similarly characterizes the participatory model using maximum input (participation) and output (policies, decisions).

Chun et al. (2010) discuss the three different stages of e-government (informational, transactional and finally collaborative). The first stage often characterized by a static website with information, the second stage includes simple web-based interactions with government by citizens, businesses and the third stage means shared

governance and decision-making requiring a supply of information. The last stage requires that information flow from government to citizens and from citizens to government. These information flows that actually result from citizens receiving or having information should translate into decisions and policies. Chun et al. (2010) emphasize the use of technology and the availability of information for citizens to achieve this third stage of collaboration.

Opening government data in principle should be regarded as a tool that encourages more participation by enabling access to government data, re-use and re-distribution of government data in various formats. Lee and Kwak (2012) state that open government generates highest public value when it results in public engagement. Other authors describe this ultimate level as collaboration (Reddick and Ganapati, 2011; Janssen, 2012; Chadwick, 2001).

Chadwick (2001) offers a model that illustrates government interaction in e-governance consisting of three levels: managerial, consultative and participatory. This model points out certain aspects relevant for this research:

1. At the participatory level, one of the main actors/stakeholders is the civil society. (p. 280);
2. More actors participate, forming complex interactions as the role of the citizens change from "customers" to "citizens";
3. There is spontaneous interaction among these actors.

New forms of Participation

Attempts to guarantee participation have always been limited by time, space, knowledge and action (Rogers, 2008). Information Communication and Technologies (ICT) enables access to government in ways that were previously impossible surpassing the limitations of time, space and even knowledge (Street 1997) ICT as a democratic instrument has three main functions: information; communication; and participation (Chadwick and Howard, 2009, Zittel & Fuchs, 2007, Kersting and Baldersheim, 2004). This is achieved through various online / digital offerings such as websites hosting government information, electronic voting mechanisms and different public services now being offered online. ICT has opened

up government services to citizens through e-government or digital government initiatives, thereby increasing transparency and participation, and making government more responsive and centered on citizens' needs (Misuraca xvii; Evans and Yen, 2005; Gil-García and Pardo, 2006; Heeks 1999, 2002). In summary, ICT gives government a new "electronic face" (Chadwick 2001; Jaeger and Matteson, 2009 p. 87).

Participation is an aspect of e-government (Chadwick 2001, p.143); Chun et al (2010) attribute the changes in how governments relate with their citizens to ICT. Specifically the flow of information is now two-way not just from government to citizens but also from citizens to government for the purposes of "transforming existing government policies" (p.2). In other words, ICT has enabled the participation of citizens in influencing policies. Chun et al (2010) place participation as the third stage of e-government interactions and describe it as "… shared governance … with seamless information flow and collaborative decision making" (p. 67). Participation is viewed here as a joint effort where citizens are seen as partners and as sources of information and valued in the decision-making process. Chadwick (2001) offers a similar model illustrating government interaction in e-governance structure consisting of three levels: managerial, consultative and participatory. Although not necessarily hierarchical, the models already presented suggest that participation moves from a low level to a higher level. These models make sense especially because participation happens in different contexts therefore the levels are dictated by these factors such as political, social or economic. However, is it possible that more than one model is evident at the same time?

Kersting's Hybrid and Blended Democracy Model

According to Kersting (2013) political participation can be divided into four different spheres each having either offline or online components as in Figure 5. participation in representative democracy (such as during elections - vote on representatives, political parties), participation in direct democracy (referendums - vote on issues etc.), deliberative participation (talk on issues) and demonstrative participation (symbolic expressive participation such as demonstrations). Kersting (2012; 2013) further proposes a hybrid and blended model (Figure 5) that accommodates diverse and heterogeneous instruments of participation and illustrates the different democracy models where participation happens. It also takes into

account the discrepancies between offline and online participation. The application of ICT has resulted in overlaps between offline and online participation leading to a blended kind of participation (Kersting, 2013, Kersting 2014). ICT makes it imperative for governments to be more inclusive of other non-state actors who, empowered by ICT and innovations, are now restless and eager to participate in government resulting in hybrid democracies. For instance citizens organized in groups such as civil societies and non-governmental organizations have taken advantage of the ubiquitous nature of the Internet to engage with each other and express themselves through new forms of democratic instruments and participation instruments such as flash mobs, protests both online and offline (Kersting ed. 2012, p.19).

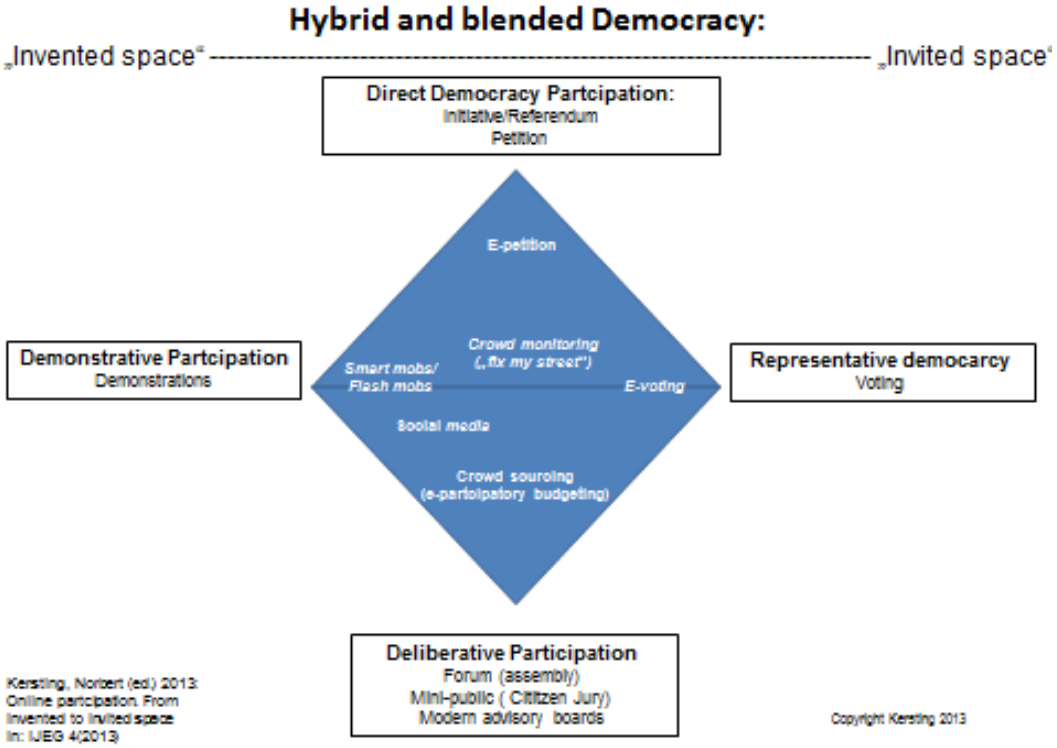


Figure 5: Hybrid and blended democracy adopted from Kersting (2013)

Kersting (2013) introduces the concept of invited and invented spaces where participation instruments can be applied. Invited and invented spaces are reactions to a non-functioning democracy and dissatisfied citizens. In the invited space although intended as an effort to widen democratic spaces, political participation is planned and organized in a top-down manner by government. This space is controlled by government who decide who comes in – who is 'invited' and when they are 'invited'

for instance in the case of referendums. In contrast invented spaces enabled mostly by ICT and championed by non-state actors such as the civil societies, is characterized by participation that is initiated almost autonomously by the citizens. This includes for example the use of social media such as the Occupy movements seen in 2012 (Kersting, 2013). Overall, these innovations around democracy and participation arising from ICT demonstrate, as summarized by Chadwick (2001), that there is increased participation and inclusion of new actors such as CSOs in government; as more actors participate, they form complex interactions; and their interactions are spontaneous.

Scholars are divided between arguments for increased participation through innovation and ICT (Chadwick and Howard, 2009; Zittel and Fuchs, 2007; Kersting and Baldersheim, 2004) and critics of its effective use by governments in promoting democracy and participation. Although ordinary citizens' voices are now being heard very loudly in a number of countries, the impact of these voices on government depends on whether anyone among the political elite is listening especially with regards to actual budgets and policies as suggested by Pateman (1970). Critics such as Edwards (2008) state that if the conventional off-line methods do not work or have not worked efficiently before, the electronic methods are likely to be inefficient and may even perpetuate existing inequalities within government and in its relationship with citizens. They further argue that these challenges are independent of other external factors such as lack of access to digital tools and other technological challenges associated with ICT. Although e-government is often hailed as a channel to promote democratic processes and participation, it can also generate negative impacts such as fragmentation of the public by ICT tools. This limits the full realization of a participative democracy and therefore ICT's causal mechanism in participation should be regarded with scepticism (Fuchs, 2007; Jaeger, 2006). Jaeger (2006) argues that e-government initiatives can also be a tool used to promote government agenda, discouraging political debate and discussions. Regardless of the opinion on whether ICT offers more opportunities or not to governments, the reality is that it is a tool that is being harnessed by all actors within participatory democracy such as governments and CSOs and it is having an impact on democratic processes. Case in point is the Arab

spring, which was enabled by digital means sparking unprecedented online and offline participation not just within the countries but also globally.

Participation Theory as a Framework for Understanding OGD

One of the widely held and expected outcomes of OGD use is increased or enhanced participation. Therefore participation can be a good indicator of how open data is used. With regards to this research, participation will be predicated on whether OGD is available, accessible and actionable for decision and policy-making in government. Very little research exists to show how OGD use impacts on participation (levels, outcomes, actors). In this regard, this research takes these theoretical assumptions reflected in the literature to understand the use of OGD and propose a framework on how OGD can lead to enhanced participation. OGD in principle should be regarded as a tool that encourages more participation by enabling access to government and government data, re-use and re-distribution of government data in various formats. Lee and Kwak (2012) state that open government generates highest public value when it results in public engagement. Other authors describe this ultimate level as collaboration (Reddick and Ganapati, 2011; Janssen, 2012; Chadwick, 2001). The assumed causal mechanism is that more OGD will enhance participation. However in using participation theory as a framework, as already evidenced in earlier discussion there are several assumptions that need to be considered namely: the influence of political will and government responsiveness, how the socioeconomic status of users affects participation, users' capacity and skills, user's motivation for participating using OGD and the existing participation and digital gaps. These will be discussed in the following sections and will be used to build on the theoretical and analytical framework.

OGD can influence all four spheres of the hybrid and blended models of participation proposed by Kersting (2012; 2013) depending on the level of access and actionable data available as shown in Figure 6. Citizens can participate in purely representative ways using data as a guide to making decisions on their representatives or political parties. For instance when data on parliament such as the Hansard is open, it can enable citizens to evaluate their members of parliament. OGD can also be used in direct democracies to make decisions on issues. Further it

can be harnessed for deliberation and even demonstrations. OGD can therefore be situated in all four spheres of the hybrid and blended model. However of greater relevance to this research, is its use in participation that goes beyond just voting i.e. in the third and fourth spheres of deliberation and demonstrative democracy respectively. Similarly, participation influenced by OGD can happen online or offline through various instruments that can be symbolic such as online petitions or more aggressive such as strikes and demonstrations (Kersting, 2013). Although OGD has the capability to create invented space, it must be recognized that it still relies on an 'invited space' especially because government is the main custodian of the data and information. As noted by Wojcik (2012): "OGD and open data rely on an invited space where government allows broader information and participation" (p.128). Wojcik (2012) points to the mutual relationship between available government information/data and the "variety of initiatives, instruments and practices." (p. 128). This relationship is taken into account in the proposed model in Figure 6.

Assumptions associated with participation models

Most of the definitions and theories present normative assumptions as is often the case with participation theories (Zittel and Fuchs (eds.), 2007). Cornwall and Coelho (2007) point to the gaps between the normative and empirical realities. One example is the assumption that the public is willing and ready to participate if offered the appropriate opportunities and that the government is willing to listen and to respond. Critics of participation theory often describe citizens as having neither the interest nor the resources to participate stating that there is a divide between citizen participation as described in literature and the actual citizen involvement in practice (Hendriks, 2010). At the same time, the assumption often made with participatory models of governance is that governments are willing and able to effectively engage citizens driven by the desire to strengthen democratic principles. Further, literature on participation also assumes that those with access to information – sometimes referred to as the political elite - will be the ones most likely to actively and substantively participate.

With regards to Pateman's (1970) characterization of the participatory model of maximum input (participation) and output (policies, decisions) and Kersting and Vetter (2003) democratic legitimacy model (input – political participation and

output – political effectiveness) there is an assumption that citizens will offer their contribution 'input' while government has the role of empowering (developing) each individual with the help of the input provided by the citizen (feedback). It also assumes that more participation is better for enhancing democratic principles. Third, it assumes that the public is empowered to make meaningful contributions towards policy and decisions in government. Finally, it assumes that governments are equally willing to promote participation and citizen empowerment. However, literature shows that the process of participation is not as simple. Several factors determine who participates and how they participate. Some of these factors will be outlined below.

Factors affecting participation

Political will and Government responsiveness

Participation requires political will, interest and reforms in a political system to develop structures that support participation. This impacts the relationships and interactions between the government and non-government actors including the public and also determines how the government perceives participation, responds to citizens and their input and to what extent contributions arising out of participation are assimilated affects participation.

The relationship between the government and non-government actors including the public is important for participation. Configuration of the CSOs, existence of distrust and delegitimisation of government may distort participation. Similarly how the government perceives participation and how the public contribution is assimilated affects participation. If the public has the impression that their contributions will not be taken seriously or will have no effect then they will lose interest in participating in any government activities. This may lead to apathy, cynicism and chronic lack of participation (Kersting, 2012).

Wampler and McNulty in Terchek and Conte (2001) argues for devolving information and increasing the opportunities and varieties of ways for the "masses" to debate, deliberate and to make good judgment. He states that there is no way of telling the potential of the masses to judge when secrecy, prejudice, misinterpretation and bias prevail. Successful citizen participation is characterized by multidirectional flow of information including feedback from government.

Besley and Burgess (2002) argue that an effective democracy should demonstrate responsiveness to its citizens. Government responsiveness can be defined as: " A clearly identifiable action taken by government … following individual or collective input by citizens" (Peixoto and Fox, 2016, p.10). This responsiveness is fostered by access to information (mostly through the media) for an informed and engaged citizenry and open political institutions and processes such as policy-making.

Socio-economic Status and Participation

Socio-economic factors such as education, time and cost affect access (Kersting, 2012). In participation, there are two factors that potentially determine the legitimacy of participation: incentives and resources. Scholars suggest that the socio-economic level of individuals in a society determines if and how they participate in OGD (Bimber, 2001; Vera et al., 1995). Those with more resources are more likely to access information as well as ICT resources and therefore participate more in policy/decision-making (Kersting, 2012). A study on participatory budgeting in Brazil indicated that the poor participate but the extremely poor do not for instance in the indigenous and marginalised groups (World Bank, 2008). The Internet has also enabled increased participation by making it possible to avail large volumes of information to many people at once therefore reducing the cost of disseminating information and in some instances collecting information. Nonetheless the cost of accessing the Internet (and information) is still unachievable for many. Connectivity and hardware is still unavailable in the remote and undeveloped areas of Kenya. Contrary research on the impact of resources on political participation (often based on studies in the US such as from (Verba et al., 1978; Norris, 2001) and studies exploring the relationship between individual resources and political participation in Africa shows those with little or no resources (time and money) are more likely to participate politically e.g. in elections (Isaksson, 2013).

Smith (2009) states that citizens do not have the capacity to make political decisions and participate as the elite will always be the dominant ones participating as they have access to resources, time and money leading to 'participatory distortion', a term fronted by Verba et al., (1995). This means that certain conditions have made it

advantageous for a specific group of people who do not represent the views or opinions of the larger group of people to participate. It is the difference between total population of those who could actually participate and those who participate e.g. those who vote and those who are eligible to vote (Fishkin 2009, p.50).

On the other hand, what does real participation mean besides equality and equal representation? Arnstein (1969) argues that there is a critical difference between "going through the ritual" of participation and the having the real power needed to affect the outcome of the process. Smith (2009) and Hibbing and Theiss-Morse (2002) argue that citizens have neither the interest nor the resources to participate. Importantly, they often do not have the capacity to make political decisions and participate hence the elite will always be the dominant ones participating as they have access to resources such as time and money. Capacity building to understand political processes well enough to participate in decision-making takes time and money. This flaw is exacerbated in examples of marginalized communities or illiterate communities.

Capacity, Skills and Motivation to Participate

Who participates, how participants communicate with one another and make decisions together, and how discussions are linked with policy or public action are important (Fung, 2006). This is more paramount in evaluating ICT-enabled participation such as the case of OGD, the capacity and skills of the public to be able to participate and engage with the authority and to harness data for data-driven decision-making need to be considered. This will include aspects of literacy (digital and data). The level of inclusiveness of the process – this questions the extent to which political discussion has considered all the relevant issues and provided a voice for all the relevant stakeholders (Perez, 2012).

Pateman (1970), Verba et al., (1995); Dryzek (2009), Barber (2003); Kersting (2012), share the opinion that one's background determines if and how much citizens participate. The socio-economical influences shape our participation patterns. Terchek and Conte (2001), contend the fact that citizens need sophisticated skills or knowledge to be able to participate in governance. They advocate for increased opportunities for education and for citizens to educate themselves. "Resources for participation" as described by Verba, Schlozman and Brady (1995,

p.15) include civic skills, time and money. The presence or absence of these resources influences the motivation and capacity for political participation. The capacity and skills of the public to be able to participate and engage authority (and to harness data for data-driven decision-making) is important Pateman (1970).

On the other hand though, Teorel (2006) states that: " … perhaps it is not the actual participation in political discussions that matters for subjective legitimacy, but the causes leading to that participation. According to this view, the outcomes of political decisions are accepted as legitimate when opportunities for participation have been provided to those who have incentives to take part, and not in relation to their access to resources. The implication is that the motivation behind participating rather than the resources may matter more for subjective legitimacy of participation. Here factors such as access to information and ICT skills may not play a big role rather the reasons behind using or not using ICT play a bigger role.

Digital gaps

Technology may enhance participation however technology diffusion and adoption is as much a political issue as a technical issue. Milner (2006): "Adoption of technology, in this case of the Internet, has a clear political component. … One cannot explain the growth of the Internet, and perhaps of any other new technology, without considering such political variables" (p.196). Street (1995) and Milner (2006) are also quick to warn against thinking that technology is a neutral tool that is autonomous and freely selected (Milner, 2006), rather it is a political tool. Milner (2006) states that ultimately all technological changes create losers and winners. Depending on which side the government is on, it may allow losers to slow down the technology spread or it may allow users to proliferate the technology. It " … alters politics but at the same time it is shaped by political processes" (Street 1995, p.35). Fuchs in Zittel and Fuchs (eds.) (2007) and Wengert (1976) also regard the contribution of technology to democracy sceptically. Rather than leading citizens back to participation, technology will instead drive them away, in the opposite direction. This is because of two challenges: the inability of technology to form a collective will (Internet is fragmented hence it fragments the public who cannot really form the "will of the demos" (p.47) and a political community using electronic means, both of which are needed for the people to govern themselves.

Participatory democracy postulates a deliberative kind of interaction – "systematic exchange of arguments by persons present" (p.48).

From a democracy theory perspective, the nature of virtual communities also undermines the credibility (anonymity afforded by internet) of the community members to work together for a common good. Similarly, Pateman (1970) suggests that such a move may be just symbolic, so that is simply giving an electronic face to participation without any real changes happening to promote citizen participation. Astrom et al., (2012) attributes this to hybrid regimes that have altered the conditions for participation especially in non-democratic countries (p.20). Perez (2012) takes a very critical approach to the techno-enthusiasts' "cyber-optimism" way of looking at ICT as being the all time solution for reinvigorating democratic experiences (pg.64). He claims that the techno-enthusiasm has led to disillusionment because of the lack of capacity of the Internet and ICT to fulfill the huge expectations and promises. This is brought about by the disparaging gaps between the strong belief in how ICT will transform democratic engagement and the actual achievements in practice. The author notes that despite these disappointments, governments and other relevant actors continue to invest in ICT related reforms in government such as open-government.

In the context of OGD and its effect on participation, the realization of impact and value is politically determined and set out by government but government does not generate value rather the users generate value. However users will generate value depending on the usefulness of the data or the applicability of the data and the extent to which this matches their needs. Therefore, effective use of OGD should be demonstrated by its value to the user and even the custodian of the data. On the other hand how valuable OGD is sometimes also depends on the infrastructure and the extent to which it supports the use and re-use of data. Literature on open government outlines key variables that heavily support it such as telecommunication infrastructure, transparency of government processes such as in policy-making and laws such as access to information (Wirtz & Birkmeyer, 2015).

These are the same for OGD: "Sitting between the publication of open data, and the use of that data to drive better development outcomes are online ecosystems of data,

shaped by legal, social, and technical forces" (Davies and Edwards yyyy, p.12). For example having legislation that requires public officials to proactively input data on the available OGD platforms or release data to the public as part of their work deliverables, in which case the civil servant or government official will have an incentive to ensure that data is published.

OGD - Towards a more participatory government?

For this research, the development and the ideals of OGD seem to have followed a path that can be explained by participatory democracy. By advocating for more information dissemination to the public in open ways, so that there is re-use in diverse ways, it opposes a system where information is monopolized by a few people who can then decide what information should be or should not be published and accessible to the public. It provides various opportunities to increase citizen participation and extend citizenship however Pateman (1970) cautions that it is not the beginnings of democratization nor does it signify the creation of a participatory society. In an ideal world, a completely open government would refer to the ideal participatory government Chapman and Hunt (2006).

This research regards participation theory as a starting point to analyze what the possibilities for OGD as an instrument or a tool that promotes more democratic practices such as participatory governance are. In order to answer the main research question evaluating how open OGD is, this research settles on key characteristics of participation and its assumptions to develop a framework that will be applied to this research. Participation theory proposes how and why people participate and to what extent participation is reflected in decision-making.

OGD is a heterogeneous and fairly new phenomenon lacking clear conceptual definition thus making it difficult to place within a specific field of political or social science. It includes technical, social, political aspects. Within political science itself, there are many ways of analyzing OGD. Others such as in the OECD literature position it within e-government framework (Wirtz and Birkmeyer, 2015), others within the public sector information, public management or even law while others will frame it in the transparency and accountability discourses. Still others will focus

on the technical aspects and hence OGD will fall under systems theories and analyses (ref).

OGD is seen as a democratization of government information. Since the Obama declaration in 2009 in his memorandum to the heads of executive departments and agencies, the concept of open government has had tremendous popularity to become an "important global agenda" catalysed or enabled by the growth of ICT and government's efforts to adopt ICT mechanisms into their operations notably to increase efficiency (Lee and Kwak, 2012 p.492; Hilgers, 2010; Evans and Campos, 2013).

The actualization of OGD is hinged on the ability of citizens to participate as well as on the opening up or openness of governments to its 'political machine' for citizens to access and participate wholly in the process. This machine could be how policies are made and the role of information to that process so that citizens do not only access information but based on their understanding of how policies are made they can know when and how to participate by contributing effectively to the policy and decision-making processes. It is seen to place great emphasis on mutuality between the participation of citizens and the responsiveness of government. Therefore, how open OGD is can best be demonstrated by evaluating the extent to which its use can influence participation especially citizen participation in government for instance in decision-making. So far this research has noted that neither OGD nor participation happen in a vacuum; having OGD that is available, accessible and even actionable is not enough to prompt or influence participation in a context that is not conducive to do so.

Spheres of Participation

The second phase of the research presented in this dissertation looks at several propositions on OGD from the perspective of participation theory and applying the theory to a case study on health sector open data in Kenya. Under this perspective the context of the health sector in Kenya and the use of OGD has been conceptualized as being influenced and determined by the existing ecosystem (to be analyzed in the first phase of this research), the level of participation, the influence of different actors using data and the responsiveness of government to contributions

and input from OGD users for purposes of influencing health policy and decision-making.

The general OGD ecosystem factors that will be established and described in the first phase of this research are also evident in the health sector case study context. These ecosystem factors shape how data is used by affecting the availability, accessibility and usability of data to adequately contribute to improving how decisions are made in the health sector at different levels of government. This research therefore proposes a theoretical framework (Figure 6) that summarizes the different typologies of participation and categorizes participation into three spheres namely: narrow, broad and extended participation. These categories are theorized as layers or spheres rather than a hierarchical order of items. This is because the spheres can overlap with each other and more that one form of participation can exist within the same context/country as a result of present/absent supporting factors including access to OGD. These different spheres demonstrate the different levels of OGD with the proposition that how open OGD is influences the level of participation.

Narrow Participation

This is the initial stage of participation where data is available in various forms but not necessarily in open data format. Participation is limited to accessing available data however the quality and relevance of the data is not sufficient to enable users to voice their opinions and agendas. OGD may be accessible but limited to a few people. Further, a combination of several other factors can also narrow participation such as strong government control as in authoritarian regimes that limit access to information and freedom of expression and other relevant freedoms, poor economic status of expected participants and so on. Participation happens under an 'invited space' often with a top-down structure.

Broad Participation

At this stage, open data is available and accessible (legally, technically, politically) to users. In this research, OGD is conceptualized as being more than just government releasing data therefore it goes beyond making government data available to making it accessible by all so as to widen the scope of participation as

discussed in the previous chapter. It is expected that real and active participation begins to happen at this stage. Participation needs to be meaningful as adequately exemplified by Cornwall (2008): "Delegated power over choosing the colour of paint for a clinic's waiting room in the name of 'patient involvement' – in the absence of any involvement in decisions on what the clinic actually does – may count for little in transforming power relations." (pg.273). Potential users have access to OGD and are able to understand the implications of the data. Government is also responsive to different actors and offers opportunities and spaces for consultation and deliberation with various actors on various agendas that are either set by the government or forwarded by the OGD users. At this stage, there is potential for collaborative governance and in some select instances, actors will collaborate to make decisions and take action while in others, government has the prerogative on actions following consultations.

Extended Participation

This is the ideal form of participation and application of OGD to enable collaborative governance and co-sharing of power between citizens and governments. Larsson (1998) suggests that the greater the degree of openness the more direct the form of democracy evidenced by an ideal form of participatory democracy where everyone is aware of and given the chance to influence decisions. Users of OGD are empowered enough to enable co-decision-making with government and other powerful actors as well as to self-mobilize (Pretty, 1995; Edwards, 2008). At this stage, described as transformative by White (1995), the data that is accessible by all and fully open and relevant to users.

Further, for effective participation, the kind of data accessed must be relevant and useable in order to trigger action. It embodies a broader view, which includes all the stakeholders in the OGD ecosystem and appreciates the fact that the exchange of data is not one-way (government to the public) rather it could also be citizens to government or even among the citizens. This complex interactivity can already be seen where data is visualized or applications are developed that allow for the different stakeholders to interact. However, there is not enough evidence to show if this complex interaction is influencing decisions/policies in government. Because of

its inclusiveness, this stage also has users who can harness the data and translate the data into useful decisions and policies in collaboration with the government. This stage depicts citizens who are in control of setting the agenda and making adequate decisions, empowered by data and an enabling environment (political, social, economic, policy). The body of literature and theoretical perspectives on participation already discussed suggest that the prospective users of OGD will be found in three main sectors – public, private/business and civil societies/NGOs. The theoretical perspectives proposed may not neatly assign the users of OGD to the political, social and economic aspects of society. Nonetheless, in general, it can be argued that CSOs and NGOs will be motivated towards either democratic or social gains of OGD; the public sector may cut across the three aspects but will mostly be biased towards the economic and social aspects while the business sectors will be driven almost entirely by economic and innovation aspects. These assumptions can be argued out but more beneficial is an empirical study.

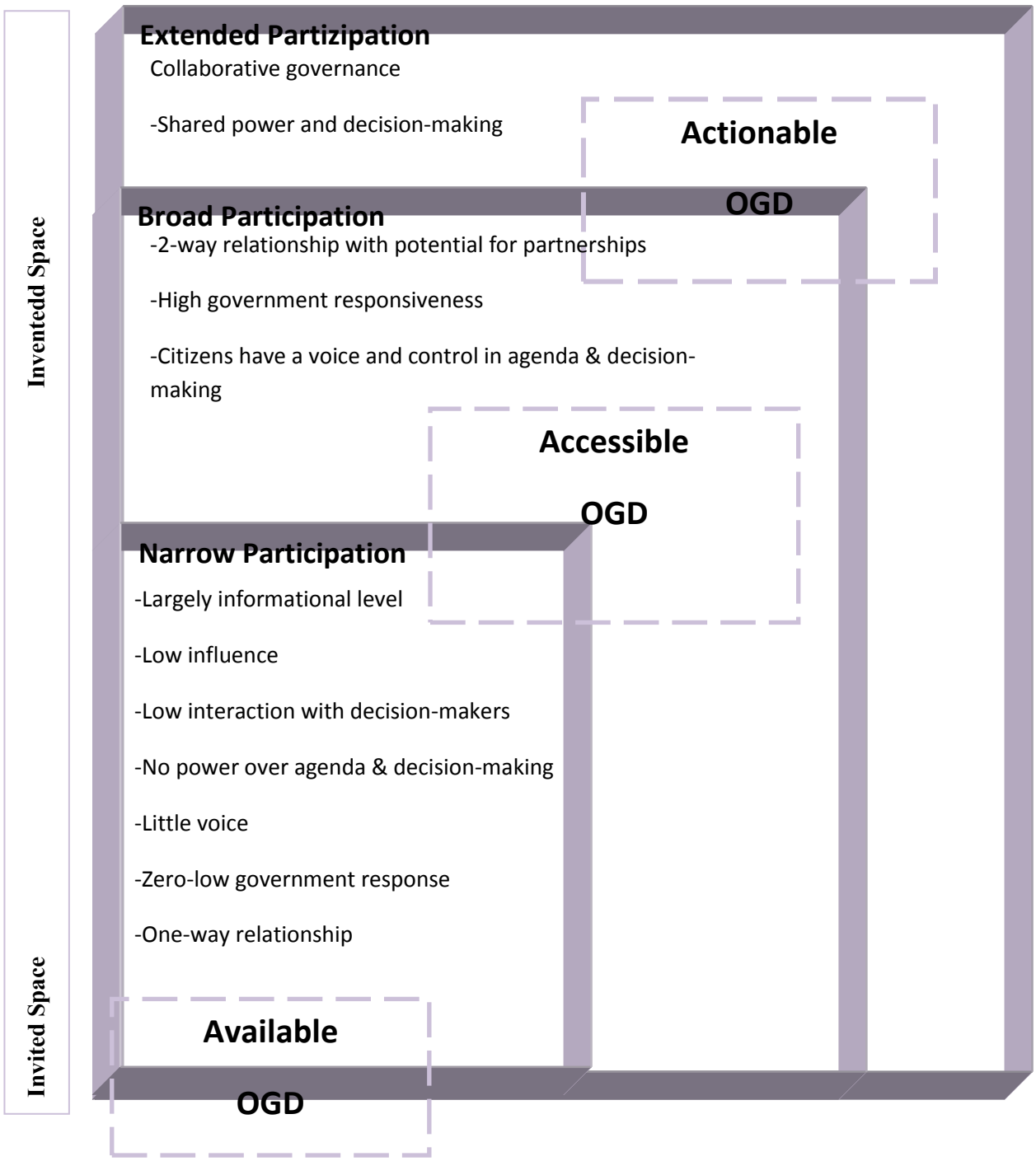


Figure 6: Proposed theoretical framework

Summary

This chapter can conclude by making the following propositions:

- The level of participation especially of non-state actors in government policy and decision-making best demonstrates OGD openness.
- OGD on its own is not sufficient to influence participation. Contextual/ecosystem variables that influence both OGD use and participation must be considered.
- The more actionable data there is the more extended participation there is as shown in figure 6.

Despite the ambition of this chapter to shed light on participation and accommodate all forms of public participation beyond political participation, in order to explain why citizens participate in government and what factors contribute to who and how they participate, the participation theory as proposed in literature still falls short of accomplishing this. For example, participation theory does not offer adequate explanations for why business people in the private sector would want to participate or use a government service yet the contribution of the private sector to OGD research, especially in the health sector, is significant.

Therefore, participation theory forms the base for analyzing the literature and data on the use and users of OGD in Kenya. Based on this theory, this study can conclude that considerations for variables of participation can be summarized by evaluating the context of the ecosystem in which the process of participation takes place. Further, this study can conclude that the success of participation is based on the understanding that if the context is improved, the possibilities of success are also improved.

This research will analyze and frame the use of OGD using a participation theory lens. It will examine the contextual aspects affecting OGD use, why some people use OGD and how use of OGD influences decision-making by state and non-state actors in government. In the next chapter we discuss how these theories are applied in the design of the data collection tools and methodologies as well as the data analysis approaches used to interrogate the data and generate insights that are presented in this dissertation.

The first phase of this research examines the proposition that OGD use is affected by the context in which the process of participation happens, which ultimately affects how users use OGD and to what extent they can harness OGD for participation. In evaluating this proposition, this study has adopted an ecosystem framework with several components that together make up the context. This ecosystem framework has been discussed in great detail in Chapter 3. It is worth noting that the ecosystem components also arise from the literature review discussions and are presented in Chapter 7 that have been informed and corroborated with literature on OGD and participation. In the second phase of this research, this dissertation explores the use of OGD in government and policy decision-making through the participation lens by using three propositions; engagement, influence and responsiveness. This phase further tests the proposed OGD-participation framework proposed in in Figure 6 above. In this regard, the second phase of this research seeks to establish whether there are linkages between the level of OGD and the spheres of participation.

5. RESEARCH DESIGN AND METHODOLOGY

Introduction

The purpose of this research is to collect comprehensive, systematic and in-depth information about the structure, use and user of OGD in Kenya specifically in the health sector and based on the findings to answer the main broad question: how open is open government data?

This research explores the use of open government data in Kenya and in the Kenyan health sector and describes the users, how they use and why they use OGD. Equally interesting for this research is to find out how contextual factors affect the use of OGD for the different users and how these shape the OGD ecosystem and experience in Kenya. This chapter describes and justifies the data gathering method used necessary to answer these questions. It also outlines how data will be analysed.

The main and broad question surrounding this phenomenon seeks to understand how open OGD is with an interpretation that open infrastructures and ecosystems support wider use and therefore greater and broader access. In order to answer the broader question of how open OGD is, three main research questions are used to guide the research process. Under these three main research questions, are further associated sub-questions

RQ 1. What is the structure of OGD in Kenya and to what extent does it support OGD in Kenya?

- What kind of infrastructure (environment or ecosystem) is needed to enable broad use of OGD in Kenya?
- How does the OGD ecosystem look like in Kenya?
- How does the health OGD ecosystem look like?
- How do the different actors (private, CSO, government) use the data in Kenya?
- What capacities do they have for using the data? /What skills are needed for harnessing OGD?
- What factors promote or limit the use of OGD in Kenya?
- What value or benefits have users derived from their use of OGD (direct/indirect)?

RQ 2. To what extent has the use of OGD led to public participation in decision-making or influenced policy-making?

- How has the use of OGD influenced how government responds to state and non-state users of OGD in government decision or policy-making?
- To what extent are the voices of users being heard in policy and decision-making in government because of their use of OGD?

This research is intrinsically cross-disciplined, combining elements from political science, qualitative social sciences and information sciences. This mix provides a good means for assessing what and who drives OGD and the extent to which its use has an influence on participation. As this chapter will show, a qualitative case study approach creates room for analyzing the different perceptions and use of OGD within its given contexts and understanding how these contextual factors affect the use. In addition, participants elicit views on a subject based on their interactions with others in society. This research will rely on the informants or participants' view and hence the interviews will be constructed as openly as possible.

This research largely employs the qualitative methodology of data collection however, quantitative data is used to triangulate data sources in order to achieve the set objectives. This is because qualitative research is 'pragmatic, interpretive and grounded in lived experiences of people (Marshall and Rossman 2011, p.2). Its chief value for this research is achieving 'an in-depth understanding of social reality in a specified context'. (Marshall and Rossman, p.91; Lindlof and Taylor, 2011, p.109). Literature reviewed has indicated that there is little research on OGD and especially on the perspective of the users in developing countries. Therefore an in-depth understanding of OGD use in the context of a developing country where all the context-specific complexities are is vital.

This chapter elaborates on the research design and the flow of research: from data collection to data analysis. The aim of this chapter is to clearly outline the process of data collection and evaluation and to show why a qualitative case study design was the most appropriate approach for gaining empirical evidence. This will be discussed in line with the research objectives.

Research Design

OGD in Kenya and on a global scale is a relatively young but growing field of research resulting in scanty literature and data. Studies done on OGD in Kenya have mostly been descriptive with little empirical evidence on who the users are and how it is used. This is partly because the phenomenon is not more than 5 years old. The main objective of this research is to better understand the use and the users of Kenya's open government data and the ecosystem within which OGD exists. Understanding the use of OGD and its relevance to the users will avoid "low value data set dumping … by introducing a notion of accountability for how well these programs (*such as OGD*) are working and how effectively they are reaching reasonable approximations of stakeholder communities" (Bertot et al., 2012, p.2495).

This research is designed in two phases answering the three different research questions but using different methodologies to achieve this. The first research phase is exploratory and seeks to answer RQ1. The purpose of RQ1 is fundamental to the rest of the research and it heavily informed the whole research as well as the case study on health. It provided a clear picture of the context of OGD in general as well as provided a leeway for accessing information and interview participants. Notably, identifying and describing the ecosystem enabled this research to establish and understand the status quo on OGD. RQ 2 is tackled in the second phase of the research, which was mainly the case study research on health data. This research propounds the view that gaining an understanding of the use and users of OGD required a narrowing down either by sector (health, agriculture budget) or actors (government, business, CSO) or geographical location (national , subcounty) and other ways of categorization. Respondents in the exploratory phase of research highly recommended health data as one of the best data available from government, hence a case study focus.

A case study design

A case study approach allows one to flexibly and intuitively ‘’discover more about the relationship between culture, society and technology …’’(Green L, 2001). It will allow this research to collect ‘‘comprehensive, systematic and in-depth’’ information about open government data.

The choice of using a case study design was dictated by the research questions – how is OGD being used, why and how users are using OGD and, how has it influenced users' participation in government? Yin (2003) in Baxter & Jack (2008) suggests that case studies should be used when the focus is on how and why questions; the behaviour of the participants of the study cannot be manipulated; contextual differences conditions are considered; and the boundaries between phenomenon and context are not clear. The case of the use of the OGD must be considered within conditions/factors that are found in the Kenyan context.

This research also takes advantage of the case study's characteristics that allows the researcher to explore and describe the phenomenon in context and from multiple perspectives such that one can "simultaneously see whole and parts" (Baxter & Susan, 2008, p.544; Chaiklin, 2000 p.48). Because OGD is a recent and developing phenomenon, it depends a lot on several contextual factors that often differ from one country to another and this greatly affects how OGD is implemented and how it is used. For example the presence of proper legislation and policies may exist in one country and not in another yet both countries have OGD initiatives. The use of a case study affords this research the advantage to uniquely explore OGD within this specific context.

Although opponents of this approach may argue that it is not representative and will therefore not allow for generalization, the extent to which the findings of this research will be generalized depends on similarity and context (Russell, 1988 p.43). Further, the objectives of the research are not so much to generalize rather to understand the phenomenon. By using a case study of Kenya and the health sector data, as the first OGD platform in Sub-Saharan Africa, this research hopes to form the basis and reference for other case studies on OGD in similar contexts.

Case selection

The case may be selected to replicate previous cases, to extend emergent theory, or to fill theoretical categories and provide examples of different types (Eisenhardt, 1989). Denzin and Lincoln (2005) also add that cases should be chosen according to what could be learned the most out of them. The selection of the study sites was based on theoretical criteria as well as pragmatic considerations. In addition the

following criteria proposed by Miles and Huberman (1994) for purposive sampling of participants and sites: the setting where the research will occur, the informants and the evolving nature of events that the informants are involved in were considered.

Given the nascent situation of OGD as well as the emerging nature of the phenomena in Kenya, the possible number of users of OGD was limited especially when the sectors to be studied are pre-determined as is the case here. Given the limitations on the number of cases that can be usually studied, it makes sense to choose cases in which the process of interest is transparently observable (Pettigrew A, 1988).

Just by looking at the KODI website, it is difficult to tell who the users of the data are. The page on applications (apps) that have been developed using data from KODI sheds more light on who the users are. Most users are software developers and CSOs (see appendix for table with existing apps.), however it would be inaccurate to assume these are the only users. Therefore this research also acquired primary data from a survey that was conducted by the Ministry of Information and Communication on the users of KODI. This quantitative data was analysed and used to inform the broad selection of interview partners.

The categorization and the identification of most of the organizations was done based on literature review on OGD and even on e-government that depicted users as mostly falling into the three main categories: public, private and civil society sectors (CSO). (Manyika et al., 2013; Hogge, 2010; Davies, 2010). In this case, identifying individual citizens who are likely users of OGD is not practical nor feasible hence this research chose to use CSO as representative of citizens as organized groups. For this study, the researcher identified actors within these four sectors who the researcher was sure have used or are currently using OGD.

Theoretically, the focus of the research was on users in the urban areas representing four main sectors in society, who also play a key role in the health sector. The research was conducted, for the most part, in and around Nairobi. This is because Nairobi is not only the economical and administrative capital of Kenya; it is also a regional hub especially with regards to ICT and innovation (Manyika et al., 2013). Every effort was made to represent opinions of those living outside Nairobi for

example by including interviewees working nationally or alliances of various organizations working across the country.

The final and pragmatic reason for including the cases was access. Despite identifying several organizations at an early stage and making contact with them, access proved to be the main challenge especially in accessing informants from the public sector. The sensitivity of the topic as it is often associated with transparency and corruption and the choice of using the health sector also regarded as a sensitive topic with regards to patient data made it difficult to gain access to key interview partners. Notably, this research relied on 'snowballing' or 'chain-referral' method and recommendations through 'gatekeepers' Biernacki & Waldorf (1981) note that this is possibly the only way to identify interview partners because the researcher rarely has inside information especially in an under-researched context. However a great effort was made to observe balance in choosing the cases and triangulation of data sources was done to ensure data validity. The researcher used personal connections from family as well as from her own networks.

The researcher therefore identified participants with the "highest potential to yield good data …" for most of the research sub-questions. (Marshall & Rosmann, 1989, p. 58). The choice of informants was because of their willingness to participate in the study, the possibility to provide answers to many of the research questions because they have used OGD either directly as raw data or indirectly as an application, map or visualization. This mix of events and activities provide a good site for data collection (Marshall & Rossman, 1989).

The Case of Health Sector Data

The health sector is a critical driver of any country's economic growth and it affects all other sectors because if citizens are unwell, they are not able to optimally participate in economic activities. The significance of health as a driver of economic growth is demonstrated by the observation that gains in life expectancy is a strong positive driver of per capita GDP growth.

The health sector is regarded as a "knowledge industry" that is heavily reliant on information for health planning, management and delivery (Kenya e-health strategy 2011-2017, p.7). It is a sector that is best positioned to benefit significantly from open data and other data-driven innovations such as mobile health and telemedicine.

For example, on the healthcare supply side, simple but efficient data collection and reporting mechanisms can help health care providers detect trends in certain diseases and proactively take necessary measures to alleviate health crises. Effective reporting systems for health commodities can also help health care providers manage issues such as procurement of drugs. On the demand side, the public's access to data such as types of health care facilities in their counties; level of care available at these facilities; availability of doctors/specialists; and availability of drugs has the untapped potential to increase demand for quality healthcare and save time, money and even lives.

Unit of analysis

The public, civil society and private actors within the health sector will form the units of analysis. Out of these groups of actors, this research will identify specific stakeholders such as a ministry of government, specific private profit-making companies and civil society organizations that have used or use data from the Kenya Open Data Initiative in some way. These three are grouped together to form one case with four embedded units of analysis as shown in the Figure 7 below (Yin, 2009). This is because they share one context or are subjected to similar contextual factors although how they react to them and how this affects study their use of OGD differs. This approach allows the researcher to analyze within each unit and across each unit to understand similarities and differences creating robust and reliable findings (Baxter & Jack, 2003).

Researchers role

The researcher relied on interviews as the primary source of data. This required accessing organizations/institutions and their staff. This was difficult especially because of the topic of health as well as the inclusion of the Ministry of Health and government bureaucracy. This required that the researcher build trust and networks with the various gatekeepers and eventually the interview partners who more often than not would recommend other possible informants in their own networks.

Because of the closeness of the researcher to the object under study and the context, questions on objectivity are often raised (Grix, 2010). However this is typical to interpretivist approaches and qualitative case study designs (Cresswell 2014, p.187). As a researcher who has been actively involved in various forums propagating for

more open government data, there is a risk of certain biases however it is this closeness and "positive interaction" that yields "rich findings" sometimes not possible with other methods such as surveys (Grix 2010, p.121).

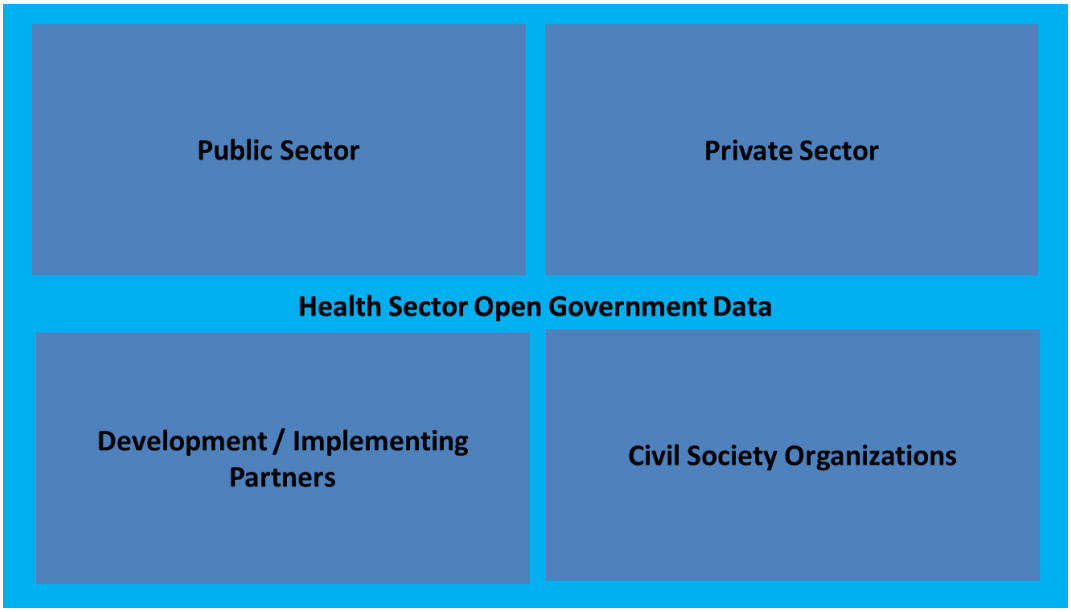


Figure 7: Research design – embedded case

Methods

This research is focused on the case of OGD use in Kenya. It is intrinsically cross-disciplined, combining elements from political science, social sciences and information sciences among others. Although it relies heavily on qualitative methods and data it also uses some quantitative data in order to achieve the set objectives and sufficiently answer the research questions. This is because one approach by itself does not accommodate the complex interactions across multiple disciplines and diverse views possible in this phenomenon all the while considering the social contexts.

This research deductively draws on existing theories and concepts already established and discussed in the previous chapters. It does not question the existence of OGD in Kenya and in the health sector. Based on literature review, it applies participation theory framework drawn from the overall theories of democracy as a starting point for research as well as a framework for analysis.

Qualitative Methods

This research is largely qualitative however because of the capabilities of a case study to accommodate more than one method to the advantage of the research. Quantitative data was used to describe the situation of use while qualitative data allowed for a more in-depth understanding oft he phenomenon. Qualitative methods are often criticized as lacking representativeness and generalizability leading to questions on validity (Grix, 2010). This however is mitigated by use of triangulation of data methods. The data that was collected was verified by other sources such as documents and quantitative data, which the case study design is well able to handle.

General characteristics of qualitative research described below summarise why this research chose to use a qualitative approach for its data collection and analysis (Cresswell, 2014 p.189):

1. Natural settings – the researcher goes to the interview partner in his or her context.
2. Researchers are the key instruments and data collection is reliant on the researchers having face to face talks, interviews with the participants or going to the site, location or the participant/phenomena to make observations or collect data such as photos (p.185)
3. It allows for multiple sources of data
4. It is flexible and allows for emergent themes and questions
5. Qualitative research also allows for purposeful selection of participants that will best help in answering the research question

Qualitative interviews

Information from surveys, although representing a larger population is limited for this research. Surveys do not consider the individual actors in their contexts. Every effort was be made to structure the data collection and analysis. There was only one interviewer for all the interviews carried out in phase 1 and 2. The questions were prepared in advance and were the same for all informants, however a little flexibility for the responses and follow-up questions was allowed to explore any emerging or interesting themes. The questions were administered face-to face guided by an interview protocol. Direct contact with the informants allowed the researcher to gain access and trust quickly and make observations during the interview, which were

helpful to the data collection process. Also in consideration of the high level of the informants such as government representatives who were often time-barred, it was more appropriate to do interviews in this way. Compared to more self-administered and standardized questionnaires, he response rate is higher. These interviews sought to answer questions such as: How do different OGD stakeholders use OGD and why? How do these experiences differ (with regards to use, contextual factors)? What value have they derived from their use of KODI? How do they influence the users participation in government?

Pan and Tan (2011) concur that there is no fixed prescription for the number of interviews to be conducted for a case study. The number of interviews/interviewees to be included in the study depended on a number of factors. In total, the research conducted interviews with 25 informants from phase 1 and 2 including informal interviews. The informants were from a diverse set of actors from the private, public, civil society and development partner organization that use government health data in various ways. Additionally, factors such as the size of the organization, the level of use of open government health data and the limitation of time and scope were also considered in Pan and Tan (2011).

Most of the users were conversant with English therefore most of the questions were asked in English. Where the language changed e.g. the interviews were translated and transcribed in English. The results were then compiled, organized and analyzed. Researchers in analyzing interviews can take a position of hermeneutics or discourse analysis or description. The two former positions go beyond the scope of this research and do not aid in achieving the set objectives, however the latter position of analysis will be sufficient in presenting this research based upon a clear social problem, (Kvale 1996, p.187).

Data collection

The data collection process for the study consists of primary and secondary sources from interviews and survey results. At the beginning of the research phase in 2013, it was the intention of this research to carry out data collection by applying a quantitative survey through the Kenya open government data platform to users who are registered on the website. This survey sought to describe who the users are, why they use OGD, how they use OGD and what benefits they have accrued from its use.

By the time the fieldwork commenced in June 2014, this research discovered that the government initiative (KODI) was running a similar survey. The researcher therefore requested for the raw data from KODI, which was given. Although the survey was not administered with precisely the same goals as this research, the data received was sufficient to analyse and inform the research. This data describes who the users are for example data on age, profession, frequency of use and so on, why and how they use the datasets. Therefore the plan to carry out the survey was shelved once the raw data was acquired.

At the same time this research obtained data from multiple sources such as archival records, documents including white papers, strategy papers, policy papers and press articles. This adds "strength to the findings" (Baxter and Jack, 2008, p. 554). This is also in accordance with case study's ability to deal with a variety of data sources Yin, 2009). This will give a background of the phenomenon as well as reduce the risk of lack of validity.

Data collection was not chronological and linear but sequential. Some data was collected to inform the subsequent steps in the research. The research was organised into two phases. In the first phase of the research comprehensive literature review and exploratory interviews with selected experts was carried out concurrently to collect data that was used to refine the research problem and hypotheses. Exploratory interviews with selected experts, which was carried out concurrently as the literature review continued. This was to enable the researcher to collect data that was used to refine the research questions and scope. The expert interviews were carried out between May 2014 and October 2014 in Nairobi, Kenya.

In the second phase of data collection, a case study on the health sector data with informants purposively selected was developed. The researcher used more in-depth semi-structured interviews that allowed the research flexibility to probe further on motivations and the utilization of OGD. Throughout the research process, secondary data from various sources was used for example web analytics, media reports on OGD in Kenya as well as official documents such as strategy papers.

The data collection process has been done with every attempt to remain objective, structured and systematic. Overall, most methods will have a minimal level of disguise except during the interview with government officials where specific

information may be withheld especially if the researcher feels that government informants may respond in more defensively or in a way that may attempt to put the government in positive light.

Data collection – Phase One

Documents

Step one of the data collection process started with collection of primary and secondary data from documents such as surveys studies on Kenya and KODI for example data from the Open Data Barometer, white papers, strategy papers, policy papers and press articles to provide background and contextual information.

These data were essential in providing both historical background and contextual information. An essential component of documentary evidence is the published statistics regarding citizen use of the systems. Underlying the importance of these data is the assumption that the use of a service indicates at least a base level of trust in the agency and the service.

Web analytics

In addition, web analytics was used to understand users' habits online (number of page visits, page views, geographical location and downloads). Analysis of user sessions will provide a deeper insight into patterns of user behaviour on the Kenyan online portal. This information is not only vital in providing a starting point on who the users could be and how they use OGD but it will also be useful in confirming informants' responses later. This adds "strength to the findings" (Baxter and Jack, 2008, p. 554) and gives a background of the phenomenon.

Survey

Having acquired some insight into the context and the current state of affairs, data from a survey carried out by the Kenya Open Data Initiative were analysed. Survey methods are a cost-effective way to gather input from large numbers of people (Gray 2009; Fink 2006; Leeuw et al., 2008). The survey used registered users as well visitors to the KODI website who were willing to complete the survey. The questionnaires developed were highly structured with each informant receiving the same set of questions. The survey ran for a year?

Data produced from the survey was analysed and used to develop a typology of users and their opinions and attitudes – demography, how and why they use OGD. Further this data was used to inform the next part of the research by identifying cases for more in-depth studies and to highlight priority issues to be covered in qualitative research.

Exploratory interviews

Qualitative open-ended exploratory interviews were carried out with a total of 12 respondents during the first phase of data collection. This consisted of eight formal and semi-structured interviews that were recorded and transcribed and four informal interviews hat were open-ended and where the researcher took notes. Because of the informality of the initial four interviews, the respondents were uncomfortable with their voices being recorded and as such the researcher took notes. For the eight formal interviews, the first step was to develop the interview instruments starting with the interview protocols. The interview protocol was developed using constructs covered in the literature review as well as the informal exploratory interviews. The use of the interview protocol also allowed some level of comparison to be done between and within the embedded units.

The 12 respondents for these interviews were chosen because of their experience and expertise that allowed this research to gain valuable insight into relationships between variables. Informants were key actors who are strategically positioned to have insight on the different tenets of OGD infrastructure and use for example legal experts, government officials at the Kenya ICT Authority (formerly known as the Kenya ICT Board), the Communications Authority of Kenya (formerly known as the Communications Commission of Kenya,) the Ministry of Information and Communication, the technology and innovation community and so on. This particular group of people were chosen to reinforce the data collection (for example in identifying additional salient variables and themes), facilitate further interviews by acting as gatekeepers and references and finally by offering insight into the current state of the art based on their expertise and experience with the Kenya OGD landscape. A snowballing sampling technique was also used in this set of interviews to identify interview partners.

The resulting data was largely used to gather more insight and verifications on the structure and organization of OGD, the dynamics of OGD in Kenya as well as the state of the art. The insights the researcher gained from these interviews were very important to understand the local context related to the research questions, and proved to be very useful for conducting the subsequent interviews more effectively such as when probing questions. For example an understanding of the existing legal framework, which many users may or may not be aware of, enabled the researcher to ask respondents whether they apply any laws when looking or accessing government information as well as when supplying or sharing the data or the data products developed from the data. In the health sector, the legal issues of sharing data such as patient data is extremely sensitive.

Data collection - Phase Two

Semi-structured interviews

The second part of this phase had the objective of gaining in-depth information on use of OGD in four specific sectors – public, private, development/implementing partners and public sector. Phase Two interviews consisted of 12 respondents from four main groups of OGD actors that were drawn deductively using the insight from the exploratory interviews in Phase One, the survey from KODI and literature review. These groups of actors with their relevant abbreviations in parentheses are: the public sector (GOV), private sector (PVT), civil society (CSO) and development partners (DP). All interviews in Phase Two used were semi-structured using an interview protocol and were recorded and transcribed by the researcher. Participants were selected through purposive sampling as well as on a reference basis (snowball method). Participants were also selected based on their willingness to participate and their knowledge about the issues under research. The aim of this approach is to allow them to provide the maximum information being sought (Glaser, 1978). Overall, the most important and deciding factor was that participants were using or have used OGD in their organizations/companies in whatever form.

Specifically semi-structured interviews were used because they have a little of the flexibility of unstructured interviews but are also based on the interview guide. Its allows for modifying of the questionnaire even during the actual interview which is especially crucial to this research (Russell 2000). In-depth interviews allow the

researcher to access participants' interpretations of actions and events (Walsham 1995).

Another advantage of this method for this research is that it produces a lot of qualitative data quickly (Russell 2000). This research recognizes that there is a risk of bias especially from those who conceptualized and implemented the KODI, keen to show that it is working (Boyce and Neele 2006 p.3). This research will make an effort to verify any claims from the informants and also compare this with the responses from the users and other data sources.

Data analysis

The nature of the qualitative study gave the researcher the flexibility to simultaneously analyze the data during the subsequent iterations of data collection and identify new categories previously not captured in the theory as a result of new data and refining of the concepts and constructs (Baxter &Jack, 2008). This is an important process as it yields new and emerging insight and knowledge and also extends theory.

Analysis was carried in two steps following a sequential explanatory strategy characterized by the analysis of qualitative and quantitative data for the first phase of data collected and then followed by analysis of qualitative data from the second step of the research process. In the first instance the results of the exploratory interviews were analyzed. Thereafter the focus was on the statistical analysis of the quantitative survey data.

As the research was hinged on qualitative methods, suitable statistical procedures for data analysis were limited to descriptive statistics. Quantitative statistical analysis of the survey data will be done using Stata software version 12.0 (Stata Corp, USA) and GraphPad Prism version 5.01 (GraphPad Software, USA).

In the second phase the results of the semi-structured open-ended interviews were analysed in a structured manner. The second qualitative phase built further on the results of the initial quantitative results as well as analysis from Phase One data e.g. in developing the interview protocol. The analysis followed three sequential phases of coding performed by a coder knowledgeable about the research topic. In this case the researcher who carried out the interviews was the same person coding the interviews. The following steps were followed: open coding to explore the material,

axial coding to create more general themes and selective coding to re-examine the raw data again (Miles and Huberman, 1984). Although a codebook would be the most appropriate from the quantitative point of view, open coding of interviews is the most valuable way for this part of the research.

The data coding process assigned codes to sections of text within the interview transcript, the observation notes and the memos and then used framework approach to rename and develop this into categories and themes. A coding schema was developed by noting down inductively individual codes from the data. For instance, an example code labelled ‚Access' was used, this represented sections of text, which related to how users accessed or acquired their data and in what formats. This was also informed by the theoretical categories created and used in the protocol so that the analysis was also deductive. In order to align with the theoretical basis guiding this dissertation as illustrated in Figure 5, the coding was first performed using a topic guide that helped extract content. Based upon this initial set of codes (these will be attached in the appendix), an iterative process was used to go through the data and codes to identify common themes and concepts. These were then renamed and regrouped forming a coding schema with themes and sub-themes. This provided a method to link similarly coded section together, for example within 'Access' there is subcodes of 'socioeconomic access', 'political access' and 'technical access.' The final interpretations therefore were richly drawn from all the results put into the context of the research problem.

Methodological assumptions and weaknesses

As suggested by Yin's strategies (2009) for ensuring construct validity, triangulation of data sources will be used. Documents such as memos, web analytics, government strategy papers as well as available local media articles will be included in the data collection. This will help in getting more reliable data and reduce the chances of biased data (Grix, 2010). An attempt will be made to give a clear and honest narration of the chain of events as possible. In addition the research will use the mechanisms below proposed by Yin (2003):

- Member checking
- Rich, thick description to convey findings

- Constant self reflection to create open and honest narrative and identify any research biases
- Spend prolonged time in the field

Table 3: Mechanisms for ensuring validity and reliablity. Adopted from Yin (2003, pp. 248 – 266)

	Strategy	**Phase of the research**
Construct Validity	Use multiple sources of evidence Establish chain of evidence Have key informants review draft case study report	Data collection Data composition
Internal Validity	Do patter matching, explanation building Address rival explanations Use logic models	Data analysis Research design
External Validity	Use theory in single case studies Use replication logic in multiple case studies	Data collection
Reliability	Use case study protocol Develop case study database	Data collection

6. FINDINGS

Kenya's geographical context

Kenya's diverse population now over 46 million is spread across 47 counties. The population comprises of 42 official ethnic groups although the official languages spoken are mainly English and Kiswahili (Kenya National Bureau of Statistics, 2015). A large percentage (approximately 73%) of the country's population resides in the rural areas (World Bank Group, 2016). The country is the strongest economy in the East Africa region with an estimated GDP of US$ 63.4 Billion in 2015 (World Bank Group, 2016) However, it has a low human development Index coming 145 out 188 countries in the 2014 Human Development Index (Human Development Index, 2015).

Kenya's Information Communication Technology Context

The government of Kenya has supported the use of ICT in the country and in government. It started using the Internet (mostly websites) for its communication in 2004 with the aim of disseminating information and improving its relationship with the public (Wamoto, 2015). More government services are now accessible online through recent initiatives such the government-to-citizen online portal called the e-Citizen (www.ecitizen.go.ke) as well as supporting offline resource centres called *Huduma* (Kiswahili word for services), which serve as one-stop shops for the public to quickly access government services such as registration of births, application of identification cards, passport, driving licences, permits and other services (Communication Authority, 2013).

All these online services require accessible and reliable Internet in the country. In an effort to increase access to the Internet, the government, in collaboration with the private sector and development partners, introduced fibre optic cable connections into the country and under-sea cables that connected Africa to the rest of the world. This has made access and communication faster and cheaper. It opened up the market for various stakeholders and businesses that rely on the Internet. Another effort to promote wider access to ICT tools, made in collaboration with the private sector and entrepreneurs, was the introduction of digital villages called *'Pasha'*. These centres were to serve as hubs or access points for Internet and ICT-related

applications especially in rural areas (Information Communication and Technology Authority, 2014).

The most outstanding example of the application of ICT in Kenya is the swift, broad uptake and impact of mobile phone technology and applications. The number of mobile phone subscriptions increases each year and now stands at 38.3 million (Communications Authority of Kenya, 2016). Approximately 89.2% of the population now has a mobile phone subscription as shown on the table below (Communications Authority of Kenya Sector Report, 2016).

According to the Communications Authority of Kenya Sector Report, 2016 statistics, the mobile Internet subscriptions have been on the rise (from 23.8 million in December 2015 to 24.7 million in March 2016). Commensurate to this is the increase in Internet usage and the demand for Internet as indicated in Table 4 below. Currently, Internet penetration stands at 67% (2014-2015 financial year) up from 54.8%in the previous year (2013-2014 financial year) (Communications Authority of Kenya Sector Report, 2016). A significant part of the increase in Internet penetration has been driven by mobile Internet subscriptions confirming that the mobile phone is quickly becoming the preferred medium for accessing the web.

Table 4: Adapted from Communications Authority of Kenya (CAK) Annual Report 2014 - 2015.

	Financial year				
Subscriptions/ Users	2010/11	2011/12	2012/13	2013/14	2014/15
Total mobile phone subscriptions	25, 279,768	29,703,439	30549422	32,246,393	36,113,100
Terrestrial mobile data /internet subscriptions	4,189,720	7, 655,576	12,340, 005	13,930,694	19,809,709

Total internet subscriptions	4,258,287	7, 738,882	12432308	14,029,072	19,924,285
Estimated Internet users	12,538,030	14,032,366	19,654,925	22,310,044	26,672,419

ICT growth is attributable largely to the liberalization of the telecommunications sector (Republic of Kenya, 2015). In turn, the widespread and phenomenal uptake of mobile phones and mobile services fuelled the technology industry and the private sector to tap into that market. A prominent example is the M-Pesa mobile money phone application introduced in 2007 by Safaricom (the leading mobile phone operator by market share in Kenya). M-Pesa offers mobile financial/banking services to all irrespective of age (financial services are available to all persons above the legal age of 18 years), socioeconomic status, literacy levels or location. It requires neither sophisticated mobile phones (smart phones) nor Internet connections making it accessible to anyone with a mobile phone.

Once a mobile subscriber is registered as an M-Pesa user, he/she receives an individual electronic account with which they can withdraw and deposit money. They can transact using this account to pay bills, purchase goods at the supermarket even to non-M-Pesa users on other mobile phone operators. New services introduced onto the M-Pesa platform even allow users to borrow micro-loans. The services have also been extended to include international remittances e.g. to and from the UK. The scale and financial magnitude of M-Pesa is so huge that domestically, it transacts more than Western Union does globally (Mas & Radcliffe, 2010). With a 30-day active M-Pesa customer base of 16.6 million, Safaricom generated total revenue of Kshs. 41.50 Billion in 2015 through its M-Pesa platform (Safaricom, 2013).

In general, the ICT space and innovation culture in Kenya is very multi-sectoral. The use of the Internet and ICT tools by the civil society or for civil society activism as well as the private sector could be regarded as one of the geneses of innovation when considering examples like Ushahidi. Ushahidi is an open source platform, which was used to map post-election hotspots from crowd-sourced content during

the Kenya 2007-2008 elections. It can be used to quickly collect and make sense of bulk information for example information from Twitter, Facebook as in the case of a crisis. It also allows its users to create visualizations or maps ('interactive mapping') (Ushahidi.org, 2013). The Ushahidi platform has been used all over the world such as during the Haiti earthquake (http://blog.ushahidi.com/). The Ushahidi team has recently introduced a internet backup hardware product called Brck for use in areas where internet and electricity is limited such as in rural areas (more information from http://www.brck.com/). The government, the private and civil society sectors are all using ICT each with different motivations and objectives although most services and products are aimed at meeting specific needs of the wider public.

Kenya's political context

Not only has Kenya recorded improvements in its economy and ICT but the country has also witnessed unprecedented political transformation. The realization of democracy in Kenyan politics began with the multi-party state declaration of 1991. The improved democratic space opened up opportunities for the public to participate more actively in political and developmental affairs. More recently, a new constitution was promulgated and it came into effect after the last general election on March 4, 2013. It promises a lot of hope for economic, political and social growth. It checks the state and provides for devolution of power and resources from the centralized National Government to 47 semi-autonomous County Governments. It demands active citizen engagement, recognizes the importance of an inclusive governance process towards national development for example through transparent public finances and even participation in parliamentary and county assemblies. Most importantly for open data and open government, it gives every citizen the right to government information and how these should be considered for OGD to stimulate use and re-use.

The Kenya Open Government Data Context

The demand for open (government) data is driven by the motivation that it will lead to improved government services and products, better governance and participation, increased innovation and economic growth. However, to achieve these objectives, there must be use of the data leading to data products and services, policy decisions and actions that are developed using the data. Research in this area is beginning to

develop despite the earliest open government data initiative being not more than 10 years old. The objective of this research is to establish the status of open government data in Kenya after more than 3 years of the existence of the Kenya Open Data Initiative, notably to identify the factors that make up the OGD ecosystem in Kenya.

Implementation and development

With support from the World Bank, Kenya became the first country in Sub-Saharan Africa to make government data sets available online under the Kenya Open Data Initiative (KODI) available at opendata.go.ke in 2011. Prior to this, OGD in other forms had started Kenya already in 2009, but it did not work because at that time people did not understand it well. The demand for government data arose from a growing community of ICT developers, innovators and technology entrepreneurs (Majeed, 2012, Ndemo, 2016). Prior to this, despite a tight noose on the release of government data and government information in general, CSOs and independent developers had taken advantage of the burgeoning technology industry in Kenya to harness data and other technology tools (for example Ushahidi).

The technology community, mostly based in the Kenyan capital city of Nairobi, made a case for more open government data for social and economic gains. At that time, the Government under the championship of the Permanent Secretary in the Ministry of ICT saw the need to share government data with technology experts for entrepreneurship purposes. Gradually CSOs added their voice, demanding for more government data to promote transparency.

The inception and realization of the Kenya Open Data Initiative (KODI) followed the three-tier model proposed by Hogge (2010). By analyzing the underlying structures and drivers of KODI and differentiating it from that of developed countries, Rahemtulla et al (2011) identified three actor groups that were instrumental in its inception and realization:

1. A high-level change agent within government with the political will to champion for OGD. Until early 2013, the champion within government was Dr. Bitange Ndemo, who had made more than one attempt to launch open government data before 2011 but political influences, conflicts of interest and lack of data stalled the process.

2. Supporting actors in and outside of government providing capacity building at an institutional level (The World Bank, CSOs, private sector).

3. CSOs and the private sector demanding and advocating for the release of public sector information (Google, Ushahidi and the Local Technology Community).

Eventually, after getting support and political goodwill from the president, some government agencies, non-governmental organizations and the private sector, the Kenya Open Data Initiative (KODI) was launched in July 2011 starting with more than 200 datasets (Omenya, 2012).

When (KODI) started it was handled specifically by the World Bank. After a few months the World Bank transferred ownership to the government. Thereafter KODI got integrated into the ICT Board(which is now the ICT Authority) in 2011 under the Ministry of Information, Communications and Technology. The initiative was expected to generate public transparency and accountability from the government, fundamentally changing the nature of citizen-government interaction (Rahemtualla et al., 2011). KODI makes government data such as national census data, government expenditure, parliamentary proceedings and public service locations accessible to Kenyans. According to the KODI website (2013), Kenya is making this data easily accessible for three key reasons:

1. It is a platform for innovation with economic and social value;

2. It enables data-driven decision-making;

3. It is the foundation for improving transparency and accountability.

The primary purpose of this research was to understand and explore the use of OGD in the Kenyan context and how its use influences participation of both state and non-state actors in government decision and policy-making. This research aimed to investigate: what kind of OGD infrastructure or ecosystem exists and to what extent it supports use of OGD and; if indeed the use of OGD has any influence on participation and decision- and policy-making in government. The research is divided into two phases where phase one seeks to understand how OGD is with an interpretation that open infrastructures and ecosystems support wider use and therefore greater and broader access. Phase two explores the health sector open data

use as a case study to further understand OGD use and the possible impact of OGD use on participation and decision-making in government. The research is organised in two phases with Phase One and Two addressing Research Questions One and Two respectively. The two main research questions and their respective sub-questions are:

RQ 1. What is the structure of OGD in Kenya and to what extent does it support the use of OGD in Kenya?

- What kind of infrastructure (environment or ecosystem) is needed to enable broad use of OGD in Kenya?
- How does the OGD ecosystem look like in Kenya?
- How does the health OGD ecosystem look like
- How do the different actors (private, CSO, government) use the data in Kenya?
- What capacities do they have for using the data? /What skills are needed for harnessing OGD?
- What factors promote or limit the use of OGD in Kenya?
- What value or benefits have users derived from their use of OGD (direct/indirect)?

RQ 2. To what extent has the use of OGD led to participation in decision-making or influenced policy-making using the health sector data as a case study?

- How has the use of OGD influenced how government responds to state and non-state users of OGD in government decision or policy-making?
- To what extent are the voices of users being heard in policy and decision-making in government because of their use of OGD?

This research is implemented with the use of qualitative data collection approaches and methods such as interviews; observations; and analysis of field notes and government documents. This research also included secondary survey data on the use of the KODI website. The survey data was received in its raw form from the Ministry of Information Communication and Technology. This survey data was analyzed using STATA (StataCorp USA)and used to inform the selection of case studies and interviewees for Phase Two of this research. The results were also used

to strengthen and corroborate the interview findings in Phase One of this research. Because of this, the findings of the survey are interwoven with the findings from the interviews conducted in both Phase One and Two where applicable.

Although the observation method was used in this study, interviews were the key source of data. In this regard, discussions based on observations are limited. In most of the observations, the researcher assumed the role of a complete participant who operates covertly, concealing any intention to observe the setting in order to avoid any bias in the collection of data. The events selected for observation were those in which participants discussed ways of using OGD. Although not all events discussed health data, it was still important to observe and gain further insight on how different people were accessing OGD, how they found it useful or not useful, what they did with the data and how this had or would have an impact on their work. Further, the observations were useful in validating insights generated from the interviews. Several documents such as government memos, policies, laws, reports, and newspaper articles were also analysed. The documents were primarily useful in establishing facts and in providing perceptions and reactions that were validated during the interviews.

A total of 24 in-depth interviews were carried out and transcribed in Phase One and Phase Two of this research. The 24 interviewees comprised of government officials, private sector players, representatives from CSOs and donor/development partners. The government officials were drawn from the Ministry of Health and Ministry of Information, Communication and Technology. The study participants from the private sector, civil society and development partners who were interviewed in Phase two of this research worked directly in the health sector and were identified from the documents reviewed in Phase One as well as by snowballing. The interviews generated rich descriptive data on: the respondents' understanding of OGD; existing and desirable components of the Kenyan OGD ecosystem and how each component affects use of OGD; and the connection between use/users of OGD and their participation in government policy- and decision-making. This will be described in greater detail in the next sections.

This chapter presents the key research findings of this research that advance the

understanding of OGD, how it is used and to what extent its use influences participation in policy- and decision-making processes. The findings organized and presented according to how the data was collected in Phase One and Two. The findings generated under each of the two phases are organized based on the structure of the interview guide and the categories identified in the coding process. Finally, in the conclusion section of this chapter, findings from the two phases of this research are synthesized and integrated.

Phase One Findings

Survey results

The analysis presented here is restricted to 1, 294 individuals who took the Kenya Open Data Initiative survey that was available on the KODI website. Out of the 1294 survey participants, 257 (19.8%) submitted responses to all the survey questions and thus completed the survey. Out of the 257 survey participants who completed the survey, 153 (59%) of them accessed the opendata.go.ke website from Kenya. Out of all the respondents (whether they completed the survey or not), 293 of them accessed the opendata.go.ke website from Kenya. In light of this dissertation's objectives, the analysis presented here is based on responses submitted by these 293 individuals, herein referred to as respondents.

A majority (over 70%) of the respondents are either university graduates or holders of postgraduate university degrees (Figure 8). Thirteen percent of the respondents have tertiary level education while only 6.5% and 3.1% of them have secondary and primary level of education respectively.

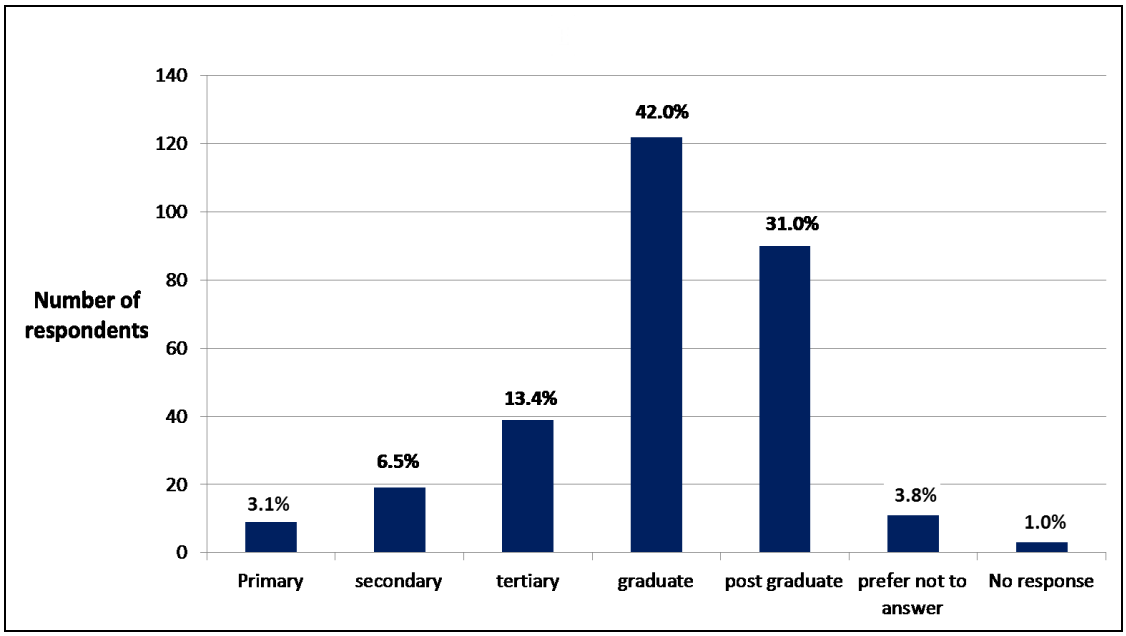


Figure 8: Education level of respondents who access opendata.go.ke from Kenya

The bars indicate the actual number of respondents (y-axis) with respective education levels (x-axis). The numbers above the bars indicate the proportion (percentage) of respondents with specific levels of education as a percentage of all the respondents who access opendata.go.ke from Kenya.

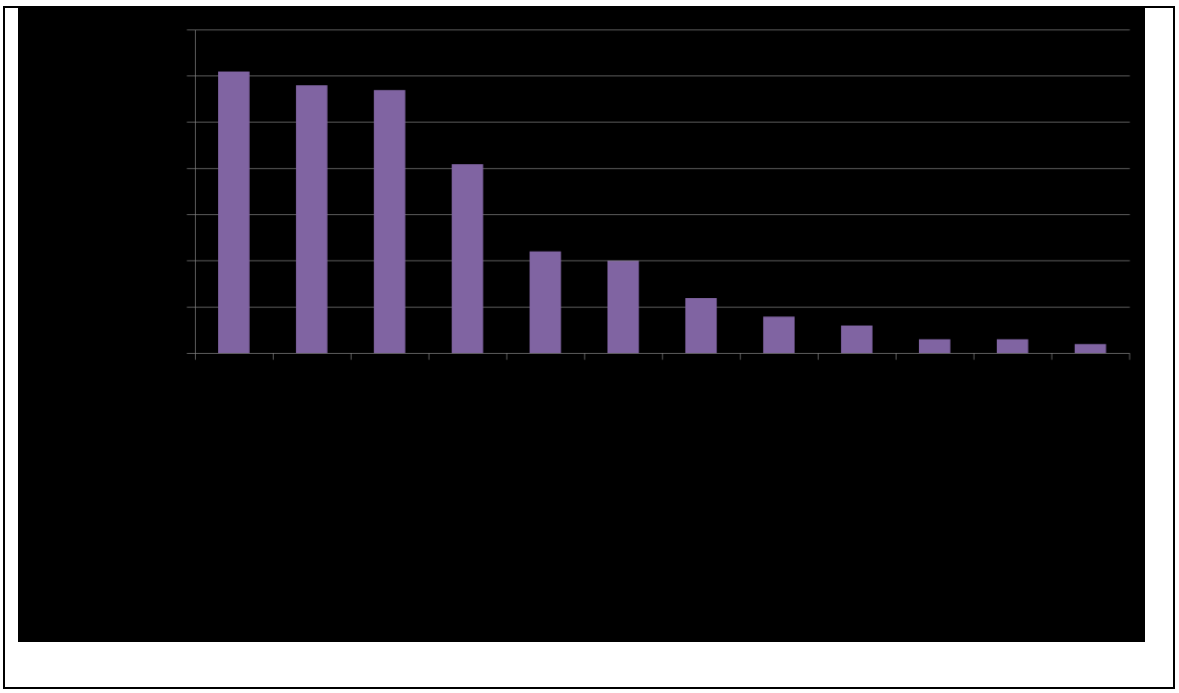


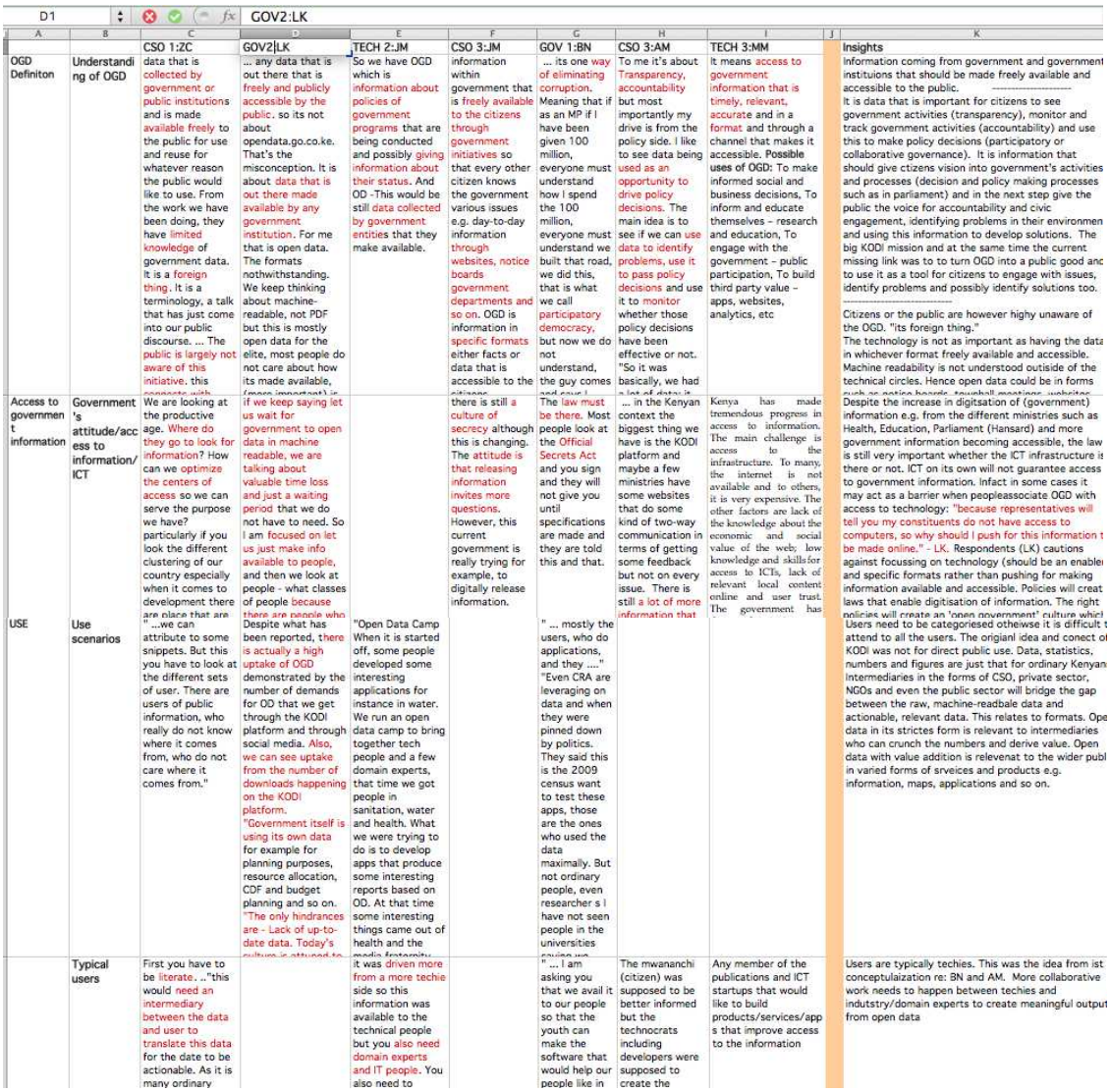
Figure 9: Occupation of respondents who access opendata.go.ke from Kenya

The bars indicate the actual number of respondents who access opendata.go.ke from Kenya (y-axis) with respective occupations (x-axis).

The leading professions and/or occupations represented among the respondents are: private sector professionals; professionals in the NGO, non-profit and civil society sectors; students and academia/research (Figure 9). Labourers and retired persons are the least represented occupations among people who access opendata.go.ke from Kenya. The leading industries represented among respondents are: education; information technology; non-profit; consulting services and healthcare. At the other extreme end of the spectrum, the advertising; pharmaceutical and travel industries are among the least represented assumptions among the respondents

Phase One-interview findings

A total of 12 interviews were carried out in Phase One consisting of eight formal interviews and four informal interviews. In the formal interviews, the researcher followed the interview guide while in the informal interviews, there was no interview guide however the questions were open-ended allowing the interviewees to respond broadly and openly. The latter form of interviews offered deeper insight as well as corroboration of the formal interview findings. The transcribed interviews were coded based on the ecosystem framework as explained in Chapter 3 (See Figure 10 below). The findings in this phase were useful for understanding and answering the question: how open is OGD in Kenya. The findings sought to address the assumptions that open ecosystems and infrastructures are indicators of how open government data is and conversely how and to what extent government data is used. The findings outlined in this section therefore refer to the first research question in the first phase of research.



		CSO 1:ZC	GOV2|LK	TECH 2:JM	CSO 3:JM	GOV 1:BN	CSO 3:AM	TECH 3:MM	Insights
OGD Definiton	Understanding of OGD	data that is collected by government or public institutions and is made available freely to the public for use and reuse for whatever reason the public would like to use. From the work we have been doing, they have limited knowledge of government data. It is a foreign thing. It is a terminology, a talk that has just come into our public discourse. ... The public is largely not aware of this initiative. this	... any data that is out there that is freely and publicly accessible by the public. so its not about opendata.go.co.ke. That's the misconception. It is about data that is out there made available by any government institution. For me that is open data. The formats nothwithstanding. We keep thinking about machine-readable, not PDF but this is mostly open data for the elite, most people do not care about how its made available,	So we have OGD which is information about policies of government programs that are being conducted and possibly giving information about their status. And OD -This would be still data collected by government entities that they make available.	information within government that is freely available to the citizens through government initiatives so that every other citizen knows the government various issues e.g. day-to-day information through websites, notice boards government departments and so on. OGD is information in specific formats either facts or data that is accessible to the	... its one way of eliminating corruption. Meaning that if as an MP if I have been given 100 million, everyone must understand how I spend the 100 million, everyone must understand we built that road, we did this, that is what we call participatory democracy, but now we do not understand, the guy comes	To me it's about Transparency, accountability but most importantly my drive is from the policy side. I like to see data being used as an opportunity to drive policy decisions. The main idea is to see if we can use data to identify problems, use it to pass policy decisions and use it to monitor whether those policy decisions have been effective or not. "So it was basically, we had	It means access to government information that is timely, relevant, accurate and in a format and through a channel that makes it accessible. **Possible uses of OGD:** To make informed social and business decisions, To inform and educate themselves – research and education, To engage with the government – public participation, To build third party value – apps, websites, analytics, etc	Information coming from government and government instituions that should be made freely available and accessible to the public. ---------- It is data that is important for citizens to see government activities (transparency), monitor and track government activities (accountability) and use this to make policy decisions (participatory or collaborative governance). It is information that should give citizens vision into government's activities and processes (decision and policy making processes such as in parliament) and in the next step give the public the voice for accountability and civic engagement, identifying problems in their environmen and using this information to develop solutions. The big KODI mission and at the same time the current missing link was to to turn OGD into a public good and to use it as a tool for citizens to engage with issues, identify problems and possibly identify solutions too. ---------- Citizens or the public are however highy unaware of the OGD. "its foreign thing." The technology is not as important as having the data in whichever format freely available and accessible. Machine readability is not understood outiside of the technical circles. Hence open data could be in forms
Access to government information	Government's attitude/access to information/ ICT	We are looking at the productive age. Where do they go to look for information? How can we optimize the centers of access so we can serve the purpose we have? particularly if you look the different clustering of our country especially when it comes to development there	if we keep saying let us wait for government to open data in machine readable, we are talking about valuable time loss and just a waiting period that we do not have to need. So I am focused on let us just make info available to people, and then we look at people - what classes of people because		there is still a culture of secrecy although this is changing. The attitude is that releasing information invites more questions. However, this current government is really trying for example, to digitally release information.	The law must be there. Most people look at the Official Secrets Act and you sign and they will not give you until specifications are made and they are told this and that.	... in the Kenyan context the biggest thing we have is the KODI platform and maybe a few ministries have some websites that do some kind of two-way communication in terms of getting some feedback but not on every issue. There is still a lot of more information that	Kenya has made tremendous progress in access to information. The main challenge is access to the infrastructure. To many, the internet is not available and to others, it is very expensive. The other factors are lack of the knowledge about the economic and social value of the web; low knowledge and skills for access to ICTs, lack of relevant local content online and user trust. The government has	Despite the increase in digitsation of (government) information e.g. from the different ministries such as Health, Education, Parliament (Hansard) and more government information becoming accessible, the law is still very important whether the ICT infrastructure is there or not. ICT on its own will not guarantee access to government information. Infact in some cases it may act as a barrier when peopleassociate OGD with access to technology: "because representatives will tell you my constituents do not have access to computers, so why should I push for this information t be made online." - LK. Respondents (LK) cautions against focussing on technology (should be an enable and specific formats rather than pushing for making information available and accessible. Policies will creat laws that enable digitisation of information. The right
USE	Use scenarios	" ...we can attribute to some snippets. But this you have to look at the different sets of user. There are users of public information, who really do not know where it comes from, who do not care where it comes from."	Despite what has been reported, there is actually a high uptake of OGD demonstrated by the number of demands for OD that we get through the KODI platform and through social media. Also, we can see uptake from the number of downloads happening on the KODI platform. "Government itself is using its own data for example for planning purposes, resource allocation, CDF and budget planning and so on. "The only hindrances are - Lack of up-to-date data. Today's	"Open Data Camp When it is started off, some people developed some interesting applications for instance in water. We run an open data camp to bring together tech people and a few domain experts, that time we got people in sanitation, water and health. What we were trying to do is to develop apps that produce some interesting reports based on OD. At that time some interesting things came out of health and the		" ... mostly the users, who do applications, and they ...." "Even CRA are leveraging on data and when they were pinned down by politics. They said this is the 2009 census want to test these apps, those are the ones who used the data maximally. But not ordinary people, even researcher s I have not seen people in the universities			Users need to be categorised otheiwse it is difficult t attend to all the users. The origianl idea and conect o KODI was not for direct public use. Data, statistics, numbers and figures are just that for ordinary Kenyan Intermediaries in the forms of CSO, private sector, NGOs and even the public sector will bridge the gap between the raw, machine-readbale data and actionable, relevant data. This relates to formats. Ope data in its strictes form is relevant to intermediaries who can crunch the numbers and derive value. Open data with value addition is relevenat to the wider publ in varied forms of srveices and products e.g. information, maps, applications and so on.
	Typical users	First you have to be literate. .."this would need an intermediary between the data and user to translate this data for the date to be actionable. As it is many ordinary		it was driven more from a more techie side so this information was available to the technical people but you also need domain experts and IT people. You also need to		" ... I am asking you that we avail it to our people so that the youth can make the software that would help our people like in	The mwananchi (citizen) was supposed to be better informed but the technocrats including developers were supposed to create the	Any member of the publications and ICT startups that would like to build products/services/apps that improve access to the information	Users are typically techies. This was the idea from ist conceptulaization re: BN and AM. More collaborative work needs to happen between techies and indutstry/domain experts to create meaningful output from open data

Figure 10: Summary of codes and categories for Phase One interviews

What is the structure of OGD in Kenya and to what extent does it support the use of OGD in Kenya?

Reflections from this phase are used in the second phase to structure the research questions and understand the health sector data ecosystem further. Finally, this information gives a global picture on the state of OGD in Kenya. The findings presented here were achieved by applying an ecosystem framework to describe the kind of environment KODI exists in. Using primarily semi-structured expert interviews, review of secondary data sources and desktop research, each element of the ecosystem was analyzed to establish what exists in comparison to what is needed by the public as well as the normative standards. The pre-determined semi-

structured questions posed to the interviewees were developed using a-priori categories that were derived from the initial literature review and from the ecosystem framework. The data generated from the interviews were coded into these predetermined categories and the researcher recorded comments and reflections in order to capture any new themes. The data were analyzed throughout the data collection process using the same a-priori categories that were derived from the initial literature review and from the ecosystem framework. The research maintained flexibility that allowed the inclusion of any emerging indicators. Final analysis of the data took place in four stages namely: coding, memoing, comparing and applying the framework.

The Kenya Open Government Data Ecosystem

OGD is understood as existing in a setting focused not only on the technology needed but also on how the different ecosystem components and actors interact with the technology, the data and with each other. Using an ecosystem approach offers a macro and micro-view and allows one to illustrate these complex relationships where the government (the state, state agencies and civil servants) interacts with other non-state actors (private sectors, CSOs) and each plays multiple roles sometimes in contradiction. For example the role of government as the source of data, user of data, conveners of data users as well as regulator (creating and approving relevant laws) could sometimes work against the success of OGD in reality. Some components that act as inhibitors or enablers of OGD in developing countries may or may not be present in the more developed economies and may also take other forms. The following sub-sections describe the structure of OGD in Kenya and thus directly answer Research Question One.

Core ecosystem Components

i) Technology

Respondents generally agreed that the (basic) technological infrastructure and capacity to support OGD in Kenya exists and "the baseline infrastructure is fairly well established …" TECH 1 (2014, August 14) Email Interview. The country has demonstrated this capacity and continues to show commitment in investing in its infrastructure. The implementation of the National Optic Fiber Backbone

Infrastructure (NOFBI) - the government-funded fiber backbone running across the country and connecting most of the country's counties – has increased broadband services and reduced the cost of data transmission.

The technology hubs that house and 'incubate' technology-inspired innovation also form an integral part of the OGD infrastructure in Kenya. The hubs, which exhibit diversity of interests in technology, provide a space for innovators, technology entrepreneurs and start-ups to access resources and support that they would otherwise not access on their own. These hubs build capacity and technical skills and also drive demand for OGD. They are also the most likely immediate users of OGD in Kenya. The hubs are either stand-alone entities or (jointly) supported by universities, the government, the private sector and non-governmental institutions. Some examples include Nairobi's innovation hub (iHub), mLab (supported by many partners), FabLab (supported by academia and government), iLab (supported by Strathmore University) among others.

Despite these ICT developments, respondents to this research strongly noted that OGD is not about the technology; technology is a means and enabler of OGD GOV 2. (2014, August 01). Personal interview. The risk of focusing on the technology component of the ecosystem is that it could be considered to be elitist and reserved for the elite who mostly live in urban areas. OGD should not be limited to the technical (online) platform and infrastructure "it is not about the technology platform, it's much more than that. So the technical platform is sort of an enabler " CSO 1. (2014, July 30). Personal interview.

ii) Open Data

Government in its day-to-day activities collects data for different purposes therefore government data exists although not all of it is in 'open' formats. Data on national statistics is mostly available from the Kenya National Bureau of Statistics (KNBS), although this data is sometimes not available freely and has to be purchased. According to CSO respondent 2 having data as 'open' is a first good step, having it in machine-readable formats is also a good step because this is information that was previously not there and can now be harnessed in multiple ways however the format

is not the destination, open data exists in these formats for a purpose. ".... the idea was to use this information and get enough people interested and identify the change - a catalysts – the people interested in making this change – and engage them ... " CSO 2. (2014, August 29). Personal interview. Respondents insisted that open data definitions should be customized for the Kenyan context without compromising on the potential power of open data. Adhering to the strict definition of open data with characteristics such as machine-readability can limit how data is disseminated and appreciated. It can also lead to a technology-focused rather than a user-centered approaches which is not ideal.

Data management and quality

"Current data collection mechanisms may be inhibiting open data." (GOV 2. (2014, August 01). Personal interview, TECH 2. (2014, August 01). Personal interview.) Respondents suggest that digital collection of data at source would make it faster and easier to collect and update. This is also eventually more sustainable because it does not require an extra resource to key in data from manual to digitized forms. The current challenge with outdated datasets will be overcome partly by this mechanism. According to CSO 2, technology entrepreneurs (tech-preneurs) are not willing to work with the data from KODI right now because the data is not regularly updated and for them to build good applications, the data must be updated regularly. He notes:" ... But when it (KODI) began to pick up, the data was no longer updated and the whole project began to lose steam." (2014, August 29). Personal interview. Most of the respondents from the survey ranked the need for updated and current data as an improvement that is urgently needed on opendata.go.ke (see Figure 11). A significant number of respondents also cited 'better tools/opportunities to manipulate data online' and improved data download functionality' as features of the website that urgently need improvement.

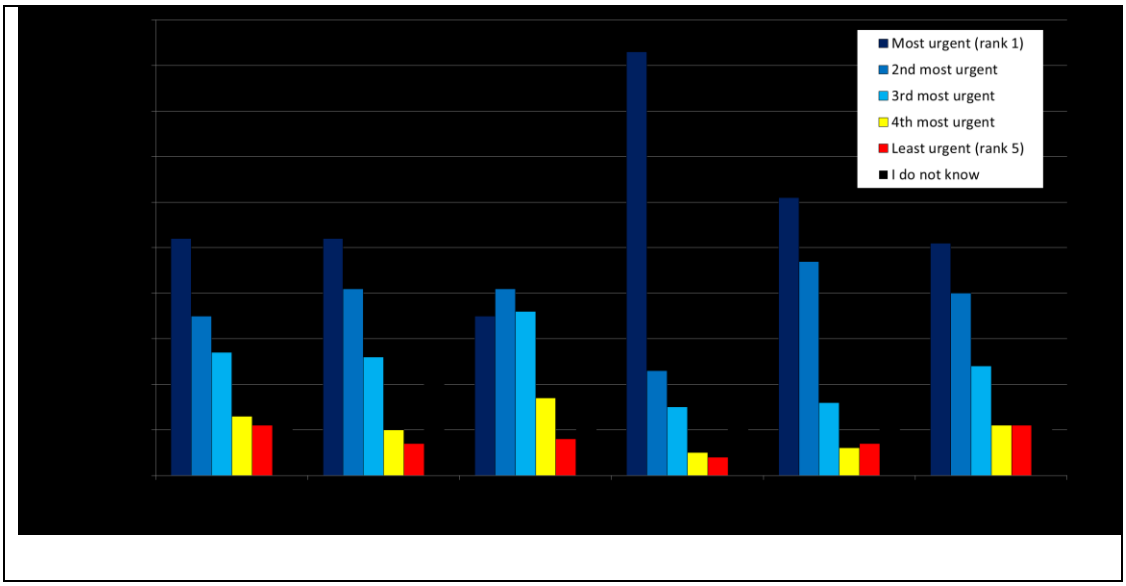


Figure 11: Ranking of data quality that users on opendata.go.ke would like to see improved.

In developing countries such as Kenya the availability and quality of government data is often questioned. This doubt was also expressed by the respondents who indicated that the quality of data should be questioned at all times regardless of whether one thinks the data is clean or not because of the context where the data is found. There are political interests and factors that are at play: case in point data on Kibera slum or on the number of Somali immigrants coming in to Kenya from Somalia through Northern Kenya. Therefore at any one point the data should be queried. On the other hand though this should not be used as a barrier to opening up of government data. The more data is out there, the more people will be able to identify errors and ideally suggest corrections to the data. Government however is afraid of this 'wrong data' or 'misuse of data' as demonstrated in these examples. This will require collaboration between the different stakeholders.

In the case of KODI, data quality is hinged on the source government agency. The administrators of KODI do not verify the data and only perform minimal cleaning. " We do not verify it; we organize it" GOV 2. (2014, August 01). Personal interview. Respondents unanimously agreed that developing standards and digitizing data collection from the source would reduce the challenge of standardization and timeliness of data. If the task of ensuring quality is left to the other data actors such as the private sector, who in most cases have the capacity and need for the data,

there is a chance as is the case now, that these actors will only select data that they need.

Another quality of data that is lacking and affects the use of data in Kenya is data timeliness - how often it is updated. It is not just the technology experts who noted the need for timely data; the civil society respondents emphasized that citizens also need timely and updated data to make decisions. Data timeliness is very important especially for it to remain relevant for the public and technology entrepreneurs. For instance when KODI was launched, many technology enthusiasts and entrepreneurs started to experiment with it. But as it started to pick up, the lack of updated data quickly slowed down the momentum that it had gathered.

Data supply and demand

Research including this one, on data demand (what people would like to see more of) as well as data or information that people have looked for, indicates that Kenyans are mostly looking for information on resources (budgets and expenditure of public money and land) service delivery from government, security, health data, election data and information on decision-making processes. This may be because resources, service delivery and decision-making processes have a direct link to the economy and the level of poverty. Public resources and use is generally a sensitive topic in most countries. It is an area that is also more prone to corruption. This research reveals that while data supply and demand should be prioritized, there is a need for a paradigm shift in the approach used to get or access more open government data. There is a need for a shift from the blanket demand for all the government data to a demand for data from which a solution to specific problems can be generated and the use of these solutions to motivate governments to release more data:

> " As opposed to saying we want government to open up all its data, which is not possible, the approach should rather be, give us this kind of data for solving this particular problem and gradually as public institutions begin to release data and see the results and impacts of data that they have released, the change in attitude and perception between supplier (government) and users begins to change gradually." – GOV 2. (2014, August 01). Personal interview.

Another perspective to data supply and demand that this research uncovered is that data demand and use is determined by how relevant the data is to the potential users. Relevance of data or information is determined by how closely the data or information relates to potential user's needs. Data demand should be driven by a motivation to solve a specific problem, which would lead to increased supply once the impact of data use becomes evident. " … Gradually as public institutions begin to release data and see the results and impacts of data that they have released, the change in attitude and perception between supplier (government) and users begins to change" GOV 2. (2014, August 01). Personal interview. For instance, national level data/information on the number of maternal deaths may not be relevant to the needs of citizens at the sub-national or county level. However, disaggregated data that shows county-specific (or even village-level) maternal mortality numbers is more relevant to citizens at the sub-national level and is "up close and personal" CSO 2. (2014, August 29). Personal interview.

These insights on data supply and demand corroborated by the findings of the survey carried out on users of the opendata.go.ke website. The survey results confirm that the most sought after general data set on opendata.go.ke is county level data with 25.6% of respondents indicating that they access opendata.go.ke in search for this data (Figure 12). This data set is followed closely by 'national level data' and 'economic statistics' at 19.6% and 14.6% respectively. In terms of detailed data sets, the most sought after data are: census data; education data; summarized county statistics; agriculture; and health.

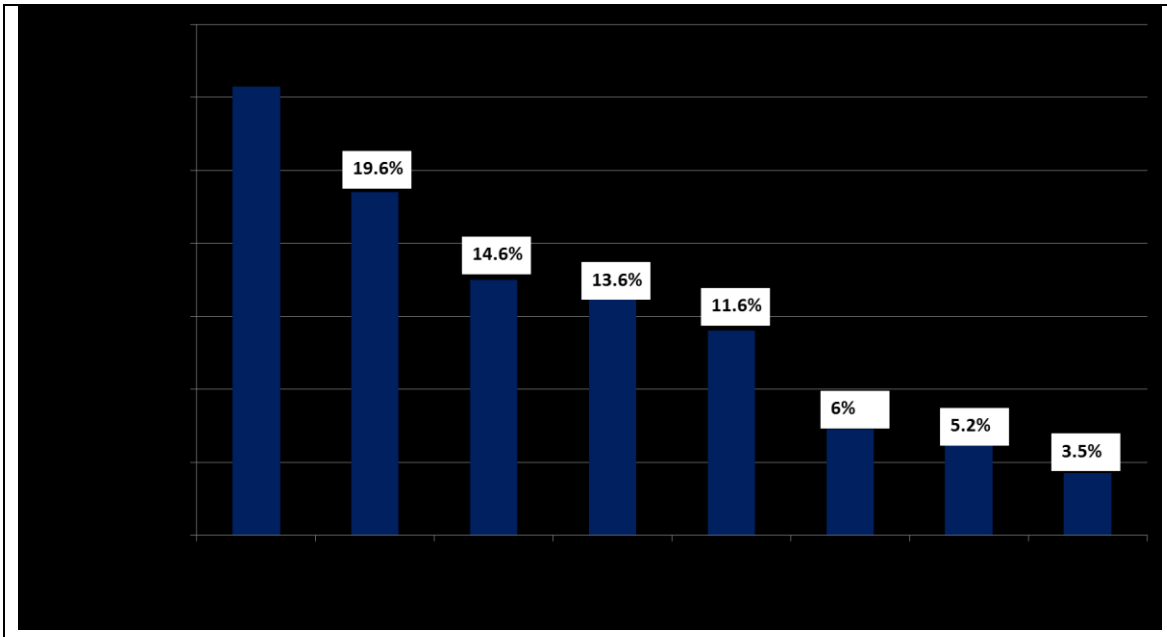


Figure 12: Ranking of general datasets in opendata.go.ke according to how much interest they generate among the survey respondents

The bars indicate the number of respondents (y-axis) who access opendata.go.ke to look for the respective general data sets (x-axis). The numbers above the bars indicate the proportion (percentage) of respondents who access the website looking for respective general data sets as a percentage of all the respondents who access opendata.go.ke from Kenya.

Further, this research reveals that, in relation to data supply and demand, making data more useful means making data more relevant to potential users and this could also include breaking any language barriers as CSO 1 notes:

> "If you centralize government information online, you are secluding a section of the population and this is again a disadvantage. And that is why the infrastructure, of how this information is made available is so critical. And this will include the issues of language." CSO 1. (2014, July 30). Personal interview.

The users

According to two respondents who were part of the task force team that developed KODI, the platform and the data was conceptualized for users who are typically technology experts often referred to as 'techies'. The original idea and concept of

KODI was not for direct public use. Their argument is that data, statistics, numbers and figures are not for the consumption of ordinary Kenyans. Intermediaries in the forms of CSOs, private sector players, NGOs and even the public sector should bridge the gap between the raw, machine-readable data and actionable, relevant and easy-to-understand information for the general public. Open data in its strictest form is relevant to intermediaries who can crunch the numbers and derive value from it. Open data with value addition is relevant to the wider public in the form of various services and products e.g. information, maps, applications and so on. According to the KODI website (https://opendata.go.ke/community-apps), 10 applications have been built using data from the government. These are applications that offer data visualizations, maps and geo-location services such as tracking budgets, schools and water points. There may be more applications as well as other uses of data from the KODI website, however, information on this is lacking.

OGD may be considered as elitist or reserved for the elite mostly in urban areas. This is reflected in the survey responses in Figure 1. Seventy three percent reside in the urban areas and a majority (over 70%) of the respondents are either university graduates or holders of postgraduate university degrees (Figure 1). According to a respondent from a CSO the people in rural set-ups who may have an idea of OGD think its a "Nairobi thing" whilst those in Nairobi feel its something reserved for a section of Nairobi folk e.g. "the techie-community." CSO 1. (2014, July 30). Personal interview. This is one the factors that led to the limited uptake of OGD (TECH 2. (2014, August 01). Personal interview). Even though the initiative was conceptualized for the use of the more technically apt population to create relevant products and services for the wider population, the TECH.2 respondent states that it should have been an inclusive project from the start. 'Techies' should have collaborated with industry experts to increase the value of their products and services e.g. apps. For example, 'techies' should have worked with health experts to develop products. This approach towards creating value and ensuring uptake was reiterated by CSO 2: ".... The idea was to use this information and get enough people interested and identify the change agents and catalysts – the people interested in making this change – and engage them. This is what the big KODI mission." "(CSO 2. (2014, August 29). Personal interview). Evidently, this research demonstrates that

more collaborative work between 'techies' and industry/domain experts is needed to create meaningful outputs from open data.

Periphery Ecosystem Components

Organizational factors/systems of government

This research found that, in addition to the lack of a freedom of information law and other supporting legal frameworks, public organizations such as ministries are reluctant to release their information because of a number of reasons: misunderstood concept of open data; cultural barriers and belief that government data are government secrets; a complete lack of awareness within government of what open data is; governments' bureaucracy; and conflicted political interest among other reasons.

> " … that is one of the failures that we had that we went to people's faces and said: "give us raw data, we want data now and someone is like no, I am not giving you my data, why do you want my data" but now that (approach) is changing " – GOV 2. (2014, August 01). Personal interview.

Further, this research found that civil servants and public officers do not have a culture of sharing government information let alone datasets on government information. Respondents however mentioned that this cultural mind-shift, although ingrained as a result of previous regimes that enforced and rewarded government secrecy as well as the existence of the Official Secrets Act, is gradually changing. The change towards open data using technology will be gradual.

> "We are starting to see government institutions put up websites, and after two weeks, you see a new button for downloads and in downloads we see reports so its starting to change … but it may take more demand for them to actually start saying lets have a separate sheet to have that out in excel formats, just the raw data … " GOV 2. (2014, August 01). Personal interview.

Importantly, as this research shows, It is still unclear how and where OGD fits within the existing government structure. Some government ministries and agencies have their own independent OGD initiatives for instance the health sector data.

Increasingly, a lot more government ministries are moving towards digitizing their systems (IFMIS from the Ministry of Finance) as well as digitizing their records (Ministries of Lands, issuing of new digital identity cards and car number plates) and publishing information in open formats such as the ministries of Finance (ePromis) Agriculture (sale of commodities in major markets), Health (Master Facility List). KODI, which is managed by the ICT Authority under the Ministry of Information Communication and Technology expects to receive datasets from all the government ministries, departments and agencies in open formats. Initially KODI was conceptualized and implemented by a task force of volunteers from private and civil societies, public sector, and the technology community, most of who went back to their own jobs after the launch (Majeed, 2013). In 2015, the Ministry of ICT embedded 8 fellows in 4 government institutions in an effort to boost data supply. Issues on who and how OGD is organized and financed raise sustainability questions. Publishing government information, sometimes regarded as secrets, may be seen as losing control and inviting criticism. "Ministries say: this is my ministry; we cannot give you the data because you are going to have power over me", GOV 1. (2014, August 19). Personal Interview. Kenya's OGD attempt to launch the first time in 2009 was thwarted by lack of political will. It took consent from the president's himself to launch in 2011. A respondent who was key in government during KODI's inception and implementation adds that when it eventually launched, it took yet more effort to get data from fellow government ministries and agencies.

Policy and Legal Frameworks

Although no laws or policies specific to OGD such as a government strategy document or open data law or even a freedom of information act (FOIA) have been enacted in Kenya at the time of this writing (August 2016), there are other more general pieces of legislation (such as the Kenyan Constitution) and guidelines that make provisions for the free access to information by the public. These pieces of law have supported and continue to support the release of government data to the public. A section of the respondents argued that these are not sufficient particularly for sustaining OGD while others argued that the presence of appropriate laws such as FOIA is not a guarantee for open data or OGD and should not therefore be used as an excuse for not releasing OGD. It is also important to note that in the presence od absence of laws and policies, KODI uses the Creative Commons Attribution Licence

which allows users to: "share — copy and redistribute the material in any medium or format and adapt — remix, transform, and build upon the material for any purpose, even commercially" (Creative commons, 2013).

While the Creative Commons Attribution Licence may cover the re-use of data (sustaining demand), respondents emphasized the importance of a legislation that will push government to release data (sustaining supply). Respondents added that laws that govern ICT also play a role although the current laws for ICT companies are 'regime laws' that limit how ICT companies grow and expand their services. The table below (Table 5) briefly describes some legislations and policies derived from document analysis that cover OGD that have been used to guide the implementation process so far.

An important finding of this research is that different pieces of legislation existing in Kenya relating to data and information are not entirely consistent with each other. The existing policies and laws contradict themselves. For example, the Official Secrets Act law strongly enforced during the former presidents' Moi era (1978 – 2002) contradicts the new 2010 Constitution. The Official Secrets Act formed the public officials' culture of withholding government information from the public under the guise of national security or official information. Most open data such as legislation data or budget and spending data would be considered official information and government secrets that should not be in public domains. However, the new Constitution washes down this law by granting the right to citizens to access all information held by the state or any other person.

Further, the laws are still not sufficient to provide a stable framework for users as well as suppliers of data. For instance, while Article 35 of the Constitution of Kenya and the county government act article 96 have provisions for access to information, these provisions are open to interpretation and can be applied broadly or narrowly. Respondents viewed the establishment of laws as the government's role. Without a policy that guides and supports the release of data, "it just becomes another personal thing" CSO 1. (2014, July 30), CSO 2. (2014, August 29). Personal interviews. Policy and legal frameworks are key to the sustainability of such initiatives such as KODI especially in a system that is constantly changing such as the government

where there are several ministries/ministers who come and go. At the subnational level, the County Government Act article 96 has provisions for access to information however both the Constitution and the County Government Act can be applied either broadly or narrowly. Other policies that support the OGD movement in Kenya include the Kenya Vision 2030, the National ICT Policy of 2006, the National ICT Masterplan 2017, the Kenya National Bureau of Statistics data dissemination and access policy, OGP National Action Plan 2, the Freedom of Information Act, 2016 and the Public Private Partnership Law. In draft form is the Data Protection Bill 2012, which is still pending in parliament.

Table 5: Description of legislations and policies and implications for OGD

Legal/Policy framework	**Implication for OGD**
The Constitution of Kenya, 2012	Article 35 explicitly grants the right of access to information held by the state to every citizen. In article 35 it states: "(1)Every citizen has the right of access to - (a) information held by the State; and (b) information held by another person and required for the exercise or protection of any right or fundamental freedom. (3)The State shall publish and publicise any important information affecting the nation." Constitution of Kenya, 2012).
Kenya Vision 2030	The Vision has as a strategy towards achieving "transparent and accountable government and to promote public participation in government through individual and community participation in activities of society decision-making on factors affecting them (Kenya Vision 2030, 2007). Although no clear methods or ways of implementation are mentioned, the document outlines the necessity of policy, legal and institutional framework.

National ICT Masterplan 2017	The Masterplan hinges its success to open standards including an open and efficient government, transparency and accountability." P.7. One of the goals of the Masterplan is to develop an infrastructure that will allow everyone affordable access to ICT tools, improve public service delivery through integrated infrastructure one of which is open data.
The Kenya National Bureau of Statistics data dissemination and access policy ***The Kenya National Bureau of Statistics (KNBS) is the Kenyan central government authority that collects analyses and distributes statistical data (KNBS, 2012).***	The policy document recognizes chapter 35 of the Constitution (the right to access government information) and terms official statistics as public goods financed by state finances. The policy agrees in general with some open standard qualities such as timely release of data and accessibility (diverse channels of distribution. However at the same time, it limits this access in the following ways: one has to submit a request for data and micro-data, disclosing nature and objective of intended use; charges fees on some data depending on type, effort used and distribution medium and it prohibits redistribution without written authority; dictates how data should be used. As the main and only government authority charged with collecting data, its policy on use, re-use and redistribution of data obtained from the authority stifles OGD development.
Freedom of Information Act (FOIA) **(2016)**	The Freedom of Information Bill, Kenya was tabled in May 2007 and was enacted into law in September 2016. The proposed law is one of the requirements for the implementation of the Constitution. Article 35 of the Constitution provides that every citizen has the right of access to information held by the State. Article 232 also

	provides that "the values and principles" of public service shall include the involvement of the people in the process of policy making, accountability for administrative acts, transparency and provision to the public of timely, accurate information. The Freedom of Information Bill is expected to bring about a culture of openness.
Data Protection Bill 2012 **(still in draft)**	This law currently in draft form is aimed at protecting citizens against misuse of their (personal) data. If passed into law it will regulate the collection, retrieval, processing, storing, use and disclosure of personal data. The law should complement FOIA by empowering people with the assurance of personal data security. The Bill's definition of personal data includes information relating to financial transaction of an individual, which may limit access to information that could create transparency and accountability. It makes it difficult to track public officials such as members of parliament's (mis) use of public funds. One could hide under this bill and claim that the information is their personal information

Conversely to the argument on the need for laws and policies on open government data, TECH 2 suggested that many may not feel the impact of a lack of a law because first the demand side is limited in terms of the number of users and worse still few users know or understand the impact of a law's presence or absence. TECH 2. (2014, August 01). Personal interview. However TECH 2 also recognized that a lack of a law also means that no one will give you data if you are not a government official. This means that ordinary citizens or members of the public may not find it easy to request for data and information from the government as the legal or policy infrastructure is lacking to compel or oblige the government to do so. CSO 2 suggested that the ideal policy should incorporate or emphasize participation of the public in the release of data whereby the public influences the release of data by the

government and can demand for the release of specific data that it deems most useful. CSO 2. (2014, August 29). Personal interview.

Further, the government should work on an interim policy and/or memoranda of understanding (MoUs) between different arms and ministries of government that will enable these arms and ministries to supply certain data to the KODI portal. CSO 2. (2014, August 29). Personal interview.

vi) Socioeconomic factors

This research found that exposure to ICT tools, knowledge and skills is limited in rural areas. This is seen in the public's preference for offline methods of data dissemination - meetings, traditional media and other offline channels. The choice of the public is informed by what they have access to (in terms of cost and availability). A limited percentage of the population will earn enough to meet basic needs and still afford to invest in an Internet connection, ICT tools and skills. Once again, OGD runs the risk of being considered elitist.

> *"... if you were to pay 30 bob for 30 minutes and you are only able to have internet for only 10 minutes, it's a very difficult decision to make because in 10 minutes you cannot read a large Excel sheet that the county government has published online and download and if you download, there is the issue of the mechanism for carrying it"* CSO 1. (2014, July 30). Personal interview.

The CSO respondent above addressed a critical component of the cost of accessing OGD in comparison to the socioeconomic status of potential users and the role this plays in how people access and use OGD. Despite the ability of technology to make OGD available anywhere and at anytime, limitations from one's socioeconomic status still remain contextual challenges that need to be tackled in order to achieve broader use of OGD with less expensive and accessible alternatives. The improvement of the infrastructure that is currently underway addresses the challenges of increased access to good quality and affordable Internet however it only goes so far to address the question of limited digital and data literacy capacity and skills.

vii) Exogenous factors

Kenya joined the Open Government Partnership (OGP) in 2012 and has since then submitted two National Action Plans that have outlined several commitments by government on OGD. These commitments include: a promise to allow greater public involvement in budget preparation and provision of essential services; improving transparency, accountability, and public resource management and public integrity among others. These commitments are evaluated in terms of implementation and impact through an independent reporting mechanism. Kenya also showed commitment to the partnership by hosting the first Africa regional Open Government Partnership meeting in May 2013. Some respondents argued that mechanisms such as the OGP can be detrimental in the long run especially if a county feels "policed" by it. Since joining the OGP in 2012, Kenya has submitted only 2 National Action Plans, the most recent one in June, 2016. Similarly, institutions like the World Bank and other non-state organizations continue to support KODI in various ways for example organizing activities such as hack-days, data training for journalists, providing technical advice and skills. By so doing they support the ecosystem – the users through events, advising government (supply) and partnering with government to promote use and sustainability. While this research shows that exogenous factors play a role and influence the OGD ecosystem in Kenya, the impact of these exogenous factors on OGD has not been systematically evaluated. Further, it is not clear to what extent these exogenous factors have affected KODI. These are issues that merit future research and systematic evaluation.

Phase Two Findings

Initially the research was designed to include case studies drawn from the public sector, private sector and CSOs. As the research progressed and after a series of interviews in Phase One and informal conversations with key informants, it emerged that the role of the donors and their implementing partners could not be ignored. This was particularly because it became apparent that the health sector and the information systems at the Ministry of Health are heavily funded by donors such as the USAID, WHO and the World Bank (Ministry of Health, 2015). In light of these insights, the research realized that donors and their implementing partners needed to

be included as part of the case studies in the research as users of data as well as facilitators of data. To this end, relevant interview partners were identified through the snowballing method and added to the research.

The data was analyzed simultaneously with the data collection as the researcher was continuously interacting with the respondents and the research tools such as the interview protocol. During data collection the data was analyzed and yielded new insights and emerging avenues of inquiry as the research progressed, a trait that is common and unavoidable with qualitative research (Pope et al., 2000). The data analysis presented in this chapter was broadly guided by the theoretical framework described in Chapter 4 and illustrated concisely in Figure 6. For the purposes of focussing the data analysis, the cases were organized according to the different sectors with respective abbreviations as shown in the parenthesis - government (GOV), private sector (PVT), donor and implementing partners (DP) and civil society organizations (CSO). The cases were first coded manually according to the analytical themes to generate categories as reflected in the interview protocol and guided by the theoretical background. These *a priori* categories were used to code the data and thus provide direction for where and what to look for. Organizing the data into these categories also made it easier to explore and retrieve the data as well as to identify concepts and themes. This is a conventional analytical strategy where specific theory or theories are used to inform the collection of data and subsequent data analysis (Walsham 2006). Importantly, the *a priori* categories were maintained as broad categories to allow for the flexibility to inductively and iteratively identify emergent themes/codes that were not previously considered during the literature review and therefore not captured in the preset categories arising from the interview protocol. Within these broad categories, the researcher iteratively identified and highlighted themes from the different data sources. The result of this iterative process was the identification of key insights from the interview transcripts that speak to different themes as exemplified in Table 6 and Figure 13 below.

Table 6: Categories and subcategories identified from the review of literature and interview protocol for analysis

Interview Protocol	Categories	Sub-Category	Explanation/examples from transcripts
Understanding of OGD	Ownership/ Role of key stakeholders	Role of government	Data custodians, government holds the data
		Role of public	The public are owners of data: they pay for the data through taxes
Use	Availability		„But government data is there and the data is very good, it exists“
	Access	Quality: Format, volume, relevance, timeliness	Disaggregated data (private sector, public sector) Aggregated data (CSO) Timely, upto date volume
		Policy/Legal access	Lack of laws „We need legal backing to access this data in order to make data comprehensive.“ Scattered/scanty laws Unclear laws Lack of awareness of laws Use regardless of laws
		Technical access	Digital vs. Manual Costs

			Technical capacity
		Political (Big-man syndrome)	Fear of the unknown – a government doesn't know its data „There is a limit to how much of the aggregated data that we can share. We are open but not everything is just that open.“ Data is power – giving out data may mean losing some power Access based on relationship and networks Accessing data is done as a favour
		Resources and human technical capacity	„We work with them to translate data to common language“
	Use	Direct	Data for decision-making Users directly participate in decision or policy making
		Indirect use	Using data to create awareness or to inform eventual decision-makers Users do not directly participate in the decision or policymaking- data 'midwives'
		Value OGD brings	Advocacy Tools for governments and other health stakeholders to use e.g. private equity

			decision tools
Influence of OGD on participation	Government engagement	Linking data use to government accessibility	„ ... we ask hard questions and they try to explain it to us as per the data and their understanding.“ Level and quality of engagement testified by the respondents
	Government responsiveness	Government more responsive to citizens	Presence or lack of political will and trust „ ... responsiveness has been there as a result of increased access to data because more people are looking at the data and identifying discrepancies.“ „There is a limit to how much of the aggregated data that we can share. We are open but not everything is just that open.“
	Level of Influence	Level and quality of decisions an policies	Level and quality of decisions an policies made as a result of users of OGD contributing or influencing decision and policy-making

	CSO 1	CSO 2	CSO 3	CATEGORIES
USE OF DATA	More often, the data that is coming it is palatable – easy to understand. They are majorly an indicator, by county/sub-county so one can track and compare the data. But I have to say that at times, there are times we need more than what is seen e.g. coverage of an intervention is 85%, when you just look at it as coverage across urban and rural areas, then one has to interrogate the data a bit more e.g. by looking at physical numbers so one has to interpret this more than by merely looking at the coverage. So we also try to use networks and the give to try and understand what this means in	**Use of data:** If you look at national data be it routine or otherwise, it is normally summarized. Unless I am writing a paper, I just get a copy of the data. The data is normally summarized to a higher level e.g. in DHIS. For us, we look at the different incidences and prevalence of different diseases and this is what we use to advocate for better delivery of health services e.g. current stats on HIV/Aids, we look the number, what it means .... We look at info as is presented and advocate for better heath services. We really do not manipulate data further; in any case the data is already aggregated. This is what people can use in every day work e.g. proposal-writing, advocacy. I don't think health data has any accessibility issues	**Use of data:** What we have done is we have an M&E office for the org., but considering that the data does not necessarily belong to us then we have collaborate with the government so that if we needed to go through a number of data for some counties then they would need to come and break it down for is so we ask them to break it down for us. We work with them to translate data to common language to inform our policy, fundraising and proposal writing. We implemented a project once and the data showed us that we have about 14 counties where the	**Access: technical.** Most of CSOs appreciate and need the data in its highly aggregated format. If there is need for data to be further interrogated, as is sometimes the case, the CSOs seek further support from government either by asking specific questions or working with them to translate the data into more common language. However they also recognize the need for extra resources in the case of DHSI 2 data **Access: availability.** For most organizations working in health, when there is no access to specific data, the CSO will more often collect their own data, which they could feed into government data if needed. However for communicable diseases, the challenge is that CSOs cannot go out and collect the data e.g. from an infected patient Hence the need for innovative data collection solutions. – "So this data they will not give you although I cannot interact with the TB patient who is smear positive, however I cannot get

Figure 13: Coding schema of phase one transcript data

Case Study Analysis: OGD in the Health Sector in Kenya

The health sector is one that depends a lot on data and information for planning, management and delivery of health services (Kenya e-health strategy 2011-2017). As early as 1972, the Ministry of Health (MOH) and other partners had begun to conceptualize a health management information system. This evolved over the years from a manual system to a web-based open source software known as District Health Information Software 2 (DHIS 2). Policy frameworks needed to support these efforts were put into place such as the Health Information Policy (2014-2030) as well as the e-health strategy (2011-2017). Health information systems and information for citizens forms two of the five pillars outlined in the strategic intervention of the e-health strategy, which acknowledges the significance of information systems as well as citizens' access to information. OGD in the health sector in Kenya has resulted in several platforms – key among them being the District Health Information Software (DHIS2) and Master Facility List (MFL) described below.

The District Health Information System 2 (DHIS 2)

In 1972 a committee composed of the MOH, the World Health Organization (WHO), the then Central Bureau of Statistics (now the Kenya National Bureau of Statistics – KNBS) and the Attorney General Chambers was tasked with developing a Health Information System (HIS) for Kenya. The mission of the health information system was to provide quality health service data for informed decision using the available but scarce resources in the Health Sector (Health Information Systems of Kenya, 2008). The system progressed and HIS offices were set up in all districts where all data from all health facilities would be processed.

This system faced challenges as its deployment and implementation spread throughout the country, some of which it continues to face even today. For example, problematic data management and reporting systems have resulted in poor quality data, which precludes the data's viability for use (Karuri et al., 2014). With the advent of ICT, demand for good quality health information began to rise (Karuri et al., 2014). Proliferation of ICT has also led to government reforms in the sectors that use technology to improve workflow and service delivery. Between 1998 and 2012, the system was revised and upgraded to an open source web-based system that was designed to "… facilitate generation, analysis and dissemination of quality health information for informed decision making" (Karuri et al., 2014, pg.39).

The Master Facility List (MFL)

The Master Facility List (MFL) is Kenya's attempt to provide institutions with the data they need most "for planning, programme and resource monitoring, and performance-based review" (Ministry of Health, 2010). The MFL is a tool developed by the Ministry of Health (MOH) in 2010 with the support of several development partners. It is the official list of all facilities providing healthcare in Kenya and it is maintained by the national government. The MFL was developed to strengthen the country's health information system by providing a single authoritative source of data on health facilities in the country. The MFL, also accessible via an application programming interface (API), contains data on: number health facilities in the country; level of healthcare provided at each facility (e.g. primary versus specialized care); number and expertise of health workers at each facility; capacity of each facility (e.g. number of patient beds available); the name

and contact details of the heads of each facility; diagnostic tests done at each facility among other data. The MFL is regularly updated by the managers of individual facilities who submit information about their facilities to the ministry of health headquarters using a unique code assigned to each facility. The Kenya Open Data Initiative (opendata.go.ke) also contains open data on health. Most of the data sets available on KODI are sourced from the two open data sites described above (MFL or DHIS 2).

Conceptualizing and understanding of OGD

The interview process began with an inquiry into the respondents' perception or understanding of OGD and a further interrogation of what OGD platforms within the health sector they were aware of, which one(s) they were using and why or why not they were using them. The responses were mostly focused on the aspect of 'open' and respondents related this mostly to ownership of data.

Role of Government

According to this research, the consensus is that the government is the central player or actor and the custodian of OGD within the ecosystem. Interviewees in this research submitted that since OGD is collected using public funds across government's different ministries, departments and agencies government has an obligation to make data accessible. Despite the shared understanding of the meaning of OGD even within government, this does not translate to more openness of government data. Data of different types is scattered across various government institutions, is to a large extent not organized in an accessible format which is part of the reason why accessing data is difficult. In addition, the public service culture within government institutions does not demonstrate the obligation to make government data open. This makes availability and access of OGD a challenge in Kenya.

Counties at the sub-national level of government present both significant challenges and opportunities to opening up government data at a large scale. Since Kenya adopted a new constitution in 2010, health as a government function has been devolved to county governments. This means that decision-making is at the sub-national level although some decision-making still happens at the national level. With regards to health data, the two open data systems i.e. MFL and DHIS2 are

managed at the national level of government. However government officials at the subnational level have the responsibility of collecting health data starting at the very local (community) level to the county level and keying it in to DHIS2 and MFL. Despite this organizational structure, there are no clear policies on how flow of data and quality assurance of the data collection and warehousing should be done. Even though data on DHIS2 and MFL can be queried to show county-specific information, county governments have not fully appreciated the value or need to collect and remit high quality data into these two open data systems. On the basis of these findings, this research shows that there is need to improve the collection of health data in Kenya. This can be achieved in part by demonstrating the use of data warehoused on DHIS2 and MFL to county governments and thus securing their commitment to collect and remit good quality data into the two open data systems.

Role of the public/citizens

Respondents to this research were also are clear that OGD is data that is owned by the public. According to a monitoring and evaluation officer at a development partner organization: "Government spends a lot of our *(public)* money to get data … .We do not need to spend our resources to collect or get data" DP1. (2015, August 11). Personal interview. As a result respondents strongly agree that the citizen/public have a right to data that is accessible and free to the fullest extent possible. The public also has a role in interrogating the data. However, respondents also pointed out the low level of awareness among the public as well as within government on the availability, usefulness of data as well as the possibility of the public to own data that is generated or collected using public or government funds. One of the journalists interviewed in this research stated that sometimes there is good data at the government ministries but people who need it are not aware that it exists. Additionally, the government does not always know what kind of data they have and are therefore scared of giving their data to journalists. This has a negative effect on the supply of data, responsiveness of government as well as the ability of the media and the general public to use data to hold government to account.

Role of other stakeholders

This research revealed that other stakeholders such as development partners (DP) and the civil society organizations (CSOs) play a crucial role in the OGD ecosystem

in Kenya. Respondents to this research stated that sometimes the DPs and CSOs generate data that is used by government and as such, the exchange of data between the government and non-state actors happens both ways. The health data ecosystem players, especially the development partners (DP) and the civil society organizations (CSOs), as part of their support to government, generate or facilitate the generation of data. At the same time, they also use OGD and their own data directly e.g. for advocacy or indirectly for instance by adding value to data that can later be used by government for decision-making.

CSOs and DPs have a close, sometimes collaborative, working relationship with government. This makes it easier for them to access government data as opposed to other actors who do not have such a close relationship. This is an important insight since, to a large extent, sourcing for data that is not available on open data platforms as well as getting assistance from government in interpreting or analyzing data relies on these relationships and networks.

The role of DPs in the OGD ecosystem in Kenya is also demonstrated by the amount of money contributed in to the health sector in Kenya. For instance, DPs contributed 26% of the Kenya‘s total health expenditure of KES 234 billion (US$2.7 billion) in the 2012/2013 financial year. This contribution is equivalent to KES 61 billion (US$0.7 billion) thereby accounting for 1.8 percent of Kenya’s GDP (Ministry of Health, 2013a). Part of this contribution has financed initiatives such as the DHIS2 and the Master Facility List and other data initiatives are heavily reliant on this funding for their sustainability.

Use: Availability

Within the health sector there is a lot of data that is collected on a daily/regular basis as well as on more periodical basis. Regular data is collected everyday at every facility while periodic data is collected annually or in specific periods of time. The health sector is inundated with organizations including development partners and CSOs who are keen to collect and use data on health especially where government data is non-existent or unreliable. These organizations are also willing invest in collecting the data by themselves. A program officer at an AIDS CSO organizations states that: “We have some strong data lying with partners, which cannot be wished away when you want to make some strong national decisions for example we have

had challenges with paediatric HIV, which is with some partners …" CSO 4. (2015, October 28). Personal interview. With regards to open data, respondents acknowledged that it is available although scattered and insufficient to enable affective engagement with the government. They stated that more OGD should be made available in organized and accessible formats to increase their use by the public and other stakeholders in the OGD ecosystem.

Use: Accessibility and Quality

Despite the availability of health data in Kenya, the formats in which it is published by government often do not comply with OGD standards i.e. they are published in PDF formats such as in scanned documents or even physical reports, which makes accessibility difficult. A respondent working with a development partner noted " … They (*government*) are willing to give you in paper but not electronically" – DP1. (2015, August 11). Personal interview. The format of data that is expected from the government, and likely exists, is csv/excel however a lot of data is still found in PDF format, implying that the government might be deliberately only releasing in PDF format. This also means that the users have to either scrape the data from other sources to get raw, machine-readable data or try to access the primary source of the data in the form of a physical report and digitize this data - all this translates to unnecessary and extra costs that are incurred by stakeholders in the OGD ecosystem in Kenya. Even when in open formats, respondents complained about difficulties in finding open data within government websites. For example, respondents submitted that they find APIs are hidden deep inside the websites. A journalist working with one of the major media organizations in Kenya and who had previously trained fellow journalists on data noted that "people would upload their reports and data but 'hide' them within their websites to avoid extra work and enquiries from curious readers and users" – PVT 3. (2015, August 12). Personal interview. Sometimes this data is available in a digital format however selling the data provides the government with revenue as is the case with KNBS that sells some of its printed reports.

Respondents unanimously agreed that the data although largely relevant is scattered, untimely, incomplete, not up to date, unreliable, sometimes inconsistent. Further, Government sometimes avails preliminary or incomplete data that is yet to be

verified, which makes it unclear for users on if and when they should use the data. This affects not only the integrity of the data but also the integrity of the OGD users' work e.g. journalists. Once data has passed through a validation process, the datasets are then deemed as accurate. This process, although useful in assuring users of the quality and validity of the data, can deter some users who might need data faster for instance journalists working in the newsroom.

The extent of accessibility of data in Kenya is complicated by the fact that different sectors need different kinds of data depending on their use. Most of the CSOs appreciate and need the data that is highly aggregated and validated while the private sector was insistent on disaggregated and interoperable data. CSOs stated that if there is need for data to be further interrogated, as is sometimes the case, the CSOs seek further support from government either by asking specific questions or working with them to translate the data into more common language. However they also recognize the need for extra resources in harnessing data in the case of DHIS 2 data.

Policy and legal access

Respondents still use the data despite the absence or ambiguity of existing law(s) on open government data. In fact most of the respondents admitted that they did not think of any legal or policy implications when accessing the data. Nonetheless respondents who handle the data on behalf of MOH stated that they rely on MOH's legal and policy guidelines and standards even though these contain only scanty legal clauses on data. Other respondents said that they rely on their organizations' understanding of the law. The absence of clear policies and legal instruments to govern open government data has made some of the users of government data to be over-cautious on how to handle data, which can be an impediment to accessing, sharing and re-distributing data and thus preclude the realization of the full benefit of open government data.

Existing laws and policies lack clarity on the use and distribution of data. Different legal frameworks/policies are sometimes divergent and redundant e.g. MOH has its own rules/regulations (which sometimes differ across departments within MOH) while at the same time KNBS has its own regulations and guidelines on non-disclosure agreements (NDA) and ethics approvals. The existing laws do not also give a clear indication on who is responsible for (which) data and where one should

go if he/she needs data especially if the data is not freely available online. This legal/policy vacuum has resulted in stakeholders in the OGD ecosystem relying on their networks (of friends or acquaintances) within the government to access data. This pattern is consistent across all the respondents who have had to rely on a person/individual or their networks in order to get data (in the required format) since they have not been able to access the same data on a platform such as an online system.

The reliance on these non-official means of accessing data brings with it challenges related to the timeliness of the data. The respondents to this research indicated that sometimes the data they need urgently is delayed indefinitely thereby losing its time value. In this regard, if the data was readily available online and freely downloadable, the time value of data would be preserved in turn allowing the respondents to realize more value out of government data.

Further, respondents (including persons working within MOH and the government) feel that even if there was a law governing open government data its implementation would still be a problem. Health data is particularly sensitive as there are a lot of ethical issues to ensure that the data is anonymized. There are no clear guidelines on what data should be collected and published and what should not: "so they need to separate what should I give and what should I not give in terms of information." GOV 5. (2016 , July 01). Personal interview. However some of the employees in the public sector and even within MOH do not understand the importance or are unwilling to share data with their colleagues. Two major reasons are cited for this challenge in sharing data:

- There is a disconnect between institutions because of digital/non-digital processes at the different levels of data collection
- The existing laws and policies are limited and prohibitive especially because of the sensitivity of the patient-level data. A high-ranking official within the MOH admitted that he could not acquire certain data because some health facilities were not cooperating in supplying the required data.

As a result of challenges in sharing data, the Government sometimes goes to the extent of not realeasing health data to the public up until people or organizations that

need the data request for the data formally and in writing. In some cases, the requesting organizations have to accompany their requests for data with research protocols that describe what they intend to do with the requested data as well as proof of ethics approval to handle the data from a recognized ethics committee. The requirement for written requests and research protocols and ethics approval documents often lead to delays in accessing data. Interestingly, because of the lengthy process of requesting for data, some respondents noted that even if laws governing OGD were in place, they would be more of a bureaucratic barrier since they may provide a legal basis on which government will demand for written requests before releasing data. This might depend on the how the law is written and the provisions within the specific law. Nonetheless, respondents agreed that having a good law in place would provide benefits that would outweigh the potential risk of legalizing lengthy data request processes. Respondents appreciate that a well-drafted legislation will be helpful if it will compel the government to release data in open, machine-readable and timely manner. Further, the respondents submit that such laws will guarantee that stakeholders in the OGD ecosystem can have unlimited access to government data of sufficient granularity for instance when they (the stakeholders) can clearly see that the government is only releasing a small part of the data yet there is more data in government's custody. Additionally, the respondents concur that laws governing OGD will save them time in accessing government data if they provide clear provisions as to how much time the government has to release data once it has been requested for as in the case of most access to information laws..

Technical access

The availability of data online and in digital format was found to be the optimum for the users interviewed in this research. Most of them accessed data through various government websites that they were already aware of as well as data platforms that were specific to their area of specialization such as TB and HIV specific data sometimes not necessarily open. Accessing the data did not require any particular or specific technical skills. Online is prevalent and most preferred method of accessing the data, although the data is not always accessible in this way. This method is preferred because it is easier and faster as opposed to making a request to a

government authority, negotiating access, getting into legal arrangements and waiting for approvals and so on.

Access to data online also allows OGD users the flexibility to get the data that they want, when they want and to use it they way they want because different users need data in different formats for different purposes. When making requests to government especially for hard copy reports, the format of the data is irrelevant. Online accessibility also makes the data easier and cheaper to work with for instance when querying the data on a computer.

There was a mention of too many sources of data each in different standards including non-digital standards making it difficult to easily analyze the data across the different sources. In order to be useful and effective, the available data should be interoperable: "*Its better to compliment DHIS2 data with periodic studies that are household based and generate health information that one can say this the prevalence of a disease "* – CSO 3. (2014, August 04). Personal interview. Periodic data can give an overview and more reliable set of data with regards to prevalence while more routine/daily data is also useful for breaking down and quickly analyzing diseases, number of births etc. At the same time, data available across many sources sometimes contradict each other e.g. between the MOH and KNBS. One national coordinator for a CSO that brings together many health CSOs remarked:

> *"We are going into a phase of mainstreaming and integrating health issues e.g. nutrition vs. economic empowerment, HIV vs. food/nutrition. One data should really inform the other, this way we can look at data as a whole so that data is really telling us what is happening."* - CSO 5. (2015, October 2). Personal interview.

The above statement indicates that data is still siloed and there are no linkages on data in different government ministries and institutions.

Resources and human capacity

The capacity of public health workers to collect and handle data is often lacking. Part of the reason is lack of dedicated resources especially human personnel to ensure that data is collected accurately and put into existing systems in good time. This forces in one way or another 'others' such as development partners of

government to handle the data. Findings also point towards the fact that this is also allowed because the law remains unclear on who should handle what kind of data.

Most of the organizations in this research have the resources that they need to use and re-use the data e.g. statisticians or data scientists especially the development partners and the private sectors. Once they can access the data, they are able to use the data they way they want especially if data in its raw format. Analysis of data is therefore not a distraction from their daily work and neither does it present an extra layer of work or costs for them as they already have the capacity to handle the data. However for some CSOs the resources needed to analyse the data for different uses also often lacking e.g. a statistician to analyse the data.

Findings also show that there is a prevailing data literacy challenge - understanding interpretations of the data enough to use it to push forward specific agendas. However sometimes data literacy was also relayed to mean that data exists but people for whom it is targeted do not know it exists or do not realize the value that data can have enough to pursue or look for the data.

"*However they cannot participate in the budget cycle if they did not know what they should be pushing for in the budget – you must understand what the data is saying – this is what we are trying to do"*CSO 5. (2015, October 2). Personal interview.

PVT 2: "*You may find good data sitting at the ministries but the person who needs it is not aware e.g. counties at the beginning of devolution did not know whit her counties looked like because they were coming from provinces and government data was always broken into provinces, yet Treasury had come up with something that had broken down the data so you find a county government comes in and does not know how much it costs to run their county and estimate the budget and realize a few months later that the budget set out was not sufficient. For us, we would show them the data and they can make better-informed decisions."* PVT 2. (2015, July 10). Personal interview.

Some respondents simply labelled this kind of behaviour as the government not caring about the data and what it says. Its not that data is not there - it is just that people that should pay attention e.g. the government are not paying attention to what the data is saying:

PVT 2: "*Sometimes you even shock someone if you ask them something that they thought they knew does not exists e.g. I went to West Pokot I was talking to CEC health (County Minister for Health) ... They don't pay attention to what data says and what the importance is."* PVT 2. (2015, July 10). Personal interview.

Political and institutional access

All respondents pointed out that access to data relies to a large extent on the relationships and networks that one has within the MOH. Although the MOH has various knowledge dissemination activities where stakeholders are made aware of any new reports, accessing the actual data/datasets depends on friends and networks: "…so finding data currently means just calling someone at the MOH or another network to link me to MOH" CSO 5. (2015, October 2). Personal interview. Essentially the stronger the relationships the easier it is for users to access data. For most organizations working in health, when there is no access to specific data, they will more often decide to collect their own data. For other organizations and individuals who are not able to have to rely on government data, use becomes limited and tedious. For example, a journalist working with a private media organization narrates:

> "*But government data is there and the data is very good, it exists somewhere you just need to know how to get it. You build the networks that are important and the people that are there and so people can even add you to the mailing list but there must be something that you can give them in return but it must not be so much because this might compromise the integrity of the journalist or the story e.g. they might give you data but restrict how far you can use the data and this might be data that is valuable for your story or to the viewer… Getting the data is also relying on someone who in their minds is doing you a favour and this has to be facilitated by buying coffee, a flash-disk, fuel to the office, printing paper etc. (money). Also this takes time to get the data."* - PVT 2. (2015, July 10). Personal interview.

One important concern that was raised by the CSOs is the distrust in government data and in government itself. Notably, respondents questioned if the data that is being availed is actually all available data or if what is being published is data that is convenient or 'safe' for the government – data that makes them look good. "We are

never sure that that is the data they have – they only share the data they have agreed to share with the public“ CSO 4. (2015, October 28). Personal interview. On the other hand, respondents from the public side expressed similar distrust in potential users stating that they were not sure how people were using the data. To access DHIS 2 through Application Programme Interface (API) one needs to seek the API from MOH, inform them why and how they will use the data. APIs allow systems to stream or access data from each other automatically. Government mistrusts who and how people use the data and therefore restricts who is accessing the data (location) and also how the API is distributed. The rationale is that data is a sensitive security issue, data is political and data is power. An administrator of one of the health sector OGD platforms says the government prefers to open aggregated data to disaggregated data. “There is a limit to how much of the aggregated data that we can share. We are open but not everything is just that open” GOV 3. (2014, August 01). Personal interview. In addition, users outside Kenya’s borders cannot access the data as was the case previously with the government officials stating:

> *“ ... we cannot cook food and feed outsiders ... Developed countries will not give you their own very aggregated data for all access. In fact it’s only us developing countries that have been too generous with our data. W are saying lets be open but there are security and privacy issues” and “You guys talk about open and open by default but how open? You realize that its open but there are measures, which have to be put in place to protect the interest of countries. Somebody must define for himself or herself what is open*.” GOV 3. (2014, August 01). Personal interview.

Use: Actionable

Findings indicate that there is increasing use of data in the health sector and in the country in general. In terms of users, the MOH clearly identified the following groups or levels of use of their various OGD:

- Partner level – have some targets to meet and are therefore good user
- Policy level – not very good because of political interference.
- Program level – good users because they are able to measure programs from day to day

- Facility and community level - there is some use but not adequate because they only use when there were problems

Different users depending on the level at which they interact with the data have different views on the quality of data. The private sector, especially the media link quality to relevance of accessible data. Where accessible data is not relevant, respondents noted that they had to buy the data. Similarly, the private sector highly valued disaggregated data that can be queried and responded to for easier manipulation. The CSOs on the other hand indicated more demand for aggregated data that they can quickly use for policy, advocacy and grant proposals. Development partners also found the data usable however they have the option and the ability to getting their own data.

Users find that the available data is generally good but not enough to lead to action; this is because either the data was not relevant or was not in the format that they want. The data 'midwives' on the other hand are more involved in the back-end handling of the data and from their perspective, the quality of the data is not good at all. OGD users in this study valued government data and noted that OGD use gives them credibility especially when engaging with the government as it is more acceptable to local users and policymaking. OGD is relevant and gives guidance because it is government's own data and makes it easier to use the data when interacting with government officials. At the same time though, respondents stated that OGD is not very reliable or trusted mainly because of the way the data is handled e.g. discrepancy, tardiness in reporting making it unreliable and not useful for making decisions based on the current state of health. Respondents noted that the influence of third parties such as donors or other CSOs in the data process makes it a little more trustworthy and of better quality. The involvement of third parties also gives confidence to the potential beneficiaries of data because they believe that without these other partners, data would never be published or it would be politicized e.g. census data.

> "*I think the quality of data is good (Scale of 1-5 = 4). I trust the data because normally government does not collect the data by itself normally there is a partner such as the WBG and therefore there is another party that is*

interested in the data and for whom the quality of data is in their interest. " PVT 2. (2015, July 10). Personal interview.

From the findings, and testament to the diversity of the sectors of the respondents, their use of OGD fell into two major groups: direct use and indirect use of OGD for participation in government.

Direct Use

Direct users accessed and used OGD to engage directly with government and policymakers in making decisions and policies that affected the health sector. The motivations behind this use range from accountability and transparency checks to more technical application such as influencing policy during meetings of TWGs e.g. to review malaria policies and strategies based on OGD accessed.

Typically the CSOs use data to influence policy and decision-making e.g. by participating in different technical working groups (TWGs) where CSOs directly engage government but rely on data to push for their agendas e.g. to increase funding and commitment by government. Here OGD is a viewed as a tool to lobby or advocate for health issues and agendas e.g. " … and we have done this successfully where we use data on prevalence and uptake of ARVS – where we say increase" CSO 3. (2014, August 04). Personal interview.

Indirect use

Indirect use of OGD is when users do not use the data to make decisions or policies in their engagement with the government. OGD users act as data 'midwives' or 'intermediaries' by improving the quality or usability of the data or strengthening data gaps on behalf of government or other stakeholders This involves looking for the data and adding value or converting it into formats that their clients can use to make decisions. This also involves easing the flow of data by facilitating the pipeline of data between various partners as well tools that allow the flow of data e.g. between facilities Sometimes this can also be through developing the capacity of their clients to use the data and eventually helping them deliver health decisions using data.

The private sector respondents tended towards making tools for government and private sector (decision-making tools) to inform decisions such as the viability of

opening up a new health facility based on the distribution of existing facilities and the health care demands in a given location e.g. the MFL tool that gives one an overview of all health facilities in Kenya.

CSOs also use the data to engage and create awareness in the citizens either directly or indirectly. Citizens empowered by OGD can also use this information to directly engage with their policymakers. Accessed OGD is also used to make a case for funding during proposal writing processes by the CSOs. The journalists interviewed also viewed their roles as that of enhancing data by playing the role of an intermediary or 'informediary' where they can use OGD as a starting point to understand a phenomenon or to strengthen their storytelling in form of stories or visualizations.

Influence of OGD use in participation

Government Engagement

This research shows that, in general, OGD has increased participation of non-state actors in governance. Improved government engagements with non-state actors have been partly attributed to the willingness of government to embrace ICT, which enables OGD. ICT has improved the capacity of non-state actors to engage with government and hold it to account especially because it has made it easier for these actors to access government data and use it to question government's decisions and actions "Whenever we are in meetings with government, we ask hard questions and they try to explain it to us as per the data and their understanding" CSO 6. (2015, December 04). Personal interview. This shows that non-state actors such as CSOs are able to engage and question government as a result of their access to data. This informed interaction between non-state actors and government is expected to improve the quality of governance.

Government, especially county governments to whom health as a government function has been devolved to, is beginning to realize the importance of releasing and also collecting accurate data. On the other hand though, government is still suspicious of digital technology and the lack of clear policies on OGD release and use compounds this suspicion. An administrator of one of the health sector OGD platforms pointed out that; "There is a limit to how much of the aggregated data that

we [as government] can share. We are open but not everything is just that open.“ GOV 4. (2015, July 30). Personal interview. This limited approach to opening up government data promotes a culture of secrecy, a siloed way of working and even corruption especially when this becomes a rent-seeking channel for government officials. It also promotes what this research refers to as the ‘big man syndrome’. This is a situation where there is an individual at a government office who has a stranglehold on OGD and therefore controls who, how, when and if people can access and use the data and information. A CEO of a technology firm that deals with health-related OGD noted: “ ... access to data also involves knowing someone and relationship-based. Maybe people fear accountability” PVT 1. (2015, June 30). Personal interview.

Government Responsiveness

In general, government has become more responsive to non-state actors as a result of data use. Government officials are more accessible and easier to engage with and data is generally more available now than it was before the launch of KODI. There are many forums set up between government and non-state stakeholders such as TWGs, roundtables, annual meetings and so on where OGD users rely on data that has been made publicly available to engage with government and drive discussions and decisions related to the health sector. Respondents also pointed out that government is more sensitive to what OGD users say and also what role data plays in guiding their decision-making. This is evidenced by the fact that sometimes government even uses data generated by CSOs (and not just government generated data) in decision-making processes. A senior public official at MOH admitted that that they (government officials) have become more responsiveness as a result of increased access to data because more people are looking at the data and identifying discrepancies. GOV 5. (2016 , July 01).Personal interview.

The increased responsiveness of government to OGD and its users is however slow. Respondents noted that there is potential and need for government to be more responsive in releasing government data and engaging with OGD users. At the moment government is only sharing what it must share. Respondents cited several reasons why the government is not yet fully releasing government data . First, government does not fully understand its own data and what people’s data needs are

and is therefore unwilling to respond as fast as the increasing demand for data. Within government, people are not aware of the data they have or the value that it has or could add to their work. As a result the level of openness of data is restricted and government only releases what they feel is safe. This could mean that the data is not in open formats i.e. in PDF or in a report or the data is not relevant to the demand.

> *PVT 2: "… sometimes one can see from what is available in public domain, one can see that there is more. And this is where the FOI law is needed, you can request for it. So that is where its starts to get frustrating, when you see there is more or also when there is no access to granular data e.g. data at the county, sub-county level."* PVT 2. (2015, July 10). Personal interview.

Secondly, because of the factors already mentioned, there is distrust between government and non-state OGD users especially CSOs. Government is uncertain of its own data and what it says about the state of health as well as what people can do with the data: "… at times it sounds like they do not release data that will embarrass them." CSO 5. (2015, October 2). Personal interview. Thirdly, there is a lot of political influence, which is a barrier to releasing OGD. "Government does not want to say they have improved health outcomes by 10% when there really has been 5%. Politicking has slowed down the development. They are not releasing the content that we need." CSO 5. (2015, October 2). Personal interview. Respondents added that there are no champions at the senior levels of government to push the OGD agenda and reverse the perception that IT and computers are too complex to understand. Finally, the public service culture that exists is one where people do not feel obligated to serve the public with data and this is compounded by bureaucratic and slow government systems.

Impact and influence in decision and policymaking

Despite the challenges in engaging government and making government more responsive to the OGD ecosystem, with the support of CSOs, citizens have increasingly become more aware of OGD and how they can use it to engage government. "It has had an impact they realize that we are using their data we are informed – we are not ignorant. Before I take on the government or anything, I

check my data and sources.“ CSO 5. (2015, October 2). Personal interview. A lead manager/director at an umbrella organization for CSOs in health shared their readiness to support parliamentarians with data-driven decision-making: “... when there are contentious issues e.g. co-financing certain things and if we see that government is going to default we speak to specific people within the parliamentary health committee We will feed these people with a lot of information and tell them what the data is saying in terms of indicators.“ CSO 6. (2015, December 04). Personal interview. Despite the improved level of influence, respondents noted that there is still not enough actionable data for the citizens to engage government with.

> *“Now they are a lot more sensitive to what they are saying and this government there is a lot more attention in terms of trying to do stuff guided by data and they are paying more attention although it is still not enough. Different ministries are at different levels, some care and some don’t care but I think it is more or less they are in a space where they have to justify their use of money. They are not sharing all the data that they have; they are sharing what they must share.“* PVT 2. (2015, July 10). Personal interview

Overall, this research found that so far OGD use has led to some actions that have generated positive impact in terms of improvements in healthcare service delivery by the government. These include:

a. Unearthing of corruption
b. Redirection of how decisions are made such that decision-making is based on data and evidence
c. Exposure and questioning of the quality of government data e.g. the true prevalence of HIV in Kenya
d. Emergence of a more patient-centric approach to healthcare service delivery as evidenced by emerging discussions on patient health records and access of patients to their data
e. Evidence-based approach to resource allocation at the MOH e.g. people know where they need to work and on what diseases to prioritize on based on a host of data’

Summary: Integrating phase One and phase Two findings

This research reveals that, overall; there is increased demand and appreciation for OGD in Kenya. Specifically within MOH, government is beginning to recognize the potential of OGD and its impact on decision and policy-making. The broader ecosystem components explored in phase 1 of the research are also reflected in the case study. In this regard, the ecosystem framework is validated as a framework that can be applied to conceptualize OGD initiatives in the health sector in Kenya.

Findings from both phases confirm that Kenya's OGD environment has developed and supports OGD use however there are deficiencies and imbalances within the ecosystem. For instance, while the demand for OGD has grown over the years, the government is releasing incomplete or just some little data, which is at times not in machine-readable formats and is neither accurate nor timely. The non-state actors realize that while government is releasing incomplete data, it has a lot more data in its possession that it is not releasing to the public. Respondents claim that what the government has made available and accessible is not sufficient in terms of volume and quality. There is demand for information and OGD from many stakeholders. Some of these stakeholders are demanding for specific kinds and formats of OGD depending on their needs. Against this demand, government oftentimes releases data in generic and aggregated formats that do not align with the needs of specific stakeholders. In this light, there is still a lot of potential and need for the government to be more responsive to the needs of the OGD ecosystem, improve the quality and quantity of the supply of data and thus achieve a balance between the supply and demand for OGD. This will enable the OGD ecosystems to develop faster and generate more value out of OGD.

In general, the findings of this research indicate that factors that affected OGD during its inception are still the same ones that are affecting its implementation. The enabling factors that existed during the inception of OGD in Kenya have either become insufficient or have changed. For example, while the Constitution of Kenya, which provides for the right to access government information, supported the development of OGD, within the health sector, specific laws and policies that are

required to realize and guide access and use of health OGD are lacking. Further, there is also a lack of a KODI or OGD strategy.

Moving forward, this research shows that several factors may limit the growth and value of OGD. One is the poor and limited ICT infrastructure especially to the majority of the population found in rural areas. With an Internet penetration rate of 49.7% concentrated mostly in the urban areas (Communication Commission of Kenya, 2013; McKinsey Global Institute, 2013), it is likely that most of the people at the grassroots levels will not access the online government data. Several other factors contribute to the under-representation of rural and poor communities as users of OGD and thus may preclude the realization of OGD's potential in Kenya. These include poor infrastructure for accessing information, low socio-economic status of a significant proportion of Kenya's population, distrust between government and non-state actors, lack of confidence in government data, digital and data illiteracy among other factors. Nonetheless, the groundwork for enabling ICT – fibre optic cable and connectivity continue to be improved and serve the OGD initiatives.

The change in political power dynamics has slowed down the implementation of OGD in Kenya. The political goodwill present at the inception of KODI has changed significantly. The then champion of OGD (former Permanent Secretary in the Ministry of Information and Communication) has since left office as has the then President Kibaki. Without a champion within government there is no one to push the OGD agenda. The lack of a champion has impacted implementation and the sustainability of KODI for instance the current consistency of data supply by various government ministries and agencies into the portal is questionable. The initial launch of KODI used data that was already in the public domain as well government data that was in the hands of the World Bank (Majeed, 2012). By so doing, the government ministries and agencies were not included in its implementation.

A notable challenge to KODI as a project within the government is its internal organization and institutional structure. This has affected standardization and harmonization of data as each government agency collects data first for its internal use and not with the open data targeted users in mind. Extra work may be needed to clean or standardize this data to comply with open data formats and standards. Further, the culture of government agencies operating without 'talking to each other'

–“silo mentality” will discourage interoperability and increase costs (Ndemo in Majeed, 2012, p.7)

As evidenced in the findings, collaboration with non-state actors such as development partners, the private sector and technology community hubs is and is likely to be a critical OGD enabler in Kenya. This is especially true in the health sector where multi-stakeholder forums are common and the role of development partners is dominant.

7. DISCUSSION

How open is OGD in Kenya in the heath sector?

The previous chapter presented the findings of the two phases of this research. The first phase evaluated the state of OGD in Kenya using an ecosystem framework that provided focus and structure to the implementation of this research phase. On the basis of insights drawn from eight expert interviews, desktop research and secondary statistical analysis, this phase established the state of the OGD ecosystem in Kenya.

Phase 2's objective was to investigate use and influence of OGD on participation using an in-depth case study on OGD in the health sector. This phase of the research was informed by phase 1 and sought to establish how stakeholders in the OGD ecosystem (who are identified and described in Phase 1) understood and used OGD to participate in policy- and decision-making in government. The stakeholders involved in the in-depth case study are drawn from the public sector, private sector, and community of CSOs as well as development partner organizations.

The objective of this discussion chapter is two-fold. The first is to generate a synthesis of the key themes identified in literature and the new knowledge generated from the data collected in phase 1 and 2 of this research. The second is to use this synthesis to assess how well the theoretical and conceptual frameworks proposed in this dissertation explain the structure of OGD in Kenya and the extent to which the use of OGD influences participation in government decision- and policy-making. In this light, this chapter will take all the information and data presented so far and interpret it in the light of the research questions; the body of literature on OGD and participation; and the theoretical foundations and conceptual frameworks already presented in Chapter 1, 2, 3 and 4 respectively. This chapter will bring together the findings and perspectives generated in phase 1 and 2 of this research to answer the main research question: How open is OGD in Kenya. In answering the research questions it is important to emphasize that OGD and participation are rapidly changing fields. The patterns of use of OGD and the available technologies that facilitate use of OGD have changed considerably over the last four years. In this regard, the appraisal of the body of the literature must be cognisant of the temporal gap between the relatively old and new pieces of literature and the technologies and OGD they reflect.

This chapter is divided into four sections. It first considers the concept of OGD and its conceptualization in Kenya using the health sector as a case study. The second section draws on the ecosystem understanding of OGD developed in Chapter 3 to analyze and discuss the findings generated from phase 1 and 2 of this research in relation to the existing body of published literature. In the third section the participation framework described in Chapter 4 is used to understand the relationships between data (its availability, accessibility and actionability) and the different spheres of participation. The fourth section discusses the implications of the findings from the case studies on the participation of open data users in government policy and decision-making and the extent to which these findings fit within the proposed conceptual and theoretical frameworks. Through out this chapter, the findings are first presented and then discussed in the context of relevant literature and the proposed conceptual and theoretical frameworks. Finally the discussion ties in the different strands of this research to provide an overall appraisal of the OGD ecosystem in Kenya. Further, the fourth section of this chapter gives future perspectives and provides a synthesis of evidence-based recommendations on how the OGD ecosystem in Kenya can be improved to optimize the participation of the ecosystem's stakeholders in government-led policy-and decision-making processes and thus optimize the generation of value out of OGD. An abridged version of these recommendations is also presented in the Conclusion Chapter (Chapter 8) of this dissertation.

The Concept of OGD in Kenya

The findings of this research establish that OGD is strongly associated with public service delivery, decision-making, transparency, accountability and participatory governance. OGD is seen as information under the custody of the government that is critical to how government delivers public service to its citizens. This is evidenced by the fact that in many parts of the country, many people are very interested in data on public resources such as budgets and data on the allocation and distribution of other public resources. At the same time OGD is seen as information that can enable the improvement of citizen's lives in the sense that when information is widely accessible the citizens can make more informed decisions that impact their lives. For instance, when people know the array of health services that are offered by different

health facilities in their community, they can make informed decisions on where and when to seek specific health services.

Secondly, OGD is conceptualized as a catalyst and enabler of stakeholders within the OGD ecosystem (including the government) to identify and solve their problems. This conceptualization of OGD was most evident in the responses from the civil society and development partner stakeholders. The conceptualization of OGD as an enabler of stakeholders is hinged on the realization that the capacity of citizens to see, monitor and question government activities is dependent on their ability to access government data that was hitherto inaccessible.

Thirdly, this research has shown that OGD is viewed as a first step in breaking silos in government and paving the way for citizens to get closer to government and to governance processes. OGD has made it possible for data that was previously stored away in printed books and documents to be converted into digital formats and published for all to access online. These conceptions of OGD as a bridge and as a window into government and its processes are consistent with literature. Harrison et al. (2011) point out that OGD should foster more public value by encouraging more interaction between the government and its citizens. It should also give the public the voice for accountability and civic engagement, identifying problems in their environment and using this information to develop solutions. Similar to these findings, Meijer et al. (2012) emphasizes the vision (transparency) and voice (participation) as key aspects of open government that enable citizens to be part of decision-making.

The understanding of OGD as being critical in public resource management and service delivery can be explained by the literature and theories described in Chapter 2 and 3 respectively. Literature shows that there is a strong relationship between demand for data (predicated on the relevance of the data), supply, use and value of open data (Halonen, 2012; Jetzek, 2012; Helbig, 2012). The most relevant data are the most sought after (demand) and the most used and thus the most significant generators of value (economic, social, political and so on). This in turn creates more demand for the datasets that encourage supply, increase use and generate value thus closing the cycle of demand and supply of relevant data. Helbig (2012) described this as the "logic of a virtuous cycle" (p. 21). Figure 14 below summarizes the

conceptualization of OGD in literature, which this research confirms to a large extent.

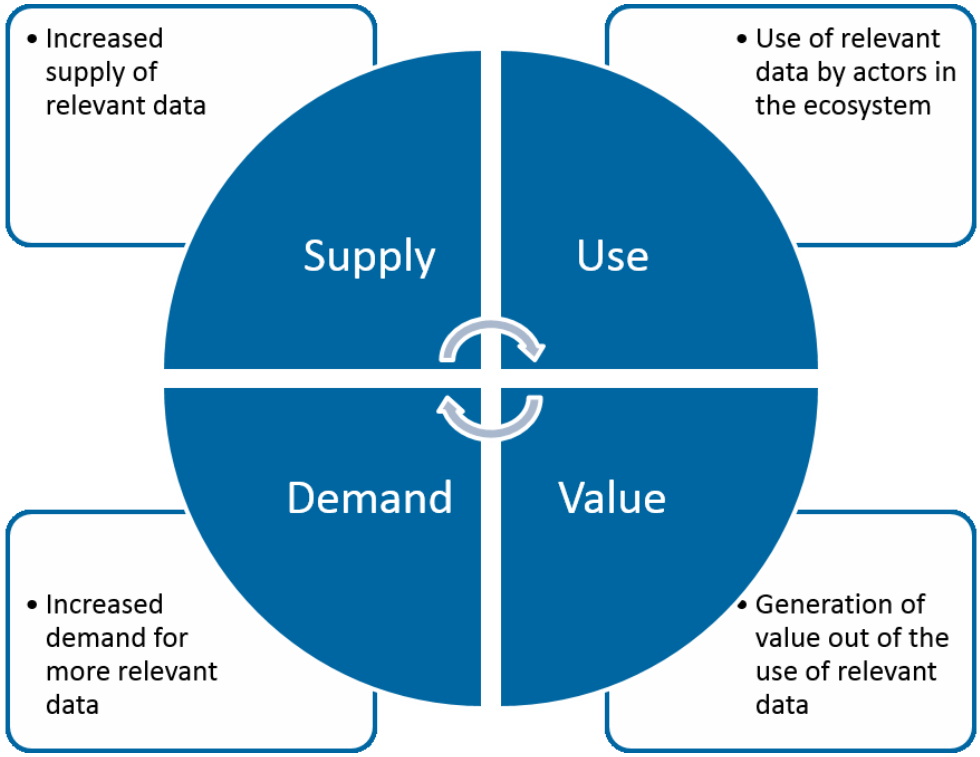


Figure 14: Conceptualization of OGD in literature and in the evidence presented in this research (adapted from Helbig, 2012)

However, in reality the supply of relevant data (i.e. relevant data rather than just any type of data) is not always assured or forthcoming and this can consequently disrupt the cycle. In Kenya, the supply of data varies depending on the type of data. The Open Data Indexes for 2013, 2014 and 2015 show that in Kenya different kinds of data exist in both digitized and non-digitized forms and the extent to which they are supplied by government also varies**.** The Open Data Index, initiated by the Open Knowledge Foundation, uses crowd-sourced surveys to measure the availability and quality of data in different countries according to the Open Definition. Data is measured according to nine indicators such as whether it is available online, in machine-readable formats, in bulk and so on. The Index indicates that the bulk of the available data in Kenya is on government legislation, election results, the budget and national statistics in that order (Open Data Index 2013, 2014 and 2015). On the other hand data on public resources such as government budgets, expenditure and

procurement are neither openly licensed nor available in machine-readable formats and are therefore not fully open.

Table 7: Demand for data on public resources adapted from the OKF ODI website: http://index.okfn.org/methodology/

Dataset	2013	2014	2015
Government Spending Records of actual (past) national government spending at a detailed transactional level; A database of contracts awarded or similar will not be considered sufficient. This data category refers to detailed on-going data on actual expenditure. Data submitted in this category should meet the following minimum criteria: Individual record of transactions, date of the transactions, government office which had the transaction, name of vendor and amount of the transaction	0%	10%	10%
Procurement tenders All tenders and awards of the national/federal government aggregated by office. Monitoring tenders can help new groups to participate in tenders and increase government compliance. Data submitted in this category must be aggregated by office, updated at least monthly & satisfy the minimum criteria by indicating name, description and status of tender/award.	0%	0%	45%
Government Budget National government budget at a high level. This category looks at budgets, or the planned government expenditure for the upcoming year, and not the actual	35%	45%	55%

expenditure. To satisfy this category, the following minimum criteria must be met: Planned budget divided by government department and sub-department and including descriptions regarding the different budget sections with annual updates.			

On the demand side of the (Figure 13), the demand for specific types of data may be motivated by factors that apply to these types of data and not to other types of data. For instance, the demand for public resource and service delivery data may be uniquely motivated by the fact that resources have a direct link to the economy and the level of poverty. In a country like Kenya, public resource management and use is generally a sensitive topic as in many other countries. It is an area that is also more prone to corruption.

Further, the cycle in Figure 13 assumes that data that is in demand is relevant and actionable and that this is the same data that is supplied and used. The proposed participation framework in Chapter 4 highlights the proposition of this research, which is that data availability is not enough - data that is open must be accessible and actionable in order to enable use. For this research, use has been interpreted as participation in government decision- and policy-making. In addition, use and value creation are impeded by other factors such as user capabilities, politics, uptake of OGD and so on as will be discussed in subsequent sections of this chapter where the way OGD is contextualized and used in Kenya will be explored.

Interestingly, to a majority of the respondents from across all the sectors considered in this research, OGD is neither about the technology nor about the formats. It is viewed, in its most basic form as government information that should be accessible and free to the public. The technology is not as important as having the data in whichever format, freely available and accessible. Machine readability is not understood outside of the technical circles. Hence open data could be in forms such as notice boards, meetings at the town hall/chief's office, websites and so on as long as it is accessible and free government information.

These findings differ from the conventional descriptions and definitions of open data forwarded by organizations such as OKFN, Sunlight Foundation and authors such as Yu & Robinson. For instance, Yu & Robinson (2012) define data as being open technically and legally. Data is technically open through the use of Information Communication and Technology (ICT) tools, which means that data is in formats that allow re-use and redistribution and exists as machine readable datasets (Yu & Robinson 2012, OKFN, and Sunlight Foundation). The findings of this research suggest that focusing only on technological or format-related aspects of OGD restricts the scope of OGD by making it merely about technology and formats and miss out on the key aspects of OGD, which are its use, value and impacts. Further, the myopic technology/format-centered perspective on OGD undermines the value of open data; ICT is only an enabler. Evidence from a dozen initiatives in the USA show that this narrowed focus amounts to nothing more than websites holding data with little or no significance (Helbig, 2012). In this regard, technology should not be viewed as an end in itself rather as a means to an end i.e. as an enabler of OGD by making it easy and faster to collect, store and share open data. This point of view is also presented by Yu & Robinson (2012) who emphasize that ICT on its own is not enough and neither is it a substitute for participation or accountability.

Taken together, the findings of this research and insights from literature seem to suggest that technology is an important enabler of OGD and that together with other key ingredients within the OGD ecosystem, enables users of OGD to derive value and impact from OGD. The importance of technology as an enabler is demonstrated by research on the usefulness of online data in Indonesia which revealed that for communities that are mostly online, publishing data offline will not be of value (Lee & Estefan, 2013). According to the OGD initiative in Kenya, KODI design and objective was to make data technically and legally open at the point of conceptualization and implementation. That design is similar to those adopted by older OGD initiatives around the world such as those in the US and UK, which had been technology-centered (Peled, 2013). KODI has maintained its initial design - data on KODI is currently made available in machine-readable formats and as complete datasets.

Within the health sector, the distinction between open data and data is not clear. Most of the respondents in the study understood the term „open data“. However

upon further interrogation, the term 'open' did not mean anything beyond being accessible to the public. Notably, respondents from development partners and the CSO sector were quick to point out that of the two platforms in the health sector (DHIS2 and MFL), DHIS2 requires its users to log in to the software using an email and password and is thus not truly open in the strict sense of the definition of OGD. These perceptions of OGD have informed how the different stakeholders have approached OGD implementation and use. Government has mainly focused on its traditional role of supplying data by trying to ensure that there is a functioning portal with data. Most recently in 2015, the KODI portal was upgraded to make it user-friendlier and to accommodate new datasets. In addition, the government embedded data fellows in four government institutions to increase the number and quality of datasets being channelled to KODI. Non-state actors, although acknowledging the role of government in supplying data and the significance of OGD in decision-making, have the potential to also generate their own open data in the absence of OGD.

The next section further elaborates on these dynamics and concepts and how they are reflected in the context in which OGD in Kenya exists using an ecosystem framework. This section identifies and discusses how the dominant elements of the ecosystem shape the interpretation, implementation and use of OGD.

The context of OGD in Kenya

This second section of the discussion chapter draws on the ecosystem understanding of OGD developed in Chapter 3 to analyze and discuss the findings generated from phase 1 and 2 of this research in relation to the existing body of published literature. On the basis of the data analysis conducted in this research, this dissertation concludes that OGD in Kenya is characterized by an imbalanced and unsustainable ecosystem. This is caused by weaknesses in the structure and institutions that support OGD and has precluded the full implementation and use and OGD and thus limited the value of OGD in Kenya.

Imbalanced and unsustainable OGD ecosystem

The Kenyan OGD ecosystem is imbalanced and unable to sustain the implementation of OGD and the realization of its impact in the longer term. This is because some aspects of the core and peripheral ecosystem are more dominant than

others e.g. at the core, the technical components are far more advanced than the data is; while at the periphery, the exogenous components play a bigger role in a context where there are insufficient policy and legal frameworks and weak institutions to support OGD. Whilst there is no perfect OGD ecosystem, this dissertation identified the imbalance in the OGD ecosystem in Kenya as a preclude to sustainable OGD use in the county. Previous studies have shown that various OGD initiatives including KODI have been hampered by the lack of these factors (Open Data Barometer, 2015; Meijer et al., 2012; Kenei, 2012; Chirchir & Kersting, 2014; Harrison et al., 2012). These characteristics that are exhibited in the general OGD ecosystem are also evident in the health sector OGD. Key among the weaknesses in the health sector OGD are: the technology heavy design and set up of the ecosystems (that outweighs other key components of the ecosystem); lack of legal and or policy frameworks; weak institutions leading to politicization and monopolization ('big-man syndrome') of OGD; stronger exogenous factors compared to other key actors in the peripheral ecosystem; and lack of sustained commitments towards improving data quality.

Technology oriented ecosystem

This research shows that the OGD ecosystem in Kenya has at its core data, actors and technology operating in a dynamic environment and affected in various ways by elements in the periphery such as donor agencies and development partners. Within this core, the OGD ecosystem is mostly dominated by a strong focus on ICT. This dominance is, in part, explained by historical background to OGD in Kenya, which is characterised by investments by government in ICT infrastructure including broadband and undersea cables, which facilitated the initial efforts towards the realization of OGD. In addition, the origins of OGD in Kenya have a strong ICT community backing that drove the demand for more open data (Majeed, 2012). Indeed Kenya is recognized as an ICT hub in the region and enjoys mobile technology penetration of 89.2% (Communications Authority, 2016). A report by McKinsey & Company notes that the level of ICT readiness in Kenya contributes significantly towards the country's social, economic and political progress. In Kenya, the Internet's contribution to GDP stands at 2.9%, which is the highest in Africa and comparable to estimates from more developed economies such as France and Germany (Manyika, 2013, p. 56). Despite the robust ICT infrastructure and a

strong community of technology experts and enthusiasts, mostly based in the Kenyan capital city of Nairobi, there is not enough effort by government to leverage on these enablers to deliver on a successful OGD initiative e.g. in making more open data available online. Ubaldi (2013) criticizes the Kenyan government's approach that prioritizes portals at the expense of developing infrastructures. The implication of this approach is that the realization of real value and impact out of OGD will be slow (Ubaldi, 2013).

This research proposes a wholesome macro- and micro-level awareness of the OGD ecosystem components by conceptualizing OGD through the ecosystem framework proposed in Chapter 3. The application of an ecosystem approach in the implementation of OGD initiatives reduces the risk of narrowing the focus of OGD to technology, data or any other one component. Based on the ecosystem framework, the findings of this research prove that a balanced and sustainable OGD should go beyond ICT and technology. ICT is just one dimension of the technical component of the OGD ecosystem, which also include: supporting technical infrastructure such as relevant hardware and software; the existence of relevant technical capacity on one part within the government to manage and 'open' data and on the other part among the users to access and consume OGD.

There are several issues with a technology-focused OGD ecosystem that have implications on access and use of OGD. Although the ICT infrastructure exists, the penetration of Internet and computers is still not adequate and even then, it is highly concentrated in the urban areas - about 95% (Manyika, 2013). There is a high risk of OGD perpetuating existing digital divides and being captured by the elite most of whom already have the resources and skills to access OGD. Previous research has also shown that although Africa and indeed Kenya's Internet penetration has significantly improved, most citizens are still using more traditional, offline methods of acquiring information such as through their village chiefs, churches, radio and TV (UN E-Government Survey, 2014, Chiliswa 2013, Mutuku & Mahihu, 2014). Traditional media such as radio and newspapers also play a significant role in how people access government information. In a survey carried out by iHub Research, 75% of the survey's respondents indicated that they still largely access government information from newspapers, radio and television even though they all had access to the Internet or an Internet-enabled device (Mutuku and Mahihu, 2014).

In light of the high mobile technology penetration in Kenya – where approximately 89.2% of Kenya's population has a mobile phone subscription - one might expect that there will be a high level of access and use of OGD through mobile phones. However, majority of the people who have access to mobile phone devices, do not use the devices for accessing information rather they use them more for communication (mostly oral) and entertainment (Communications Commission of Kenya, 2013; McKinsey Africa Consumer Insights Center survey, 2012). These infrastructural and contextual issues limit how many people look, find, use and in the process drive the demand for OGD, which in its strict definition is digital and online. This trend can also be observed in Mossberger et al., (2012) where despite more mobile phones among Blacks than among Hispanics in the USA, the inequalities and divides that existed in online participation and achieving ‚digital citizenship' are still evident. The lack of broadband at home as opposed to smartphone penetration is still critical for increasing online participation (Mossberger et al., 2012 p.2493). Both examples caution against the risk to widen digital and subsequently participation divides through what this research can term as digital over-optimism and the assumption that digital technologies by themselves will be able to bridge participation gaps whilst overlooking the embededness of technology in social and economic contexts (Kersting, 2012).

In reflecting on the understanding of OGD and the ecosystem by various respondents in phase 1 and 2 of this research, OGD is not so much about technology and data formats as it is about getting data (in whatever formats) and using it to know what government is doing. In line with this conclusion, other studies such as the Web Index have shown that the user's need for products and services created by technology rather than the absence or presence of technology is what drives the uptake and use of technology (World Wide Web Foundation, 2012). Other contextual factors also play a role and should be considered in determining the relevance and application of technology. This is also apparent in Kersting (2012) where he outlines that despite the rapid rate of urbanization the corresponding challenges such as structural unemployment, changing demographics, lack of basic infrastructure such as sewage, water, housing can easily divert resources and priorities away from investments in ICT. This may also explain why some ICT applications and tools have more successful uptake than others in similar or different

contexts. It raises questions on what technical infrastructure would be most appropriate for OGD in developing countries such as Kenya. It also points to an important consideration – that of more focus on filling a gap/need using open data and appropriate technology and less on technology-centered OGD implementation strategies. Kersting (2012) agrees by pointing out that use is sometimes not so much about reduced costs and accessibility but also about user-friendliness and relevance.

Institutional weakness

This research shows that government institutions are too weak to support the OGD ecosystem specifically in management of data, including collection, storage and supply, enforcement of OGD practices and even use of the data in public institutions. Accounts of the government being more willing to distribute manual or PDF reports as opposed to raw, machine-readable open data came up repeatedly in this research and go to show the government's inability or unwillingness to make useable data available to the public. This is despite the fact that government institutions have the data in digital formats and that it only takes minimum ICT infrastructure to share data in open formats. Most, if not all, government agencies have an existing website where they upload reports often in PDF formats. Findings of this research as well as existing literature point towards Government's lack of will and/or capacity to make data in its possession open. Ultimately, these institutional and organizational contexts influence the quality, availability, accessibility and usability of OGD (Dawes, 2012).

These limitations are not just technical but also reflect on other factors beyond the technical capacity of government for instance scarce economic and human resources and an entrenched culture of secrecy in government institutions. In Kenya, the human resource within the health sector that is required to carry out regular healthcare duties besides data collection is stretched. For instance, while 4.45 skilled healthcare workers (doctors, nurses and midwives) per 1000 population are required to attain universal health coverage (UHC) and SDG-related targets (World Health Organization 2016, p.10). Kenya only has about 0.2 skilled healthcare workers per every 1000 of its population (World Health Organization 2016, p.10, Kiambati et al., 2013). Taking the example of the already overburdened nurse who is still expected to key in accurate and quality data into several (fragmented) systems e.g. DHIS2

tool, TB tool, HIV tool and so on either in between his/her regular work of attending to patients or at the end of the work day it is clear that the human resource to collect data is over-stretched to effectively collect good or quality data. The government has tried to enforce the collection of health data by making it obligatory for health workers to regularly upload data onto the DHIS 2 system as part of their formal work but as a result data collection by these over-burdened heath workers has become another formality. Most health workers input data into the system as per the instruction from government but do not refer back to the data to advice or inform their own work and colleagues. This means that there is limited health data use amongst the health workers not because data is not available or accessible but due to other factors not related to whether the data is open or not. This scenario makes opening up data even more crucial because it means that other people with more time and incentive can interrogate the data and hopefully raise questions or alarms where needed. For example if data shows a notable disease trend such as a spike in diarrhoea diagnoses in a specific period of time and space, it would be important to ask questions related to food, water or sanitation within that specific population or even compare this data with data on food supply, sanitation (access to toilets, water) and even budgets in order to take necessary measures before it becomes a health crisis.

The weak institutional systems within the government is also evidenced by the siloed way of working. Government agencies like the national statistics office (Kenya National Bureau of Statistics - KNBS) and other departments charged with overseeing government data in several other ministries do not know what the other is doing in terms of data collection and publishing. Even within the DHIS2 data portal itself, the many data contributors from all over the country are still working in silos. This is translated into equally siloed data such that no one really understands what the different streams of data are saying e.g. what the disease patterns are in comparison to supply of specific drugs or where there are likely to be linkages and so on. The extent of the siloed work culture within government is further demonstrated by the evident lack of coherence even within the public sector itself – some entities within the public sector appreciate and implement principles of (open) data sharing but a significant part still remains unwilling and/or unable to live up to

these open data principles. According to this research, the siloed work culture within government can be attributed to:

- Disconnect because of digital/non-digital processes at the different levels of data collection;

- Limited and/or prohibitive legal and policy provisions that govern the acquisition of data and cooperation among health facilities and other relevant government institutions that supply the data. This is especially relevant to data on patients because of the sensitivities around patient-level data.

The siloed work culture has resulted in several health programs within government running parallel and at times redundant initiatives. In light of this work culture, the development of OGD has the potential to make government's work more transparent and increase efficiencies in public service delivery.

Bates (2013) confirms that the closed nature of government institutions is a possible reason for poor implementation of OGD terming them "institutional firewalls" that protect the interests of the powerful in society who fear the possible disruption of their activities by OGD (pp.135-136). Changing the institutional culture of secrecy and a wrong perception of releasing government data will need to transcend personal and political interests of public officials clinging onto data for some form of power. In Majeeds' (2012) account of the conception of KODI, he narrates that the then President initially misunderstood OGD as being similar to Wikileaks. This kind of perception is partly the reason that the team charged with implementing KODI still faces resistance from colleagues in government agencies when they attempt to access information that is in the custody of government. The other reason for the 'data-hugging' mentality documented in the findings of this research is the perception that OGD's main purpose is to unravel corruption. While this is one of the benefits of OGD, requesting/demanding for government data with this approach is unlikely to yield any data. Initially this was how OGD was packaged to government, which definitely made public officials anxious and over-cautious about releasing data. Policies and laws that ensure users as well as suppliers have no fear of OGD should be constituted. Additionally, public officials should be educated or made aware of OGD and its potential benefits not only to Kenyan public but also

even to them and their work in public offices. As Hogge (2010) states: change must come from the top, the middle and the bottom rungs of government institutions.

Notably, within the health sector, there is strong dependency on exogenous factors especially donors and development partners for funding. These actors continue to play a central role in championing and even implementing health systems reforms. Since these donors and development partners are largely governed by their own sets of rules and procedures (which are not necessarily similar to government's rules) their initiatives sometime result in duplication of work, fragmentation of health data and data systems and even conflict where their rules and procedures are inconsistent with those of government or those of other donors and development partners (Bernardi (2009). MOH relies a lot on donor funding for its budget implementation including data collection, warehousing and use. For instance, the implementation of the DHIS 2 system itself has been highly donor funded by development partners such as DANIDA and USAID through their implementing partners such as AfyaInfo (USAID) (Karuri et al., 2014; Gething et al., 2007). Even when not directly funding MoH, donors and development partners still have more money and time to collect their own data, which users in the health sector sometimes make reference to e.g. WBG, USAID-PEPFAR and WHO data. Some respondents mentioned that they trust the data only because it involves some third parties such as donors and development partners who ensure that data quality standards are adhered to. In fact, respondents noted the possibility that data would never be published or it would be politicized if there were no third parties involved to support the release of data. This points to the economical and financial challenges of opening up government data that is often not discussed enough in the literature. Ubaldi (2013) asserts that deploying the right human and technical resources costs money especially at the beginning of the implementation process (Ubaldi, 2013). Donor funding has provided much needed support to Government, however it can lead to overreliance by Government on external sources of funds to meet its OGD obligations. Considering that donor funds do not constitute a sustainable approach to financing OGD in Kenya, there still remains a lot to do to make OGD financially sustainable in ways that do not propagate the big man syndrome.

Weak policy and legal frameworks

In answering the question on what kind of an ecosystem OGD exists in, the findings from this research suggest that existing policy and legal frameworks that should support OGD are insufficient and the implementation of the few existing frameworks is weak. This insufficiency contributes towards making the OGD ecosystem in Kenya unsustainable. The few and fragmented laws lack clarity on whether data should be opened, who is responsible for opening up the data, the formats that the data should be presented in and the time frames in which data should be opened up among other grey areas especially with respect to sensitive health data. The existing policies and laws also contradict themselves. This confuses the (re) users (most of whom are non-legal experts) and affects the flow of data, data products and services. The challenge facing OGD with regards to policy and regulation is that despite the considerations laid out in different policies, the law is still not sufficient enough to provide a stable framework for users as well as suppliers of data.

This research suggests that there is need for one law that expressly makes end-to-end provisions on OGD from data management (collection, storage) to supply of data from government sources and to data (re) use. In the context of Kenya, the lack of FOI law seems to inhibit to a great deal the development of OGD. What is provided under Article 35 of the Kenyan Constitution granting the right of access to information held by the state to every citizen is eroded in the Official Secrets Act, which provides a guideline for making information public but which could be misused to limit citizen's access to information if the state deems any piece of requested data as jeopardizing to national security. Kenya's Access to Information bill has only recently passed a significant stage – that of being passed by the Parliament of Kenya - after almost 10 years since it was tabled before the legislative house. At the time of writing this dissertation (May 2016), the bill was awaiting endorsement by the president of Kenya to become law. The law will not be an assurance of more open data, however, it will be a first good step towards better policies for OGD.

The debate in the literature has been on whether there needs to be one law that expressly covers OGD and the supply of data from government sources and whether this will be one certain way to sustain OGD initiatives. There are countries such as

Kenya that have no FOIA, RTI or other OGD-specific laws but have OGD initiatives whilst there are examples of African countries with FOIA but no OGD such as Uganda. Countries such as the UK have strong OGD initiatives and OGD-specific laws. Ubaldi (2013) affirms that countries that forge ahead with OGD initiatives without sufficient laws and polices stand little chance of success. RTI and FOIA are starting points for OGD but are not sufficient in themselves and must be amended to enable (re) use of data. The number of countries with access to information or FOI but no implementation exemplifies this. For instance only nine countries in Africa (Angola, Ethiopia, Guinea, Liberia, Nigeria, Rwanda, South Africa, Uganda, Zimbabwe) have access to information laws, and two have actionable Access to Information regulations (Niger and Tunisia) (Right to Information (2010). Out of these countries, only Rwanda, South Africa, Liberia, Nigeria and Tunisia have government-led open data initiatives at national or sub-national levels. Examples of African countries with FOIA but no OGD include Tanzania and Uganda. It is critical to note that a policy on its own will not solve the supply problem. Van Schalkwyk et al. (2014) writing on South Africa's Higher Education data indicates that the existence of numerable laws and policies has little effect on open data use compared to more imminent and day-to-day issues and realities of actors responsible for managing open data supply such as skills, time, priorities and so on.

The conundrum presented by the insufficiencies of existing legal and policy frameworks is further compounded by weaknesses in the implementation of existing frameworks. For instance, while the Kenyan Constitution and the County Government Act (wherein Article 96 makes provisions on access to data and information) exist and make some provisions related to government data, their application is done either too broadly or narrowly to significantly impact OGD in Kenya. On one hand the provisions of the two laws are too broad i.e. they state that government data should be accessible to the citizenry but do not state who is ultimately responsible in ensuring the data is indeed accessible. On the other hand, the two laws are too narrow in the sense that they only speak to data being accessible and do not make explicit provisions on what the wider OGD ecosystem (other components of the ecosystem other than the data component) should do to ensure OGD is realized. Weaknesses in the implementation of existing policy and

legal provisions are also evident within KODI. The open data platform's website features a comprehensive data policy that is targeted at suppliers and users of data in and out of government. While the policy promotes non-commercial use, re-use and distribution of government data its implementation is negated by the fact that there are no legal provisions that enforce the policy's provisions. The presence of laws such as the Official Secrets Act also compound the difficulty in opening up government data.

Contrary to expectations, the findings of this research show that the lack of an OGD-specific law (or the weak implementation of existing laws) has not stopped users from using the data. In fact, the respondents to this research submit that most users are not knowledgeable on the existence or lack of a relevant law and the implications thereof. Although this is the case, respondents appreciate the significant role that a law on OGD can play with regards to opening up more data. For instance, it is appreciated that a law on OGD will ideally compel government ministries and agencies to consistently release data, which will avoid situations such as those described in literature where the release of data from Government varies significantly over time. A previous study revealed that, in Kenya, less than 10 new datasets were uploaded to KODI in 2013 compared to over 400 in 2012 (Mutuku & Mahihu, 2014).

According to the findings of this research, the most significant value of a policy or law on OGD would be the ability of the policy/law to lead to proactive release of data thus stabilizing data demand and supply dynamics of data and eliminating middle-men. These findings resonate with the existing body of literature, which suggests that the presence of a law like FOIA promotes to a great deal the development of OGD (Ubaldi, 2013; Helbig, 2012; O'Reilly, 2010). Relevant policies and laws such as FOIA, Access to Information and Data Protection will be crucial in structuring and supporting OGD practice and culture (Harrison et al., 2012). An additional benefit of a law on OGD is that it will empower citizens and other actors in the OGD ecosystem by providing them with a legal basis to demand for data as well as guidance on where, when and how government data should be released. This will be a far cry from the current state of ambiguity on who, when and where government data should be released. Although the Information and Communication Technology Authority in Kenya (ICTA) the institution within

government hosts KODI, without a legal/policy tool that can be used to compel fellow government agencies to release their data, it becomes difficult to sustain a constant supply of data. ICTA is currently working on a policy that will guide OGD in Kenya (Kwamboka, 2013). Most importantly for data users, this policy will hopefully guide how and who makes data available and compel public servants to open up data in the correct formats.

In the interim (before a substantive law is in place) respondents in this study caution that, without a policy or law that guides and supports the process and implementation open government data, the release of data could just become another personal thing especially in Kenya's rapidly changing political environment. Based on the interviews conducted in this research, an emerging suggestion is that government should work on an interim solution such as a memorandum of understanding (MOU) in which government ministries and agencies commit to supplying data to the KODI portal. This MoU would suffice in the interim as a substantive policy and legal framework is developed. This framework should ideally define exactly what information should be released, who is responsible for releasing data, the timeframes in which data must be released as well as clear provisions on how participation of the public will be guaranteed

An important aspect that future legal and policy frameworks should provide for relates to the use of data in decision-making by government. Currently, there are no provisions that compel government and civil servants to use data generated by government in decision –making. In the health sector for example each government owned health facility is obligated to provide monthly reports to MOH. Facilities at the local/ subnational level are required to summarize their data and send them to the next administrative level, which in turn inputs, the summary data into DHIS2. To a certain extent, this institutionalization of data flow is a good first step in collecting data and indeed inputting data into an open platform (DHIS2). However, it is not sufficient in promoting OGD in its complete sense because it does not necessarily lead to use of data in decision-making. For instance, most health care workers do not refer back to the data they have collected when they are making decisions. This is partly due to the fact that there are no provisions that compel these health workers to use data for decision-making. The end result of this is a situation where health workers simply collect and remit data to government-led platforms such as DHIS 2

because they are obligated to do so. The data is unfortunately not used to generate value (through evidence-based decision-making) – hence funds are spent to create data (collection) but this value is not captured (i.e. collected data is not used to generate value). In this light, the need for policy and legal frameworks that make provisions for the entire OGD ecosystem is not only urgent but also holds promise for benefits for the healthcare sector in Kenya.

Privacy as a deterrent to open?

One of the unanticipated and emerging themes that is relevant to this section is the issue of privacy and security of data especially from the perspective of public sector respondents. The interviewees from government emphasized the need to enforce privacy and security of data in the OGD process. An outstanding example is the realization that the DHIS 2 portal was being accessed more from outside Kenya than from within. Government introduced a login verification step as a requirement to access data on DHIS2 because they wanted to track who was accessing data and how they were using the data. In addition, they continue to control that accesses the portal as well as its APIs. In the strict definition of open data, these kinds of measures will be regarded as restrictive towards more OGD.

It remains unclear whether the clamour for privacy and security of data is used as grounds for restricting access to data or if privacy is being genuinely considered in decisions about opening data. The data privacy and data security concerns are particularly important for health sector data because data and information on patients are genuinely and inherently sensitive. Without a data protection law and with unclear and/or scattered laws and policies on data handling and responsibilities it seems that actors within the OGD ecosystem especially government are more inclined to err on the side of privacy as opposed to openness. This, on one hand, limits the use of data as potential suppliers and users are unsure of how to handle data. On the other hand, it protects the patients and upholds open data standards that require that patient identifiable data and personal data be protected from unwarranted and/or public access.

Literature stresses that a sustainable OGD ecosystem is built around a community of OGD actors generating value from the data and a good balance between supply and demand for OGD (Zuiderwijk et al 2012; Torkington, 2010); Helbig et al., 2012).

Some scholars such as Harrison et al. (2012) have recommended that governments first consider the users and/or stakeholders involved in the OGD ecosystem before focusing on either the data or the technology to enable a "strategic ecosystem thinking" approach towards OGD implementation (p.910). This was not the approach taken in Kenya and seemingly not in countries such as the USA and UK, where the move towards OGD initiatives including KODI was initially heavily motivated by advancements in ICT and demand for data from government by a group of ICT communities. Gradually, the initial ICT-focussed demand for OGD has given way to efforts such as hackathons and open data events that have been held to build a community of OGD users, suppliers, advocates and enthusiasts.

Despite the increase in digitization of (government) information e.g. from the different ministries such as health, education, parliament (through the Hansard) and more government information becoming accessible, the law is still very important whether the ICT infrastructure is there or not. ICT on its own will not guarantee access to government information. In fact in some cases it may act as a barrier when people associate OGD with access to technology. Public servants such as members of parliament (MPs) who represent their constituents' rights question the feasibility of OGD on the basis that most citizens do not have access to computers, so why should he/she push for this information to be made online? The right policies should go beyond release of data to create an open government culture, which ICT on its own will not deliver and which is far more important in enabling use of OGD by all sectors of the society. Government institutions and agencies are still shrouded in a culture of secrecy that is, at least in part, attributable to Kenya's political history (single-party state and the existence of the Official Secrets Act). In addition to this, there lacks a law that can challenge this culture and the existing Official Secrets Act.

These findings raise intriguing questions on how best to achieve institutionalization of OGD i.e. whether it should be done by embedding OGD into existing institutions or by developing institutions that are relevant for it. Olsen (2007) describes an institution as "an enduring collection of rules and organized practices, embedded in structures of meaning and resources" (p.3). As demonstrated in this research, OGD in Kenya lacks the necessary supporting policy/legal frameworks and institutions. Very recent research suggests that institutionalizing OGD is crucial to addressing issues of sustainability and use. (Mungai et al., 2015; Cisco, 2014; Oberoi, 2013;

van Schalkwyk et al., 2015; Mejabi et al., 2015). OGD is implemented by, for and within government's multiple institutions. As outlined by Van Schalkwyk et al. (2015), too little attention has been paid to the institutionalization dynamics of OGD especially in Africa. Too many changes in government disrupt supply of data and thus interfere with OGD especially because OGD relies on a consistent supply of data from different government ministries, departments and agencies. Institutionalizing OGD will shield the principles and practices of opening government data up against the many changes in political leadership and the varying and inconsistent political agendas and priorities that comes with these changes. In this regard, institutionalization of OGD will be critical in the implementation and coordination of OGD as well as the realization of benefits from OGD. Institutionalization of OGD will require the establishment of proper and relevant laws that support OGD and implementation of reforms across multiple government ministries and agencies. These reforms will include political reforms (goodwill, interoperability across government ministries and departments); social reforms (mechanisms to enable wider inclusion and participation e.g. digital/data literacy); financial reforms (budgeting and financing OGD initiatives) and; reforms in the rapidly changing technological space (standards, interoperability, data collection and storage).

The theoretical framework proposed in this research suggests that political will and stronger government institutions are important for deliberately including - 'inviting' - citizens back into participation arenas fulfilling what Meijer et al (2012) calls both vision and voice through OGD and leading to a true form of openness. Lee & Kwak (2012) state that open government generates highest public value when it results in public engagement. However with the weak public institutions described, the implication is that even with OGD, a closed government will impede OGD's impact on participation. If users can access OGD but cannot engage the government on various issues, how will they derive value? The proposed theoretical framework further suggests that in the absence of an invited space, dissatisfied citizens can create their own 'invented ' space. A popular example is the Occupy movement seen in 2012 where the space invented was through the use of social media such as Twitter and Facebook (Kersting, 2013). The creation of invented spaces by citizens

who are dissatisfied with the ’invited‘ spaces provided by government was also evident in the Arab spring (Kersting, 2013).

These weaknesses in the OGD ecosystem have impacted the implementation and generation of positive impacts of OGD. There could be many reasons why public organizations and institutions such as ministries remain ‘closed’ and are reluctant to release their information. Some of the ones that became clear in this research were: misunderstood concept of open data, cultural barriers and belief that government data are government secrets, a complete lack of awareness within government of what open data is, governments’ bureaucracy, conflicted political interest among other reasons. Public servants and institutions are largely unaware of what data is in the government’s custody and some have a wrong understanding of the value of data. Therefore when non-state actors seek data from government they have to explain at length the purpose of the requested data often to a public servant who is already suspicious of the public. Additionally, public servants are not sure what the non-state actors will do with the data. This scenario has meant that the availability and accessibility of data is limited and piece-meal. Findings from this research suggest that the government will only avail data that they are sure of and comfortable with. This is compounded by claims related to three peculiar behaviours among government who should release government dates. One is that these officials are lazy and thus unwilling to take up the task of making government data open and accessible to the public. The other is that some of these public servants are not authorised to release government data such that they cannot act on requests for data. Often the civil servants who have sufficient authority to release data have a rent-seeking behaviour and ask for bribes or favours in return for data.

The close relationship between politics and the government is a big barrier to OGD. De (2005) and Robinson et al. (2009) both concur that government–led initiatives involve politics, power struggles and conflict leading to undesirable outcomes. In contexts like Kenya, demarcating the line between politics and the government as an institution is not always easy. The proposed ecosystem framework notes that the political context has an influence on OGD implementation. It takes into consideration the reality that individual government agencies will never ‘free’ what they view as precious information that define their political status and strengthen

their bargaining power vis-à-vis other agencies. This is not unique to Kenya and developing countries because research has shown that even in developed countries government agencies, which are also political in nature, are reluctant to release their 'valuable' data despite the knowledge that by adopting a culture of openness, data that is deemed valuable can become even more valuable as a collateral in trade with other agencies and/or a basis to secure funding (Peled, 2013).

This research shows that in Kenya, government agencies hoard data because giving away data is viewed as giving away information that is powerful politically and economically. A government respondent stated that DHIS 2 was limited to Kenya and the addition of a login verification step as a requirement to access the portal was introduced when the Ministry realized that they were ' preparing food for outsiders'. This means that they realized that their valuable data was being accessed mostly by people outside Kenya. Data hoarding is even made worse when advocates of OGD demand for data with a claim to improve transparency and accountability. It is then not surprising that government agencies lack incentives to supply data and when they do supply data they do in piece-meal and end up releasing data that the users suggest is not very relevant. The findings of this research are corroborated by existing literature. The failure by OGD initiatives to take into account the reality that datasets are valuable assets to government agencies who might be unwilling to offer it up for free has been described in literature as one of the problems facing OGD initiatives (Peled, 2011). Further the observation made in this research to the effect that, when pushed by non-state actors to release data, government only releases little and often less relevant data also resonates with existing literature. As open data continues to pressure agencies to "free" data, most agencies have adopted a passive–aggressive stance to the program… indexing a minimal quantity of mostly useless data while locking more valuable datasets inside closed database "gardens" (Peled 2011, p.7).

The analysis presented here has implications not just on OGD but also on the wider accountability and transparency discourse. The lack of a sustainable OGD ecosystem means that the initiatives that were initially supposed to enhance transparency and participation as practices of good governance instead perpetuate corruption, rent-seeking behaviour and the very culture of opaqueness that OGD was intended to eliminate within governments in the first place. As a consequence, most of the data

users rely on relationships and networks to access OGD, which is often motivated by rent-seeking behaviour ultimately breeding corruption. In essence, from the users' perspective, data is only as open as ones networks. All respondents noted the importance of knowing someone within government in order to access (more) data or technical support in using the data. Making data more accessible by making it truly open breaks down these barriers and erodes the big-man syndrome.

Generally, there is still optimism that the Kenyan government has the capacity to put out data even if this means collaborating with the emerging technology community in the country through mechanism such as public-private partnerships (PPPs). Previous examples of PPPs in Kenya have seen collaborations between the civil societies; the private sector (media) and government make data accessible, relevant, usable and actionable. An example of such a collaboration is the Code4Kenya pilot program where government, NGOs and the private sector partnered to increase awareness and use of OGD within their organizations (Chirchir & Kersting, 2014).

In conclusion, the ecosystem factors have influenced the implementation, impact and sustainability of OGD in Kenya. Challenges facing the realization of OGD that relate to policy and legal frameworks are to a large extent based on the fact that the existing frameworks and laws are insufficient and/or are inadequately implemented to provide an enabling environment for users and suppliers of data. The lack of a Freedom of Information law that can compel public organizations to release data is also a precluding factor. If present it would legally prompt government ministries to release data (freedominfo.org, 2013). The findings of this research as well as insights from literature strongly support the proposition that there needs to be one law that comprehensively makes provisions on OGD and the supply of data from government sources.

Judging from the initial 'phase' of OGD in Kenya, it can be concluded that the government has the technical capacity in terms of technical infrastructure and even know-how to successfully implement open government data. Studies like the Open Data Barometer confirm that the potential for Kenya to realize the impacts of OGD is there but OGD's implementation in the country is slow. There is little doubt among respondents that the technical capacity of government to release government data in line with OGD principles exists. Research, including this one, has shown that

the technical infrastructure and the demand (online and offline) for data exists. The historical background to KODI is characterised by massive investments by the then government in ICT infrastructure including broadband (Majeed, 2012). Importantly, data is also there albeit in the government's custody and the major challenge seems to not only be the quality of the data but also the willingness of government to release the data (Daily Nation, 2013).

To realise the successful implementation of sustainable OGD initiatives considerations for the entire OGD ecosystem will need to be made. This will require a strong and complimentary interplay of core and peripheral components within the proposed OGD ecosystem.

Use of OGD in Kenya

OGD runs the risk of being considered elitist i.e. a practice or good that is reserved for the elite in society where majority of the people live and work in urban areas. Although KODI encourages participation and use of OGD through social media (Facebook, Twitter) as well as through its website where users and site visitors can suggest datasets that should be opened up, awareness of the portal is very limited especially outside Nairobi city and other urban areas. Findings from this research show that people who live in rural areas and who may have an idea of OGD think its a 'Nairobi thing' whilst those in Nairobi feel its something reserved for a section of Nairobi's population such as 'the techie-community.' This lack of awareness and the general distrust in government could explain why there is low demand for and a general lack of interest in OGD (information from government). Research conducted in 2013 indicates that 86% of the public did not know about OGD and has never used it. Only 5.2% of those who had used it agreed strongly that open data is useful (Jesuit Hakimani, 2013).

Open Health Data Use

Research has identified health data as one of the data types that is in high demand from Kenya's citizenry (Chiliswa, 2014). Health datasets have the potential to contribute towards social planning. Opening up healthcare-related data (such as revenue allocation, medication availability, staffing of healthcare facilities and disease trends) would allow the citizenry to interrogate government decision makers, enhance citizen participation in governance and improve accountability. Similarly,

accessible and reusable data is useful for government itself when it (the data) is shared. Government agencies in healthcare as well as other stakeholders would access data that would help them plan, monitor trends and react proactively to gaps in healthcare delivery as well as pre-empt future healthcare needs and emergencies e.g. disease outbreaks among other ways of deriving value from open data.

Over the same 3-year period that the Kenya Open Data Initiative has been in existence, Kenya has been implementing its most ambitious governance reform since independence - the devolution of key government responsibilities (including healthcare provision) from the national government to its 47 county governments. The devolution of government functions was envisioned to bring governance closer to the people, increase citizens‘ participation in decision-making, improve service delivery and enhance quality of life. In this regard, devolution under the County Act provides for citizen participation in decision-making e.g. in the development of county budgets. As regards healthcare provision, the benefits of devolution seem to not have been fully realized due to several factors such as inadequate institutional capacity in most county governments to handle healthcare human resource challenges. More importantly, there has been a lack of clear frameworks to guide the devolution of health information systems to build on the gains made by KODI in healthcare provision at the national level. This has resulted in fragmentation of health systems and poorer service delivery at the county level compared to before devolution. For instance, according to the Kenya Medical Association (KMA) and the Kenya Medical Practitioners Pharmacists and Dentist Union (KMPDU), the quality of healthcare service delivery in Kenya has worsened since the devolution of healthcare to the county governments (Ooko, 2015).

Direct and Indirect use

The findings from this research show that, often, non-state actors serve as data midwives by enriching and enabling data within the OGD ecosystem. CSOs play the role of user, producers (generating data), and intermediaries. Sometimes they act as open data watchdogs to keep the government in check by pushing the OGD agenda. These findings resonate with previously published literature “... While lacking the regulatory power of the state and the economic power of market actors, civil society wields power through its networks of people“ (Rahemtulla 2011, p.34). NGOs and

CSOs also leverage on their relationships with governments to persuade governments on the importance of OGD. They also outrightly support OGD initiatives for example the Datos Publicos in Argentina. A more collaborative approach would support the ecosystem more as opposed to viewing government only as a supplier of data and the other actors as players on the demand-side of OGD. The Open Data Barometer explains that many African countries e.g. Kenya and Ghana have placed an emphasis on developing "a community of intermediaries" (Davies et al., 2013 p. 32 - 33). The 'standard model' for developing countries as established by Davies at al. (2013) describes open data as pre-existing data that is being published and intermediaries using this data to create/add social or economic value. In that model, intermediaries include CSOs, businesses, entrepreneurs, the media and the academia community. These intermediaries would be groups that are most likely have first-hand access to KODI and other government data and the motivation to demand and re-use data. However the participation of intermediaries' in the OGD ecosystem does not happen automatically. Jetzek et al (2012) highlights the tension that exists in the process of implementing OGD citing the blurred borders between users, intermediaries and suppliers of data.

This research reveals that, within the OGD ecosystem in Kenya, data is available and accessible but there is not enough (actionable) data to enhance/increase participation in government policy- and decision-making processes. Respondents note that they can see that there is more (relevant) data than what has been published by government. They are however limited by the lack of a law that can legitimize and support their requests for more data and therefore have to either: rely on their networks to request for this additional data; collect their own data; or work with the little data that has been published. These findings corroborate the Open Data Barometer's ranking of Kenya's health data. The Open Data Barometer – a tool that measures the availability and openness of open data according to 10 indicators shows that health data exists and is available but does not meet all the open data standards and requirements such as availability in machine-readable format and in bulk and therefore it is not entirely open (World Wide Web Foundation, 2015). Several reasons could explain these findings. First government does not fully understand its own data and what the citizens' data needs are. Within government, people are not aware of the data they have or the value that it has or could add to

their work therefore the level of openness of data is restricted and government is unwilling to move as fast as the demand for data is moving. Because of not knowing what the data says and the fear of what the data might reveal Government is releasing what it regards as 'safe' data and not necessarily what the users need. This is further exacerbated by a public service culture where people do not feel obligated to release government data and the highly bureaucratic nature of government processes.

However it must also be recognized that data in its raw 'machine-readable' format will not be useful to the average citizens. While individual citizens might not directly take advantage of government openness - in the form of open data, for example - academics, investigative journalists and others can translate newly available raw information into understandable narratives and visualizations that can benefit the public as was shown by the findings of this research. In other words, citizens do not necessarily have to directly act on government openness to experience its benefits.

On the side of users or the demand-side, use of OGD is limited by digital competencies in terms of technical know-how, time and human resources, especially within the public sector to access relevant OGD online. Actors who are not resource-constrained have the ability to collect their own data when OGD is unreliable or not forthcoming however actors with these limitations have to rely on government data. Meaningful use of online open data platforms requires, at the very basic level, computer skills including how to use the Internet and literacy (to read and comprehend information) especially if the platform is in a language other than the user's first language. The use also needs data literacy skills to understand and interpret the data. The literacy constrains mean that even if data exists and is open and targeted at the wider public, its value may not be realized because the wider public will not know that it exists; that it is valuable; and how to use it to generate value and as such will not be incentivised enough to pursue and use the data. When considering the larger public as immediate users of OGD, it is acknowledged that data and ICT literacy required to understand and interpret the data enough to use it to push forward specific agendas such as how resources are allocated, is very limited. However in this research, where the focus was on specific groups of people as opposed to the wider public, respondents elicited sufficient skills and or resources

to make use of OGD and further reiterated the importance of having OGD accessible online for easier access and use.

Going by the Communications Authority's statistics on Kenya's unprecedented and rapidly increasing mobile penetration, the expectation would be that most Kenyans would opt for the mobile phone as the preferred medium for receiving information. Despite the high mobile penetration, research from Jesuit Hakimani (2013) indicate that the mobile phone is often not used for accessing information on government but more for entertainment. Another notable observation is that mobile phones are easier for the public to use as the skills needed for their use are simple oral skills (voice) in any language as opposed to computers whose adoption and use may need extra skills and money. The computer requires more investment in literacy and data literacy creation but the use of the mobile phone does not need special or advanced skills. In light of these infrastructural and literacy limitations to the use of open data and the findings of this research that demonstrate the OGD ecosystem in Kenya is technology-heavy, it is no wonder that OGD is considered as elitist or reserved those in urban areas with reliable Internet access and higher levels of literacy including digital literacy.

Two studies on OGD use in Kenya highlight these sentiments. The first study sought to examine the impact of Kenya's OGD on participation especially in urban poor and rural settlements (Chiliswa, 2014).) With over 2, 500 respondents selected from all over the country and using questionnaires, semi-structured and one-on-one interview the study revealed that a majority of respondents prefer *barazas* to online means as ways of getting information. A *baraza,* loosely translated, means a meeting for example at the chief's office. The preference for offline rather than online means of getting information such as through libraries, telecenters and cybercafes, CSOs and religious institutions with broad network and infrastructure up to the grassroots level seem particularly popular within the wider public (CCK Sector Report, 2013; Chiliswa, 2014). This might also reflect the predominant demographic present in the surveyed target group and locations.

In the second study, the World Bank carried out a survey using online and traditional (largely offline) methods to assess the demand for open financial data in rural towns in Indonesia and Kenya. The study first concedes that much more needs

to be done to establish the demand for data or information, especially in communities that are predominantly offline. It argues that although data may be available online, its demand is often offline and not documented (Lee & Estefan, 2013). Fifty four percent of the completed nano-survey responses (500) indicate that they are familiar with the term open data. Sixty one percent would like more access to public information (n=1316) and out of these, only 26.1% know how to access it (Lee & Estefan, 2013). Similar to the Jesuit Hakimani study, respondents in the study by The World Bank preferred more traditional media (rather than online options) such as newspapers and television to access financial data (Lee & Estefan, 2013).

Offline ways of accessing government data is not only a consideration for developing countries. Most OGD initiatives globally have focused on making data online mostly for technology experts such as developers leading to a neglect of offline mechanisms that allow for direct and wider OGD access (Davies, 2010). Davies (2010) notes that moving from offline information to online open data will involve several significant drivers that shape the nature and context of open data. Although respondents of this World Bank study agree that the infrastructure should not only be limited to the technology and online platforms, the challenge still remains in converting OGD into a public good and getting average citizens, who are not technology-savvy, to engage with OGD in whatever forms/formats and with the policy makers. The failure to address this challenge in Kenya's OGD ecosystem has been faulted as one of the factors that have led to the limited uptake of OGD by the general public in Kenya.

This research as well as the Jesuit Hakimani and The World Bank studies described above, advocate for community-driven OGD, where both offline and online dissemination methods are explored. These studies may also explain the irony in having a significant proliferation of mobile phones (almost 80%) but not an equal measure of access to (government) information (Communications Authority, 2016). The limited access to government information negatively impacts the number of people who access government data/information and consequently the number of people who drive the demand for the data. On the other hand, the quality of government data available, although still in question, has improved significantly over the years partly because of the application of ICT. The application of

technology for example in the implementation of DHIS 2 has streamlined data collection and analysis.

The principles of open data prescribe that data should be made available online for wider access from anywhere. Users of DHIS2 appreciate the online access they have to the software. Respondents to this research note that simple and customized data analysis and visualizations has encouraged data use for decision making right from the lowest level (Karuri, 2014). Increasingly, there are efforts to enhance collaboration between experts in different sectors (e.g. between health and ICT experts) to improve the OGD ecosystem.

Finally, the case study on health sector data also demonstrated that data is political and it represents power. This means that not only are public officials cautious about the sensitivity and risk involved in releasing government data but they are influenced by the political undertones in the governments they serve in. The political influence and necessity for political goodwill in enabling access to government data is a barrier to the implementation of OGD in Kenya. Government can use data to gain political mileage. For instance, government can use data to influence targeted segments of the citizenry towards particular decisions. For example, governments can use government data on health to claim that health outcomes have increased and thus convince voters to vote in favour of the government in upcoming elections. On the basis of the power that data holds, what may be deemed as risky, sensitive and potentially valuable data is hardly ever released by the government to the general public and when it is released it is often in PDF or hard copy formats. In the absence of government data the opportunities available to non-state actors to question claims put forward by government are severely limited and secrecy thrives. Respondents in the health sector research noted that politicking has slowed down the development of OGD in Kenya noting that government agencies and ministries are not releasing the content that they need. This is exacerbated when there are no champions at the top levels of government to steer government institutions towards a cultural mind shift away from secrecy to embracing ICT and OGD.

In view of these findings, the theoretical framework proposed in this research (and illustrated in Figure 15 below) suggests that while data is mostly available and accessible, it is qualitatively and quantitatively insufficient to enable action,

participation by actors in the Kenyan OGD ecosystem does not go beyond the broad level of participation. Broad participation is characterized by a two-way exchange of data enabled by open data that is available and accessible (legally, technically, politically) but not enough (quantity, quality) to enable meaningful action by actors within the OGD ecosystem. Within broad participation the involvement of actors within the OGD ecosystem is meaningful, stakeholders are involved in critical decision and policy-making but there is no shared power since the data is not available in sufficient quality and quality to allow stakeholders to share power with the government. The relationship between users and government is also open, inviting, consultative as well as deliberative based on various agendas that are either set by the government or forwarded by the OGD users. At this stage, there is potential for collaborative governance and in some select instances, actors will collaborate to make decisions and take action while in other instances government has the prerogative to make decisions following consultations with non-state actors.

The levels of participation blend into each other in different sub-contexts and as suggested in the theoretical framework, the levels of participation are seen more as layers as opposed to hierarchical levels. However, even though the theoretical framework presented in Chapter 4 and in Figure 15 below acknowledges the existence and importance of different levels of participation and data, it does not sufficiently account for the impact of other factors beyond the availability, accessibility and usability of data on the quality and level of participation. It would be shortsighted to ignore the relevance of these factors (e.g. political will, legal and policy frameworks, exogenous factors, socioeconomic factors) in influencing the quality of data and the level of participation. OGD on its own is not sufficient to influence participation. Contextual/ecosystem variables that influence both OGD use and participation must be considered. These ecosystem factors shape how data is used by affecting the availability, accessibility and usability of data to adequately contribute to improving how decisions are made in the health sector at different levels of government.

Users of open data demonstrate that they have some level of leverage in influencing the agenda and processes involved in policy and decision-making in government even with the little available, accessible and actionable data. Consistent with broad participation in the proposed theoretical framework on OGD and participation, users

have access to open data and government is open to accommodate a wide scope of actors through various opportunities and spaces for consultation, deliberation and even potential collaboration. Wojcik (2012) points to the mutual relationship between available government information/data and the "variety of initiatives, instruments and practices" (p.128). For example consultations that take place between CSOs and the parliamentary committee on health as well as individual committee members on health based on data demonstrate a level of influence in decision- and policy-making in health.

It is worth noting that the realization of broad participation is not only as a result of all actors in the OGD ecosystem appreciating the significance of open data. The importance of other contextual factors such as political will and the role of other platforms, which are not necessarily online but enable good relationships and a more responsive government on health matters come into play. Responsiveness refers to three main aspects: facilitation of collaboration between citizens and the government, the participation of these stakeholders in decision-making and incorporation of the stakeholders' input. For example, the Kenya Health Information System Policy outlines a governance model with three actors: state (politicians and policy-makers), clients/citizens and providers. The model illustrates the link between the state and the citizens where citizens voice their preferences to the state and the state responds to the citizens. The findings of this research also point towards the important role played by technical working groups (that are composed of actors in and out of government) in cultivating good working relationships between the government and non-state actors e.g. CSOs and development partners. Such facilitator functions (e.g. those played by TWGs) allow for an organized way of incorporating the views of non-state actors and the community at large in government's decision-making processes. These facilitatory roles are crucial considering that in the absence of TWGs the views of non-state actors and the wider community are often not taken into consideration during decision-making because there are no platforms through which these views can be channelled to government in an organized manner.

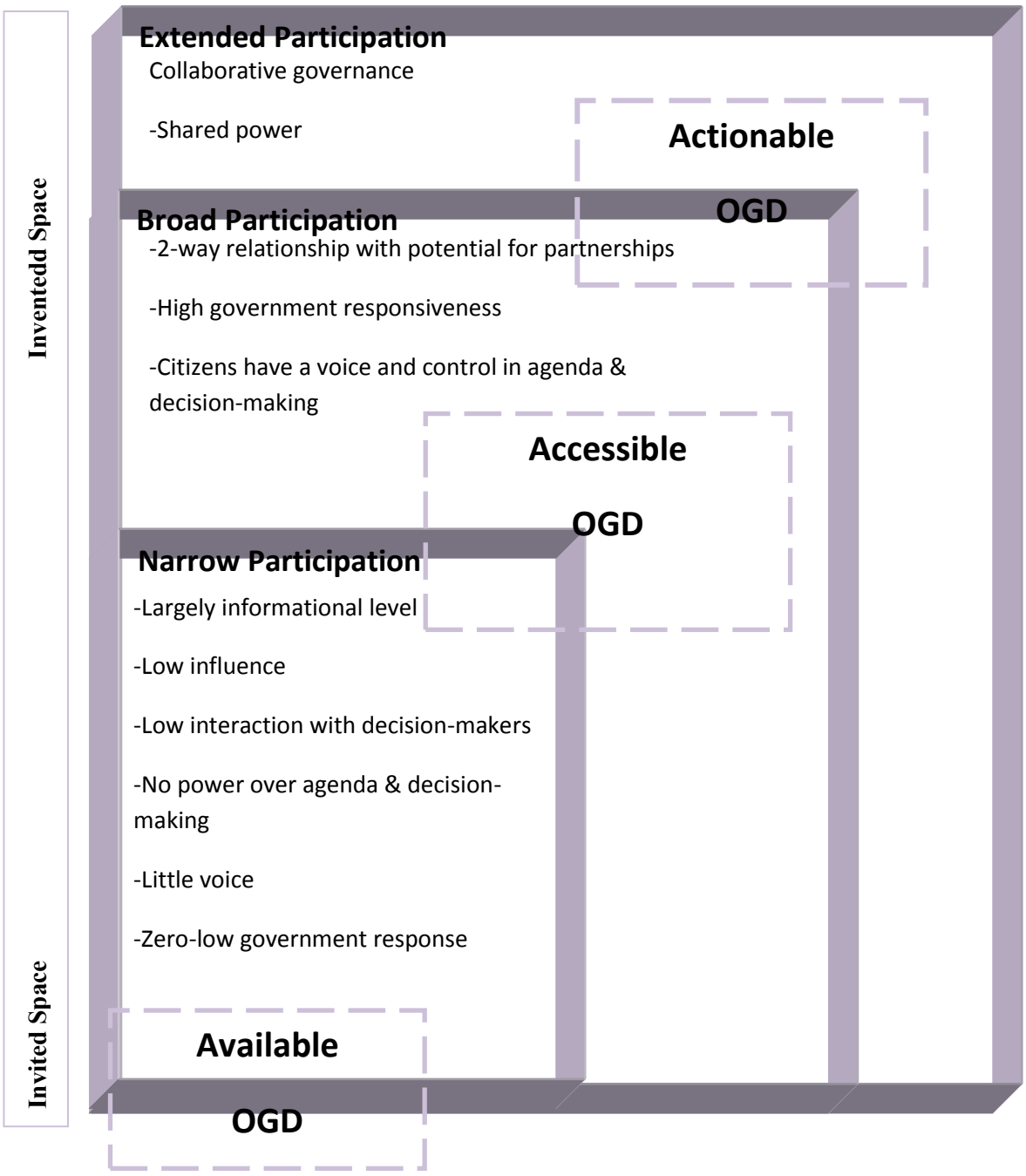


Figure 15: Proposed theoretical framework

The proposed OGD-Participation theoretical framework in Figure 15 also reflects the responsive model of democracy, which defines participation as "an attempt to influence those who have a say in government...." (Teorel, J., 2006). Participatory models proposed by Pateman (1970); Edwards (2008); Wampler &. McNulty L (n.d.); Kersting (2008); Kersting (2015) are characterized by the development of the social and political capacities of each individual to have a voice and be part of the policy process. The research presented here shows that the government is, to some

extent, deliberate in including other actors in various policy and decision-making processes. Based on the level of engagements exhibited in the proposed OGD-Participation theoretical framework, non-state actors are viewed as partners as well sources of information because in some cases, the government will consult and or compare their own data with data from CSO's or development partners such as WHO. Nonetheless, government still controls the agenda and the participation space consistent with Kersting's (2013) concept of invited space. Although intended as an effort to widen democratic spaces, participation is planned and structured in a top-down manner by government which decides who comes in i.e. who is 'invited'. As noted by Wojcik in Kersting (2012): "OGD and open data rely on an invited space where government allows broader information and participation" (p.128). The research presented in this dissertation shows that there is no evidence of invented spaces as a result of OGD access and use neither offline nor online. It is also interesting to note from this research that engagements with the government are primarily offline in physical meetings and conversations yet the data is available and accessed online. Kersting (2013) corroborates this observation and demonstrates that participation as influenced by OGD can happen online or offline through various instruments that can be either symbolic such as online petitions or more aggressive such as strikes and demonstrations.

The ideal form of extended participation is unlikely to be fully achieved in the current OGD ecosystem in Kenya until when there will be universal access to OGD and decision making processes that allow for power sharing between the government and non-state actors. According to Larsson (1998) extended participation is realized when everyone is aware of and given the chance to influence decisions. At the level of extended participation, government and citizens co-share power and set the agenda together. What is evident from the findings of this research is that although citizens might not always directly control the agenda, government has increasingly become more responsive to non-state actors in the OGD ecosystem. Respondents also unanimously agreed that government in general, and also as a result of the clamour for open data, has become more responsive. There are a few examples from the findings of this research that indicate that the contributions and feedback from OGD users are taken into consideration by government during

decision making and thus to a small extent attain extended participation for instance the set up of TWGs in the health sector.

Often there is an assumption that governments will be willing to listen and engage with OGD users based on data presented to them. The government's motivation for engaging with citizens might not necessarily be to promote good governance or encourage increased participation. Recent developments in the political structures and the gradual improvement of democratic institutions have also made it easier to engage with government. The realization of democracy in Kenyan politics began with the multi-party state declaration of 1991. The improved democratic space opened up opportunities for increased and active public participation in political and developmental affairs. More recently, a new constitution came into effect after the general elections on March 4, 2013 thus strengthening these democratic advancements. The new Constitution offers opportunities for devolution of power and resources. It provides mechanisms for transparency and citizen engagement for example through transparent public finances, participation in parliamentary and county assemblies and public participation at the sub-national level. Most importantly for open data and open government, devolution gives every citizen the right to government information and puts citizen participation at the heart of governance.

Summary

The existing OGD ecosystem in Kenya is imbalanced and in the longer term unsustainable. The ecosystem was initially heavily structured around the potential of technology to deliver on the promises of OGD. While the strength of the technology component of the ecosystem should continue to be leveraged especially because ICT penetration is increasing with time, the other supporting elements of the ecosystem should also be boosted to balance the existing technology component. For instance, a strong community of actors and institutions that drive the demand and supply of data using policies and regulations that promote openness in government data use should be developed. Governance policies and the various government institutions responsible for OGD will need to keep up with the dynamic and fast nature of ICT and the rapidly changing OGD agenda. The current ecosystem limits OGD access

and use because of the policy and institutional weaknesses exhibited by the findings of this research. On the other hand, the findings also caution data-enthusiasts on the extent to which OGD can solve governance problems and the fallacy that OGD can in and of itself solve all the governance-related challenges. This dissertation also points out that the current ecosystem could perpetuate the very ills it set out to eliminate - corruption and opaqueness – if the inadequate supporting policies and weak government institutions are not strengthened. Lastly, the 'dark side of OGD' and the risk of it curtailing the positive impact of OGD needs to be guarded against. For instance, issues of data privacy and data security, the risk that OGD will empower the empowered and leave out the less empowered, the risk that OGD will further widen the digital divide as well as the public's distrust in government need to be managed in order to realize the full benefits of OGD.

The underlying assumption throughout this dissertation is that the extent to which OGD is open can be determined by the extent to which users of OGD participate in government decision- and policy-making, therefore participation in government decision- and policy- making using data is a good proxy measurement of how open OGD is. The findings of this research assert that indeed the level of participation especially by non-state actors in government policy- and decision-making best demonstrates OGD openness. Actors in this research value OGD and recognize the massive potential that OGD has to improve development and government functions. However, as the findings show, there is not enough actionable OGD to enable a higher level of government openness, which ultimately also limits the extent of participation. The kind of OGD needed to meaningfully engage government and effectively influence decision-making has not been sufficiently (quantitatively and qualitatively) supplied by government. What is also evident from this research is that a conclusion should not be made simply on the basis of the type of data that is available and its relationship to the spheres of participation. Rather, such a conclusion should be taken into account other contextual factors (e.g. the political and democratic space) that affect the relationships between OGD and participation.

8. CONCLUSION

This research set out to understand how open OGD is by exploring the concept of open government data and its use specifically in the context of developing countries. Using an example of Kenya this research has identified and described the complex nature of the elements that constitute Kenya's OGD ecosystem, the extent to which this delicate balance of elements in the ecosystem impact on how people use OGD and finally, by using the health sector open government data as a case study, how use of OGD by state and non-state actors ultimately influences participation in government decision- and policy-making processes.

While there is some evidence in literature that OGD can contribute to participation by state and non-state actors in government's policy- and decision-making processes, the structure of OGD in developing countries (e.g. Kenya) and the extent to which OGD influences participation is not well documented. This research sought to bridge this gap in knowledge within the OGD and participation discourse with a specific focus on the African continent. This research therefore sought to answer two key research questions (RQ):

RQ 1. What is the structure of OGD in Kenya and to what extent does it support OGD in Kenya?

RQ 2. To what extent has the use of OGD influenced participation in government decision or policy-making?

This chapter outlines the main conclusions and recommendations of this research for Kenya in particular, and for developing countries in general with the aim of promoting a better, more meaningful and sustainable use of OGD in enhancing participation in government policy- and decision-making processes. First, this chapter will synthesize and summarize this research's key empirical findings. Further, on the basis of these findings, , this chapter describes the contributions that this research makes to theory, policy and body of knowledge in the field of OGD and participation. This Chapter will end with recommendations on how best stakeholders within the OGD ecosystem can implement successful OGD initiatives and overall conclusions that emerge from this research.

The main empirical findings are specific to the two phases and were summarized within the findings chapter (Chapter 6) and discussed more analytically in the discussion chapter (Chapter 7). This section will synthesize the empirical findings to answer the study's two main research questions.

One of the outstanding findings of this research relates to how users understood the concept of OGD and how this related to how they use OGD. All users directly related OGD to the public and the role of the government as the custodian of the public's data. OGD's significance was strongly associated with solving problems with regards to public service delivery, decision-making, transparency, accountability and participatory governance. These perspectives reflected open data as relating to government information that is used for solving problems. At the same time, the aspect of open governments was reflected in the findings. Users viewed OGD as a sign of more government openness and a means to breaking silos in government and paving the way for citizens to get closer to government and its governance processes. More importantly, for most of the respondents in this research, OGD is not about the technology that supports it nor the formats it is in (i.e. machine-readable, online and so on) rather they view OGD as government information that is accessible and free to the public.

The context of OGD in Kenya

From the analysis conducted in this research, it is evident that OGD in Kenya is characterized by an imbalanced and unsustainable ecosystem caused by weaknesses in the structures (legal, policy etc.) and institutions that support OGD hence limiting full implementation, eventual use and impact of OGD. This research finds that the ecosystem has at its core the data, actors and technology operating in a dynamic environment and is affected in various ways by components in the periphery. The Kenyan OGD ecosystem is characterised by an overly dominant technology and exogenous factors/components mostly donors that contrasts sharply with the weak public/government institutional support and policy/legal frameworks. Repeatedly the findings of this research confirmed that no one OGD ecosystem component can sustainably stand on its own and that a balanced ecosystem that is user-centred is more likely to be sustainable.

Institutional weakness

This research clearly demonstrates that the role of political and public institutions cannot be underestimated or ignored in the implementation of OGD. This research finds that government institutions in Kenya are too weak to support the OGD ecosystem specifically in the management of data, including collection, storage and supply, enforcement of OGD best practice and even the use of the data in decision-making in public institutions. It raises intriguing questions regarding the nature and extent to which OGD should be institutionalized i.e. whether institutionalization should be done by embedding OGD into existing institutions or by developing institutions that will be relevant for OGD. Do public institutions need an overhaul? How should OGD be institutionalized? The importance of institutionalizing OGD is premised on the fact that with institutionalization, OGD will have a 'home' and adequate support to transcend political barriers among other barriers as well match the fast-changing technology component. This research notes that existing institutions that house OGD may be constraining rather than facilitating the implementation of OGD

These limitations also reflect on other factors beyond the technical capacity of government institutions to manage OGD for instance scarce economic and human resources and an entrenched culture of secrecy in government institutions. Weak public institutional systems are also denoted by a siloed way of working such that government agencies like KNBS and government ministries do not know what each the other is doing in terms of data collection and publishing. Weak government institutions could lead to informal institutions that do not necessarily adhere to good governance procedures hence undermine OGD efforts in the long run. In Kenya's OGD ecosystem, these informal institutions have to a large extent been 'accepted' e.g. having a network within government that supplies data that would otherwise not be supplied.

Unsustainable Ecosystem

In answering what kind of an ecosystem OGD exists in, findings in this research suggest that the insufficient policy/legal frameworks that are necessary to support OGD could render the ecosystem unsustainable. The few and fragmented laws lack clarity on whether data should be opened, who is responsible for opening up data,

the formats and time frames within which data should be opened among other grey areas especially with respect to sensitive health data. The analyses conducted in this research raise pertinent questions on the role of policy and legal frameworks in the OGD ecosystem and whether they should be at the core of OGD initiatives. This research asserts that for purposes of sustainability especially in a rapidly dynamic political environment such as in Kenya, strong legal provisions that support OGD will ensure that OGD has continuity and is firmly entrenched in policy and (eventually) practice. Contrary to expectations, findings also show that the lack of OGD-specific laws has not stopped users from using the data. Notably, this research also reveals that within the health sector, there is strong dependency on exogenous factors especially donors and development partners for funding.

Use and Influence of OGD

The second question that this research sought to answer relates to the use and influence of OGD in participation. This question sought to understand how the different actors (private, CSO, government) use OGD and to what extent data at different levels of openness (available, accessible and actionable levels) relate to different levels of participation. Further, this question investigated whether the use of OGD is resulting in emerging participation models.

First this research has established that data is available and accessible but there is not enough (actionable) data to enhance/increase participation in government policy and decision-making. On the side of users or the demand-side, use is limited by capacity in terms of technical know-how, time and human resources across sectors especially the public sector to access and use relevant OGD. Actors who are not constrained by resources have the ability to collect their own data when they cannot reliably source for data from the government while actors who are resource-constrained have to rely on government data which compromises the extent to which they use OGD. Despite its unreliability and questionable quality (e.g. discrepancy, tardiness), government data is regarded as better and more credible to use when engaging with government officials.

It must be noted that data is political and it represents power. In essence, data (supply and demand) is linked to politics, power and development. Data demand is driven by development, while supply is driven by politics; power is crosscutting on

both the demand and supply side. In as much as one may agree that open data can exist without open government, it will be naïve and challenging to implement open government data without an open government or relevant institutions that subscribe to open government/open data principles and who acknowledge the value that these initiatives portend for their role as public institutions under public trust and tasked with delivering public services efficiently to their citizens. This understanding is further strengthened in light of how the different users perceive OGD as a bridge to get closer to government and its processes as shown in the findings of this research.

Finally, this research sought to understand the extent to which OGD use by different stakeholders influences how they participate in government decision and policy-making. The kind of OGD participation model exhibited by OGD users as shown in Figure 15 suggests that it is not enough to have open data in order to have or encourage participation. The kind and quality of open data is as important as the action of opening up government data. This research concludes that there is not enough actionable OGD to enable a higher level of government openness - a fact that has limited the extent of participation. The kind and quality of OGD needed to engage government and effectively influence decision-making is not enough. What is available is data that is open in principle but which lacks the relevance, quality and consistency required by the users. In essence, government is releasing data that it thinks is relevant to the users. However this data, although available is not enough to enable action e.g. participation in government decision-making processes especially by users who are not in the public sector. It is also important to point out that a conclusion should not be made on the type of data that is available and its relationship to the spheres of participation in isolation of other contextual factors that affect these relationships such as the prevailing political, economic and democratic space. For instance, OGD can exist but if it exists in a closed and autocratic system of government its potential to influence or catalyse the various mechanisms of participation is diminished.

Contribution to research and theory on OGD and participation

The theoretical lens of participation employed in this research needs to be revisited in order to capture the contextual or ecosystem factors that determine if and how people participate in government decision- and policy-making processes. This

research challenges participatory models proposed by Pateman (1970); Edwards (2008); Wampler &. McNulty L (n.d.); Kersting (2008); Kersting (2013); Kersting et al., (2009); Smith (2003); Fung 2006 characterized by the development of the social and political capacities of each individual to have a voice and be part of the policy process. As demonstrated in the findings of this research, participation of citizens in government policy- and decision-making as a result of accessing data is indeed limited by their capacity and therefore participation will often be limited to organized groups such as civil society such that not every citizen can or will participate. This means that there is still a long way to go before a majority of citizens can leverage on OGD and actively participate in government decision-making beyond the routine elections. This is confirmed by Fung (2006) who states that not many citizens will have the intensity to significantly participate hence this is left to a few technical experts such as working groups evidenced in the health sector OGD case study.

This research has demonstrated the significance of conceptualizing or analyzing OGD through an ecosystem framework. An ecosystem approach provides a framework for analyzing the complexity of OGD in context and provides conceptual clarity in an emerging field. This contribution to research and theory is not only relevant to the Kenyan context that was investigated in this research but can also be used to analyse other contexts and the elements that come together to create an OGD ecosystem. Further the approach enables research to evaluate the intricate balance that each ecosystem has or needs and the extent to which these elements affect OGD implementation.

A sectoral view of OGD enabled this research to gain deeper understanding of OGD use notably through the perspective of health sector OGD. The case study approach enabled this research to explore and describe OGD in Kenya from multiple perspectives such that the researcher was able to "simultaneously see whole and parts". (Baxter & Susan, 2008, p.544; Chaiklin, 2000). Given the nascent nature of OGD research especially in developing countries and the dynamism of phenomena such as ICT and OGD, there is an advantage for researchers to narrow down their focus by sector (health, agriculture budget); actors (government, business, CSO); geographical location (national, subnational) or by other ways of categorization.

Contribution to policy on OGD and related themes

OGD is described as still in its embryonic stage. The Kenyan case has provided evidence for how OGD was conceptualized and implemented, how it has evolved since 2011, its uptake and the extent to which it has influenced decision- and policy-making in government by non-state actors. Taking the Kenyan case is appropriate since Kenya was one of the first countries to implement an OGD initiative supported by the presence of a strong technology infrastructure.

Kenya's OGD initiative has been hailed as a success in the developing world. However, evidence from several studies, including global indexes such as the Open Data Barometer, Open Data Index, and this thesis point to the fact that OGD is yet to realise the objectives for which it was set to achieve namely, participation. This study has used empirical findings to show that the OGD ecosystem is not sustainable enough to achieve the anticipated impact. Further the case study on the health sector OGD has shown that the policy framework as much as the quality of the data is important. On one hand, the lack of a law has not impeded use of OGD while on the other hand, the lack of actionable, relevant and quality OGD has discouraged use. The theoretical and empirical arguments presented in this research suggest that there is a need for policy review to secure the sustainability of OGD initiatives as well as to increase the demand and quality of supply of OGD.

The findings of this research, especially those related to the need of policy and legal frameworks, should ignite interest in both practitioners and scholars seeking to understand open government, open data, citizen engagement and access to information as well as crosscutting themes such as the application of ICT and innovation in enhancing governance., Practitioners can use the findings of this research to build upon existing practices of citizen engagement. The findings of this research can also serve as a reference for government leaders and stakeholders seeking evidence-based approaches to OGD implementation and success.

Limitations of the research

This research has offered an evaluative perspective on an emerging field of research and practice. As a result, the study encountered a number of limitations, which need to be considered. The challenges of measuring and analyzing government initiatives

and citizens' reaction towards these initiatives are well appreciated by this research and are even greater when evaluating a nascent and dynamic field such as OGD. The subject under research is relatively new. Therefore there were a few applications of OGD in the government at the start of this research. In this regard, one challenge was in getting a representative body of stakeholders as interview respondents especially within the government. At one point, the researcher had pursued a government official administering one of the open data systems under the custody of the Ministry of Health for over a year and eventually resorted to using secondary data.

Additionally, the constantly changing political leadership in Kenya posed a challenge to this research. Between the inception of some of the OGD initiatives in Kenya, the beginning of this research and its conclusion there have been some significant changes in the leadership of these initiative at the Ministry of Health. For instance, the KODI platform has been revamped, MFL is currently undergoing an upgrade, staff working on these initiatives have been transferred between departments and ministries. These changes have affected the flow and conduct of this research in the sense that the OGD initiatives under this study have been undergoing changes in the course of this research. Government documents and records also have limitations in that they may be incomplete or inaccurate (Patton, 2002). This research sought to minimize the impact of these limitations by using data triangulation, which involved obtaining data from several sources and cross-checking the data across the sources to validate the accuracy and completeness of the data.

Perhaps the most notable limitation to this research is the lack of voices from the citizens themselves who have accessed and used OGD and who are not necessarily part of an organized group such as civil society, NGOs or the private sector. An attempt was made by this research to include these voices by integrating citizens' opinions that were expressed in the KODI survey results obtained in Phase 1 of this research (although these data was purely for purposes of informing Phase 2 of this research) and corroborating findings between the two phases. Citizen participation in this research reflects the perception of civil society groups (umbrella organizations), private sector (firms), NGOs in the form of development partners and the public

sector represented by relevant government departments. Future research should include empirical evidence from the general citizenry.

Secondly despite looking specifically at open health government data, this research did not go into a lot of detail on the health sector itself. The case study was chosen on the basis of several reasons as outlined in the methodology chapter. Key among these factors is the fact that the health sector is one of the sectors with available and accessible open data therefore making it more feasible and practical to use the health data to demonstrate use and impact on decision-making as opposed to looking at OGD in Kenya in general. While taking a health sector specific approach may be viewed as limiting to the scope of this research, it has allowed this research to make an in-depth analysis of a sector that is increasingly gaining prominence in research as well as in the development agenda as exemplified by the Sustainable Development Goals (SDGs). Importantly, the in-depth focus on a single sector of the economy has allowed this research to unearth nuanced attributes of OGD in a manner that would not have been feasible if this research attempted to focus on multiple sectors.

Finally, use of the case study approach means that while these research findings can be generalized across sectors, the generalization should be done with caution and in cognisance of the nuances that make every sector unique. The intention of this research was to understand in an in-depth manner how OGD is used and its influence on participation in this specific context. For this reason, a case study approach with in-depth interviews from key informants was most ideal. Nonetheless, the Kenyan case provides critical insight into the characteristics of open data ecosystems, the use of OGD and the influence of OD use on participation and governance in the context of an African developing country. The specificity and in-depth nature of this research on the Kenyan case is further enhanced by looking into a specific sector (health), its understanding of OGD, use and impact on policy and decision-making.

The researcher considers this research as a good starting point towards better understanding of open government data and its use in a specific context, in this case in a developing country and the development of more comprehensive and robust evidence for measuring open government. It is anticipated that this research will

contribute to theory and practice not just in similar contexts but also beyond and will also contribute to the development of various frameworks that can be used to measure government data openness.

Recommendations

This section will start with recommendations for change and conclude with recommendations for further study. A key finding of this research is that the Kenyan OGD ecosystem lacks balance and therefore leans more towards one element at the expense of others making it unsustainable. This research therefore makes the following recommendations in that regard:

Consider contextual factors

Proliferation of OGD will need more than just an improved technical infrastructure or data supply. Offline and online channels for data distribution should be explored. The public needs to have ICT skills even where offline methods are integrated to the dissemination of OGD. This will gradually bridge the information and digital divides, encourage more participation and access as more government processes and information become digital and online. It also discourages the development of other divides such as data divides, participation divides and rural-urban divides that may arise if the gaps in ICT skills are not addressed.

There is great need to develop or enhance OGD laws and policies and ensure that they are implementable and enacted. A successful OGD initiative is not possible without the existence of an appropriate legal or policy framework that underpins and supports access to government data and information as well as provides guidance to public sector employees and OGD institutions on how data should be made open so that government officials are confident to release data to the public while at the same time, the public is empowered because they know exactly who should release the data, when and in what formats. These laws or policies could be in the form of FOI or Access to Information laws. Kenya's Access to Information law was recently passed in September 2016 however time will tell if and how it will enable increased use of OGD.

Localise or devolve OGD

The relevance of data or information is based on how closely the data or information relates to potential users. Data/information about the number of maternal deaths countrywide may not interest the citizen at the county level. Relating that data to a specific county and even disaggregating it further to the village level makes the data ‚up close and personal'. Bringing the data this close should cater for language barriers depending on the language that the county accesses its information in. On the other hand, centralizing OGD and government information access e.g. making it only accessible online excludes a section of the population and this is again a barrier to the use of OGD in enhancing participation. Lee & Alonso (2013) also suggest a more community-driven approach towards OGD. The current state of a devolved system of governance in Kenya is an opportunity for the devolution of OGD to the community level to make it more relevant for people in their immediate contexts. Localising OGD also means that services and products that are developed from OGD are more relevant and can be used to bring in and include more users of OGD e.g. by including previously marginalized communities in government policy- and decision-making processes. Most importantly for open data and open government, devolution it gives every citizen the right to government information and puts citizen participation at the heart of governance.

Strive towards user-centered OGD

There needs to be a move towards making OGD citizen-centered through CSOs and other intermediaries. Users need to be categorized otherwise it is difficult to attend to all the users. The original idea and concept of KODI was not for direct public use. Data, statistics, numbers and figures are not easy to analyse at least not by most Kenyans. Intermediaries in the forms of CSOs, private sector actors, NGOs and even the public sector will bridge the gap between the raw, machine-readable data and actionable, relevant data. Open data in its strictest form is relevant to intermediaries who can analyse the data and derive value out of it. Open data with value addition is relevant to the wider public in varied forms of services and products e.g. information, maps, applications and so on.

Therefore, considering that most users of OGD are typically not tech-savvy individuals, infomediaries and intermediaries should be strengthened in order to

increase demand and demonstrate the value of OGD. This can be achieved through more collaborative work between the technology communities and industry/domain experts to create meaningful outputs from OGD in Kenya.

Further studies should be done on localised OGD initiatives e.g. at the federal state or county levels and compare those initiatives with national OGD initiatives especially with respect to the extent to which they are relevant, used and lead to participation. This comparison is warranted and interesting because it will provide empirical evidence on the most effective way of implementing OGD initiatives. For example, Nigeria does not have a national OGD initiative however OGD has been implemented in Edo state. How does this compare to countries with national OGD initiatives? In countries such as the USA where there is a national OGD initiative as well as state initiatives, how do they compare in terms of effectiveness and impact? Insights from such studies will build on the body of knowledge generated in this research and contribute towards evidence-based approaches to the implementation of future OGD initiatives – a move that is likely to improve the role of OGD in catalyzing participation and governance.

This research has demonstrated that the use of OGD is a robust proxy measure of how open OGD is. Divergent from the common idea that OGD must be in specific formats and available online, this research shows that openness of OGD needs to go beyond making data available or accessible and ensure that OGD is actionable (i.e. of sufficient quality and quantity to enable non-state actors to meaningfully engage with government) and attain the extended level of participation outlined in the theoretical framework put forward by this research.

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APPENDICES

Appendix A. Interview Guide for phase 1

EXPLORATORY EXPERT INTERVIEWS

Background

The overarching goal of this research is to inquire into the use and

users of the Kenya Open Data Initiative (KODI) and the social and political factors that account for how they adopt and realize benefits from OGD. It further seeks to understand how KODI is structured and to what extent the infrastructure supports OGD use. By so doing, it illustrates how different factors critical in the conceptualization and implementation of OGD affect public participation and success of OGD initiatives.

The plan is to systematically interview key figures that were or are involved in conception, implementation and research on OGD either directly or indirectly and follow a snowballing method whereby other names of people who could potentially provide alternate perspectives will emerge during these sets of exploratory interviews. The decision on who to interview is informed by literature reviews done on OGD. I therefore intend to interview key informants in government, policy/legal, socio-economic, technical and governance experts. This identification of potential interview partners is also complemented by examination of documents.

Research Question:

To what extent does the existing OGD infrastructure support OGD use and users in Kenya?

Sub-questions:

- How would you describe the OGD infrastructure or ecosystem in Kenya?
- How is the infrastructure related to the use (rs) of OGD? To what extent does it support OGD use/re-use in Kenya

- What factors have affected the advancement of KODI especially in increasing the use of the data?

Interview Protocol

Date

Job title and primary functions

Interviewer

Interviewee

Introduction

You have been selected to speak with us today because you have been identified as someone who was key in the conception, implementation and research of the Kenya Open Government Data Initiative (KODI) and/or from whom we can gather valuable insight on open government data and open data in developing countries especially in Kenya.

The aim of this research is not to evaluate your techniques or experiences but rather to gather more insight on the use of OGD in a developing country context.

Consent

To facilitate my note taking, I would like to audio record our conversations today. Only researchers on the project will have access to the recording and the final transcribed data will ensure that your identity remains anonymous unless otherwise stated by you.

This interview will be used as part of a PhD dissertation, to be submitted for examination at The University of Muenster by Emmy Chirchir and then placed in a public archive of research.

Confidentiality & voluntary participation

Responses will only be used by the researcher, and will be kept securely. No responses will be attributed to individuals in the analysis and the

identity of respondents will be protected. Your participation in this study is voluntary. If you wish to end your participation and/or remove you information from this study you can do so by contacting the researcher at any time.

Sharing results

To contribute to shared learning around open government data, results of this study will be published once the study is complete. No personally identifying information will be included in the analysis and the final dissertation.

Please sign the consent form. This document states that: (1) all information will be held confidential and your identity anonymous (2) your participation is voluntary and you may stop at any time if you feel uncomfortable.

Contact

If you have questions at any time about the research at any time, you may contact the researcher, Emmy Chirchir (emmychepkirui@gmail.com).

The interview is planned to last one hour during which we will cover approximately 10 questions. The structure will be as follows:

1. (Question – Icebreaker at the beginning)
2. 8-10 questions that are sub-questions of the main research question
3. Probes for the questions
4. Concluding statement or questions – willingness to participate in follow-up interviews and transcribed responses.

A. Public official at the Ministry of Information and Communication in charge of KODI.

How did KODI start? What was the motivation behind the whole initiative?

What factors have affected the advancement of KODI especially in increasing the use of the data?

1. **Data:**

   How is the process of data management – from the field to the platform? (Data verification/quality control? Data publishing? data prioritization)?

   What mechanisms have you put in place to ensure timely release of periodic data?

2. **Capacity – technical know-how, financial**

   How do people in the ministries or government agencies understand the concept of Open Data?

   What kind of resources including know-how is needed to publish OGD and what is your capacity?

3. **Users**

   How would you describe the data/information needs of potential KODI users?

   What is expected of the user in order to use OGD?

   How has the public responded/taken up/used OGD so far?

   Citizen engagement is an important dimension of OGD. How has KODI handled this? What role does the government/public agencies play in this?

   How responsive has government been to requests and actions resulting from OGD use/users?

4. **a. Technical**

   How do you perceive role of existing ICT systems in the government for releasing data in open formats?

   b. Organizational/political system

   What is the role of politics and/or government in an OGD framework?

   To what extent does this affect the use of OGD?

   c. Socioeconomic factors

What socio-economic factors could be antecedents to OGD access, availability and use?

How socioeconomically ready for OGD is Kenya?

d. Exogenous factors

What role should they play and what role do they play in KODI

e. Policy/legal

To what extent is existing policy/legal framework supporting OGD use? What is needed or recommended and why?

(Kenya has no FOIA or RTI law, how does this affect OGD use and users)?

5. **Impact/Benefits**

Do some Individuals within your department perceive significant risks of open data being misused? In what ways?

What are possible ways people will use the data released?

How does it help in promoting good governance and the public sector? Changes in government to citizens' relationships? Collaborative gov.?

To what extent does KODI offer the public an opportunity to participate in decisions involving issues that are important to them and on programs throughout the whole agency?

B. Policy/legal expert

To what extent is existing policy/legal framework supporting OGD use? What is needed or recommended and why?

(Kenya has no FOIA or RTI law, how does this affect OGD use and users)?

C. Technical expert

Kenya's ICT has grown significantly over the years. Is the existing ICT infrastructure able to support OGD users?

(Accessibility, technical requirements of OGD, technical capacity of public agencies and the potential users, role of ICT in creating economic, political and social value)

What kind of skills does one need to access and use open data?

D. Socio-economic expert

Is Kenya What is the potential of open government data use for social and economic impact? What would users need (what kind of data, skills and resources) in order to realize these impacts?

E. Governance expert

What kind of open government data infrastructure would lead to more public participation on government affairs? (What kind of data? Tech.? policies?)

How would you describe the relationship between access to open data and good governance practice such as more public participation?

What kind of impact would citizens accessing open government data have on government or the public sector?

What kind of changes in relationships between the government and the citizens including. Specific groups such as the CSOs and the business community are we experiencing (or should we experience) as a result of OGD use?

Conclusion

Thank you so much for your time and sharing this information with me. The next steps for me are to conduct more interviews with other

stakeholders and thereafter transcribe and analyse the data. Would you want me to send you the transcripts for verification? Would you also be available for follow-up interviews? Thank you once again. I will be in touch.

Appendix B. Interview Guide for phase 2

Interview Protocol For Case Study

Data Users

Date……

Time: Begin……. End……

>>Informed Consent will be handed now>>

If you agree to participate in this interview, please indicate so below. Thank you.

Do you certify that you are over 18-years of age and agree to participate in this interview?

a) No “Thank you for your time but feel free to let me know in case you change your mind”

b) Yes “Thank you. <<Proceed >>

Organisation: Savannah Informatics Limited (“Savannah Informatics Limited is a Kenyan health software company founded in 2012 by clinicians and finance specialists to deliver inter-operable, connected solutions for healthcare facilities, organizations and regions)”.

Year and Duration: 3 years

<< If necessary, verify this information with the respondent before starting the interview>>

--- Start interview now ---

SECTION ONE: Demography and Background Information

• Name

• Title/position/profession

• Education and Training

• Years of experience and number of years in this position

• Age

• Gender

• Area of research/expertise

1. Can you please tell me in some details about what your job entails?

<< Try to get the respondent to speak about activities s/he is involved in, objectives of these activities, and the different stakeholders involved in these activities>>

SECTION TWO: Understanding of OGD and the OGD ecosystem.

1. What is your understanding of open government data?
2. Which data platforms are you aware of? Which ones are you aware of with regards to health data? Which one do you use (the most) and why?
3. Actor role: How would you describe your institution within the OGD ecosystem? Why?
4. What do you as a user expect in terms of data on health from government?

5. Legal & Policy framework: To what extent do existing policies support your work with data?

Excellent!

SECTION THREE: USE OF OGD

Let us now focus on the use and users of OGD in health.

Let me start by the understanding how you access the data you use

What are your main sources of data on health? <<This category can include names of organizations, people in charge at these organizations, emails, URLs, etc.>>

1. How did you find out about the available data/data platforms?
2. What kind of resources have you received from

government (training, communication etc.) for you to make use the data?

3. Technical capacity including human resource: What kind of technical skills do you need to access government data and to use government data?
4. How difficult is it for you to find the data that you want? Brief description of the factors that may have hindered or facilitated the discovery and acquisition of the valuable/relevant data
   << Factors can be technical, legal, institutional, socio-cultural, or economic>>

   <<Ask for elaboration on each factor identified>>

   <<Read factors and repeat what you are writing down as respondent speaks>>.

I am now interested in aspects related to the quality of the acquired data:

4. What kind of data do you value most? Why and what purpose are they intended to serve?
   Probe question: How and why was the data was identified and recognized to have value?

   Brief description of the motivations to seek data
   <<Ask for elaboration on each motive reported>>

5. How do you evaluate the quality of the data and the overall usefulness and value of data to your work?
   >>Give the respondent some examples of information attributes such as accuracy, relevance, timeliness,

etc.

>> Ask for elaboration where needed e.g. how to deal with lack of quality>>

Let us now focus more on the utilization process itself.

6. How do you/you organization use this data? Areas to focus at this stage are tools, products, questions, research, decisions, policies etc. that have been developed as a result of accessing and using data.

   Probe question: What kind of value did you add to the data?

   <<Ask for elaboration if necessary>>

7. How easy/difficult was it to analyze/process/interpret this information? If difficult, why? What were the main reasons?

SECTION FOUR: INFLUENCE OF DATA ON PARTICIPATION

1. How did the data add value to your work? To what extent was the acquired data useful?

2. Do you participate in any discussion forums or try to engage the government in any way as a result of the data you access? If yes, how? If no, why not?
   >>Ask what channels they use to engage government and at what level of government>>

3. If yes – what do you think is the impact of your discussions/Participation/engagement?

4. To what extent do you think that government responds to citizens' feedback? Would you say that access to data has made government to be more responsive to citizens in any way e.g. more collaborative work between government and NGOs? How?

5. To what extent do you feel that access to health data has contributed to decision and policy-making? How? >>Ask for elaboration>>

That is great. Thanks!

Finally, is there anything else that you would like to share with us about this issue that we have not talked about?

Do you have any questions for me, or would you like clarification about anything that we have discussed?

Would you be available for any follow-up questions?

<< Thank you very much>>

--End of Interview

Appendix C. List of Interviewees

Code used	Number	Category/Description
GOV	5	Government or public official
CSO	8	Civil Society Organisation
PVT	4	Private sector
DP	4	Development Partner (NGOs, donors)
TECH	3	Technology Firms (which also fall under the private sector)

GOV 1. (2014, August 19). Personal Interview).
GOV 2. (2014, August 01). Personal interview).
(GOV 3. (2014, August 01). Personal interview).
(GOV 4. (2015, July 30). Personal interview).
(GOV 5. (2016, July 01). Personal interview).

(CSO 1. (2014, July 30). Personal interview).
(CSO 2. (2014, August 29). Personal interview).
(CSO 3. (2014, August 04). Personal interview).
(CSO 4. (2015, October 28). Personal interview).
(CSO 5. (2015, October 2). Personal interview).
(CSO 6. (2015, December 04). Personal interview).
CSO 7. (2015 January). Personal interview
(CSO 8. (2014, April 04). Skype Call).

(TECH 1. (2014, August 14). Email Interview)
(TECH 2. (2014, August 01). Personal interview).
(TECH 3. (2014, June 04). Personal conversation).

(PVT 1. (2015, June 30). Personal interview).

(PVT 2. (2015, July 10). Personal interview).

(PVT 3. (2015, August 12). Personal interview).

(PVT 4. (2014, August 01). Personal interview).

(DP1. (2015, August 11). Personal interview).

(DP2. (2015, September 21). Personal interview).

(DP3. (2015, July 17). Personal interview).

(DP4. (2015, July 15). Personal interview).