

A Model to Enhance Use of Open Data in E-Governance

**A User Perspective - The Case of Ministry Of Finance, Planning and Economic
Development, Uganda**

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Racheal Mbabazi

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DEDICATION

This thesis is a dedication to Family. To my husband Derick Kwizera: the most wonderful man whose amazing faith in me taught me to believe in myself.

To my children Andrew, Gabriella and Daniella who prayed every morning for “Mummy to get good marks”; letting down their prayers was not an option.

To my Mother and Sister that never stopped praying for me.

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Acronyms

APC	Association for Progressive Communications
CIPESA	Collaboration on International ICT Policy in East and Southern Africa
CSO	Civil Service Organization
e-governance	Electronic Governance
GoU	Government of Uganda
ICT	Information Communication Technology
IMS	Information Management Services
IS	Information Systems
IT	Information Technology
NBI	National Backbone Infrastructure
NGO	Non- Governmental Organisation
NITA-U	National Information Technology Authority Uganda
OECD	Organization for Economic Co-operation and Development
OGD	Open Government Data
SCOT	Strength, Challenges, Opportunities and Threats
TAM	Technology Acceptance Model
UNESCO	United Nations Educational, Scientific and Cultural Organization

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Abstract

Open data has become a force to reckon with especially its adoption by Governments for e-governance. The concept of Open Government Data has been welcomed by Governments around the globe with enthusiasm owing to the numerous benefits and promises to address social issues such as corruption that are tagged to it. Several authors though have indicated that most Governments focus on the release of data in their custody hoping to achieve transparency and accountability to the citizens. These authors suggest that it's not enough to just publish and avail data but there is a need to address the demand side of data - that is the users and their data needs. This study focused on proposing a model that could guide Government's Open Data implementation determining requirements for the model through Library and Empirical research methods. Three existing models were reviewed and the basis of these three rested on Strategy formulation. It was also established that context and environment in which Open data is used is critical to setting an effective Open data implementation strategy to change the relationship between government and citizens, enabling greater transparency, accountability and responsiveness to meet the needs and demands of the people. The research adopted a case study approach looking at the Budget Information Portal in the Ministry of Finance, Planning and Economic Development to gain insight into the specific nature of use of this portal establishing key features to enable drawing generalisations. The study proposed a model addressing issues of ease of access and use looking at alternative ways in which data can reach the users especially the use of Intermediaries and an enabling environment to give and receive feedback. It also addresses capacity building and expansion of the National backbone Infrastructure to promote access and use of data made available to the citizens by the government.

CHAPTER ONE: INTRODUCTION

1.0 Introduction

This chapter introduces Open Government Data as an e-Governance initiative. The chapter presents the gap identified as the underlying challenge of an unexplored user perspective which can enhance the actual use of data provided when addressed to improve government transparency and accountability to the citizens.

1.1 Background of the Study

The demand for Government's transparency, accountability, citizen participation, democratic engagement and the reform of public services has given rise to Governments' adoption of Open Government Data (OGD), an E-Governance concept that data in custody of Government or Government controlled entities should be produced or commissioned by the respective entities, making it available for anyone to freely access, use, and redistribute as they wish, without restrictions from copyright, patents or other mechanisms of control for any purpose (Open Knowledge International). Therefore the use of Open data for e-governance gave rise to Open Government Data concept. Technology innovations and ideas continue to evolve supporting electronic interactions to users and their Governments with provisions for improved service delivery. As such, Governments are constantly looking for more efficient and effective uses of technologies to better service delivery (Thamer and Steve, 2009) and empowering the citizenry to tackle fundamental good governance issues that include: graft, rule of law, government effectiveness, voice and accountability, political instability and violence, and regulatory burden – a role giving rise to the concept of e-Governance (Waiswa and Okello, 2014). Corruption and poor service delivery in systems of Government in Uganda and around the globe have become issues that attract much attention from the citizens, Civil Society Organizations, international donors and anti-corruption activists. Corruption has been

cited as one of the most prevalent and persistent challenges in enhancing economic growth and improving the quality of life of citizens across the globe (Mistry and Jalal 2012). A number of attempts have been made including e-government initiatives (Hopper et al., 2009) suggesting that electronic delivery of services can reduce corruption.

While not being the only motivation, initially corruption was one of the main issues which prompted the founding of OGD initiatives. Corruption is a global issue that seriously harms the economy and society as a whole, affecting people's lives and often infringing fundamental human rights (Attard et al, 2015).

Open data initiatives, however, broad and multidisciplinary, have been identified as enablers of transparency, accountability, citizen participation, democratic engagement and the reform of public services. (Huijboom and Tijs, 2011) quote (Staples, 2007) as saying openness or transparency of government is a traditional 'good governance' principle and the right to freedom of information has been constitutionalised in many countries. Governments produce a lot of information since they generate, collect and compile vast amounts of digitized data continually, but the lack of mechanisms to distribute this data so that it is openly accessible means that most government collected or mandated data remains closed. As such, a number of organizations have come out to advocate for governments to embrace open data initiatives as a measure against corruption among others.

A large number of countries have set up local or national government data portals in order to provide access to open government datasets (Attard et al, 2015) facilitating consumers' access to government data from various authorities and public offices. Some countries such as Europe, USA, Canada and Australia are making significant progress to provide open data to the public. In addition to that there have been numerous initiatives in developing countries in Africa, Asia and South America (Schwegmann, 2012). This, however, does

not mean that the targeted aims of promoting transparency and facilitating accountability have been achieved yet. Like any of these other governments, the Government of Uganda (GoU) is making effort towards OGD initiatives to streamline its structures and processes for effective and efficient governance and to improve service delivery starting with the (OGD) readiness study conducted in 2015. A similar study was conducted in 2012 by Collaboration on International ICT Policy in East and Southern Africa (CIPESA) together with Association for Progressive Communications (APC) to assess the country's readiness to implement OGD. The study report states that the legal and policy framework exists to implement OGD, but the challenge lies in actual implementation of the enacted legislation. For instance, much as the Access to Information Act was passed in 2005 and made operational,(CIPESA, 2012) there is the Oath of Secrecy taken by civil servants which contradicts the free availing of information in some instances. Uganda has, however, gone ahead to develop an open data strategy aimed at laying out a clear road map for implementation and use of open government data in a bid to tap into the promised benefits of government opening up data.

Usually the open data initiatives and use have been associated with the benefits and positive implications. Much of today's focus is on the suppliers of data, whereas achieving the success of open data systems depends to a large extent on the use and the quality of the data provided (Janssen et al 2012). One of the main criticisms of current open data initiatives is that they are largely supply-driven (Kucera and Chlapek 2014). For governments hoping to adopt open data in policy and in practice, simply making data available to the public isn't enough to make that data useful. Open data, though straightforward in principle, requires a specific approach based on the agency or organization releasing it, the kind of data being released and, perhaps most importantly, it's targeted audience (Shueh, 2014). Open systems require an understanding of the external world and must consider the feedback and insights of users in order to continuously improve (Janssen et al 2012).

The promises and potential of open data contrast sharply with the many barriers and the diverse nature of open data means that different types of results from open data have different benefits and are confronted with different barriers (Janssen et al, 2012). The benefits of OGD are numerous, even if it is impossible to predict what value it will create in the future (Varga et al, 2014). As many governments embrace open data and others work on initiatives towards implementation, what it is and why it's important isn't always clear. The basic assumption is that open data itself creates and generates more value than the selling of data sets. The benefits are clustered as political, social, economic, operational and technical. Political and social benefits are viewed as the most important category and difficult to separate (Janssen et al 2012). According to the (World Wide Web Foundation, 2015), the practice of openly publishing key datasets for anyone to analyze and reuse – is rapidly gaining traction as a tool for enhancing democracy, fighting corruption and driving economic growth. (Ubaldi 2013) states that increased data transparency provide the basis for public participation and collaboration in the creation of innovative, value-added services and that data openness is eventually expected to improve the decision making of both governments and individuals. However, with all the benefits and promises of OGD, many governments still struggle to fully implement their open data initiatives. This is because different institutions and governments are faced with unique challenges in opening up their data ranging from data providers not wishing to publicize data to data users failing to use the data easily.

Considering that open data is a relatively new phenomenon that has been deemed as worth adopting to tackle good governance, a number of researchers have suggested a number of approaches that can enhance adoption and use of OGD in order to accrue the anticipated benefits of Open Data. These approaches include linking of datasets to increase their findability, having strategy based approaches to open data initiatives and publishing of data through a number of lifecycle phases so as to tackle all disciplines that may contribute to use

data published. All these approaches point to the fact that users have an upper hand in the use of open data and therefore the need to have a user centric approach to open data initiatives.

There's a need to ascertain the views and expectation of the intended OGD users in order to understand how best to implement OGD initiatives that will be used. Of the various efforts towards OGD initiatives made in Uganda, no such analysis has been done to address the understanding of the external world and considering the feedback and insights of users. Therefore, the research sought to address this gap by proposing a strategy based model towards enhancing use of open data in e-Governance. Once implementers are aware of the user's needs and expectations, they would be in a position to implement initiatives that are sustainable. This research reviewed literature and built upon findings and recommendations of previous studies to establish what has been done towards encouraging open data adoption by governments. An in-depth study was done to ascertain the users' perspective towards effective and sustainable use of OGD in Uganda and proposed a model towards enhancing use of Open Data in e-Governance.

1.2 Statement of the Problem

Open data usage has become one of the most popular trends both in public and private sectors believed to have profound implications for companies, governments, and individuals. However, many open data initiatives, particularly in the public sector, have been motivated by goals such as improving the transparency and accountability of institutions as well as improving the efficiency and effectiveness of existing processes (Chui et al, 2013); most of which are supplier driven, capitalizing on the promised benefits of Open data.

In other instances, Governments have managed to successfully implement their open data initiatives and successfully publish their data but subsequently fail in usage due to poor citizen engagement and a feedback mechanism thus no sustainability of such initiatives.

In order to achieve the most value out of OGD in a sustainable manner, there's need to evaluate open data usability from a user perspective by putting into place guidelines to foster evaluation of how effective the mechanisms in place are being used. It is necessary to look at open data from a user perspective as Harrell (2013) argues that a citizen-centric approach is key to fully realize the benefits of open data in civic life and engagement. Approaching OGD initiatives from a strategic point of view addressing user needs would improve access, use and re-use of data published. When OGD is used continuously and appreciated by users, Government becomes more transparent and accountable to its citizens.

1.3 General Objective of the Study

The general objective of the study was to analyze open data understanding and usability through evaluating the user perspective and propose a model to guide the implementation of OGD initiatives to enhance use of open data for e-governance in Uganda. If the model is implemented as per the guidelines developed, it is likely to address the user centric challenges faced and positively impact on open data implementation by the government.

1.3.1 Specific Objectives

- i. Review the current best practice Open Data models and determine the requirements for a new model that will enhance effective use of OGD in Uganda.
- ii. Propose a usability model to enhance use of open data in e-governance.
- iii. Validate the proposed evaluation model.

1.4 Research Questions

- i. What are the current best practice Open Data models that can inform the requirements for a model to enhance effective use of OGD in Uganda?
- ii. What model can effectively address use challenges to guide OGD initiatives implementation and enhance Open Data use in Uganda?

- iii. How applicable or acceptable is the proposed model in enhancing open data use in e-governance?

1.5 Scope of the Study

The study aimed at developing a model following analysis on use of open data in e-governance from a user perspective. It was intended to establish whether the currently established open data initiatives are being used by the target audience and how effectively so. This was necessary considering that users of OGD exist in various contexts, have different expectations of open data and will differently appreciate the value accrued. The study survey was conducted focusing on a case study of the Ministry of Finance, Planning and Economic Development specifically focusing on the Budget Information Portal. The time scope for the research was nine (9) months from November 2015 to July 2016.

1.6 Significance of the Study

The study can serve as a reference point to concerned government institutions and developers involved in Open Data initiatives for insight into users' expectations and preferences. Understanding users' perception ensures that OGD initiatives are geared towards quality and use of data to be published thus harnessing OGD to bring about transparency, accountability, citizen participation, democratic engagement and the reform of public services.

The study will also be a basis for future researchers to build on and establish ways to enhance open data use for improved information and service delivery, encouraging citizen participation and making government more accountable, transparent and effective which contribute to overall effective e-governance.

Harrell, 2013; Janssen et al 2012; Jason Shueh, 2014; all bring out the idea that in order to make optimum use of open government data, there's need to relate "government's providing of data" to "users' access of the data". Most of what has been done has been centered on governments engagement in providing data in its custody for better governance and less has

focused on the actual users of this data. Therefore, this will be a step in the direction to address users' engagement of open government data access.

1.7 Definition of Key Terms

Electronic-Governance (E-Governance) has been defined by UNESCO as the public sector's use of Information and Communication Technologies (ICTs) with the aim of improving information and service delivery, encouraging citizen participation in the decision-making process and making government more accountable, transparent and effective.

Open Data: Information that is available for anyone to access, use, and redistribute as they wish, without restrictions from copyright, patents or other mechanisms of control for any purpose, at no cost. The research will not be strictly tied to the definition of open data as data published online since there could be other mechanism towards information access that may not necessarily be online. **Open data** is the idea that certain data should be freely available to everyone to use and republish as they wish, without restrictions from copyright, patents or other mechanisms of control.

Open Government Data: Data produced or commissioned by government or government controlled entities that is available for anyone to access, use, and redistribute as they wish, without restrictions from copyright, patents or other mechanisms of control for any purpose, at no cost.

Open Data initiative: Any organized activity focused on providing open data (Supply side) or on securing access to open data (demand side).

Data Portals: An Open Data Portal is a single point of access to data held by institutions, agencies or other bodies and is usually a key element of open data strategy. Open Data portals facilitate access to and re-use of public sector information

1.8 Conclusion

This chapter introduced the research study area identifying the gap that is the focus of this study. It provides the basis for the research problem, methodology, the structure of thesis, and presents the objectives, scope, and significance of the study.

The objectives presented in this chapter guided this research to identify and categorize users as well as establish the users' perception in question. This chapter also gave a basis to the literature to be reviewed in the following chapter.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This chapter focused on the review and analysis of existing literature on the relevance of establishing the users' perception of open data as an e- government enabler. This is attributed to the fact that open data initiatives for access to public information is relatively new but said to be a very significant, and potentially powerful, emerging force. The review of literature further focused on Understanding of Open Government Data with specific inclination to a user centric approach to enhance use and realize full benefits of OGD.

The knowledge acquired provided insight to the developed research questions and a basis to the theoretical framework. It also helped in coming up with requirements to evaluate the data sources that might meet an information need, and looking at how OGD fits into this.

2.1 Understanding Open Government Data

There is not yet a single specific definition or description of Open Data and Open Government Data but several sources have attempted to define open data in different contexts. The Organization for Economic Co-operation and Development (*OECD*), defines *Open Government data* as any data and information produced or commissioned by public bodies that can be freely used, re-used and distributed by anyone and may include business information, registers, patent and trademark information, public tender databases, geographic information, legal information, meteorological information, social data, and transport information among others.

Therefore OGD in our context is data or information made readily available by Government to the citizens and can be used, re-used and distributed as regulated. This way the citizens have access to important information and can access it whenever they need it.

2.1.1 Open Government Data as an enabler of e-governance

From the UNESCO definition of e-governance, we see that it is the use of information and communication technologies to improve information and service delivery, encourage citizen participation in the decision-making process and to make government more accountable, transparent and effective. The opening up of data by government empowers citizens with information on the use of public resources enabling them to hold their governments accountable as Cranefield et al (2014), state that government provision of information has historically been important in informing citizens and allowing access to needed information. The belief that OGD is a good governance principle, has made it a political objective and commitment for many countries while the promises of supporting economic growth, improving public services and promoting government transparency and accountability make it an attractive policy objective.

This implies that Governments want to incorporate OGD in their governance structure to improve and have effective governance systems through the use of technology. Embedding OGD in Government policies has become attractive since the promises of OGD are numerous.

2.1.1.1 Transparency and Accountability

Open data increases transparency as free access to Government data empowers citizens to exercise their democratic rights. Consequently, transparency increases the accountability of government to its citizens. Transparency is seen as a key benefit of OGD and through the ability to access and explore open data, citizens have improved opportunities to participate with, understand and critique the actions of their government thereby strengthening their trust in government (Cranefield et al, 2014). With data opened up, the expectation is that Government will make better decisions in the public interest thus creating value in government itself by increasing its efficiency. Supporters of OGD argue that it is a key enabler of e-governance, promoting transparency and public accountability through the assumption that the absence of data in the public domain allows public servants to engage in

corrupt behaviour with impunity and that OGD can be a powerful force for public accountability by making existing information easier to analyze, process and combine, allowing for a new level of public scrutiny raising the level of public trust and perceived responsiveness of Government actions (Ubaldi, 2013).

According to the (PA Times Online, 2013) transparency is often seen as a powerful tool to transform government. It is often seen as a solution through open data policies to all kinds of issues in the public realm, such as low citizen trust, corruption, bad performance, low accountability and power abuse by public officials.

Transparency and accountability would be hard to separate. If Government publicly and openly gives needed information to the public, this would enable citizens to hold their leaders to account for the various resources allocated and this in turn would check on vices like corruption thereby paving way for good governance.

2.1.1.2 Innovation and Economic Development

Open data may enable innovators to improve services or build new products and services within public or private sector. (Varga et al, 2014) state that open data may shift certain decision making from the state into the market making the economic domain the key focus. Open data creates value in many ways, for example by helping create new products or services in places where they are missing, including the development of new products. The (World Bank, 2015) in a report on Open Data for Economic Growth states that, there is also strengthening evidence about some of the types of data which are most important for economic growth. The opening of data by government can help businesses to perform better by making more informed decisions as (Salvatore 2007) talks about the shift from traditional economy to know-how based economy, explaining that revolutions in web technologies and the spread of information have their impacts in the way businesses are conducted. He further notes that in this new era, the economic environment has many new aspects such as

globalization, the spread of information technology and many more. OGD can stimulate a competitive marketplace, for instance public sector services and innovators from outside governments are provided with the opportunity to develop modular services which are more agile and targeted to users' needs (Ubaldi 2013).

Opening up Government data can help citizens to identify gaps and opportunities that exist in the economy as well as the available resources that could be utilized. This could lead innovation of new products and services that could lead to economic growth. Published Data could in addition help businesses make more informed decisions thereby performing better giving them a competitive edge.

2.1.1.3 Inclusion and Empowerment

A promise of Open government data among others is the involvement of citizens in policing and law enforcement removing power imbalances and bringing new actors in the political debate, especially those with special interests or needs. (Davies et al 2013) put it that open government data may work by supporting the direct engagement of grassroots communities in working with, interpreting and responding to data about their situation. With open data there is the possibility for local communities to build up their own understandings and interpretations of key issues, and for intermediaries to contextualize information in ways that make sense to diverse groups, including citizens at the grassroots. Through print-outs, mobile phone-based services, offline access, community radio and participatory workshops (De Boer et al., 2012) data can be taken to local settings –empowering previously marginalized groups.

2.2 Open Government Data users and the demand for data

Understanding the demand for data might help organizations to focus on datasets that are relevant to the users which in turn might foster use of Open Data. Not every dataset that an organization can possibly publish as Open Data is equally relevant or interesting to the users.

Selecting datasets to be published as Open Data might be challenging because it might not be always clear what datasets are worth making available for use. Understanding who the potential users are and what datasets they demand helps publishers to focus on datasets that are relevant and interesting to the users. Misalignment between the supply and demand sides of the Open Data might negatively affect the use of data. Users access the data they need for various purposes. Therefore it is important to understand who the users of open government data are and categorize them according to their needs and capabilities. Each user's community is unique in its own way and has its own needs and priorities in accessing data. The stakeholders and users of open data are not a uniform group of people who share the same urge and interest to access data and (Varga et al, 2014) classifies users as public sector, private sector, donors, civil society organizations, academia, civil hackers, and media, depending on their role in open data initiatives. Based on data driven classification they are classified as data producers, data consumers, data intermediaries and data specialists. Data journalists represent a user group that can help promote the released data. Realizing the full benefits of data use also means engaging civic hackers, also known as programmers and developers who believe that data-driven products, apps, and content can improve quality of life.

Table 1: Stakeholders' Classification

	Data producers	Data consumers	Data intermediaries	Data specialists
Public sector	Government data producing	Government interoperability		Topic specialization (health, transportation, education, etc.)
Private sector	Business data producing	Data market	Data consultancy	Cross-topic specialization (legal, economic, entrepreneurship, etc.)
Donors, Foundations and International Organizations	Social data producing			
Civil Society Organizations	Mainly social data producing	Data for social good	Data advocacy	Data advocacy
Academia and Research	Science data producing	Data analytics	Data research	Data science
Civic Hackers		Civic data apps development	Apps and visualizations development	
Media		Data journalism		

Source: Varga et al, 2014

Worthy (2015), categorizes users in four groups namely; Public, Journalists, Business and Academic basing on type of people and organizations requesting datasets from data.gov.uk.

However, there is a potential gap between effective use of open data by all its beneficiaries and digital access. (Gurstein 2011) explains that efforts to extend access to data will perhaps inevitably create a data divide similar to digital divide between those who have access to data which could have significance in their daily lives and those who don't. This could be due to differences in income, education, literacy and so on. Since some of the users and beneficiaries of OGD wouldn't be able to access published datasets later on make sense of the published data, there might be a need for certain groups of users acting as intermediaries, to use print-outs, mobile phone-based services, offline access, community radio and participatory workshops (De Boer et al., 2012) to take the data to local settings empowering previously marginalized groups, and can provide the basis for feedback loops that enable local communities to shape the knowledge base on which policies are based. (Gurstein, 2011) also

notes that open data alone does not necessarily equate to empowerment, if data only empowers the already empowered. Users with prior experience will more easily adopt the use of open data as “open data” empowers those with access to the basic infrastructure and the background knowledge and skills to make use of the data for specific ends. These above mentioned resources are more likely to be found among those who already overall have access to and the resources for making effective use of digitally available information. From analysis of literature on OGD users, there was need for further study of the users’ perspective of open data. Little work has been done to map out the users of specific open data, and to explore how far open data is supporting greater inclusion in policy making and governance processes (Davies et al 2013).

From the discussion above, it is clear that Open data users vary in categories and would need different kinds of data, using it for varying reasons. These users would also access data at many different levels especially in our Ugandan context where the use of ICTs is not widespread and the use of middlemen who have been classified as intermediaries would be inevitable. Therefore, knowing and understanding the needs of the various categories of users would be crucial in ensuring that users’ data and information demands are met leading to successful OGD initiatives.

2.2.1 OGD Users’ expectations

Knowing what the users of OGD expect from data published by government could be the basis of addressing the demand side of open government. (Varga et al, 2014) note in their findings that data consumers want to have access to all types of useful data, in a single place, data that is easily accessible, appropriately described and interpreted, and free. Further note is taken that the impediments for adoption of OGD include among others, users not feeling that they have the right to seek public information from Government and its bodies, not being familiar with the concept and importance of open data and that citizens do not feel that

seeking public information will make any difference in practical problem solving in their community. Therefore establishing user expectations to make the most of OGD is a necessity as (Harrell, 2013) argues that a citizen-centric approach is key to fully realize the benefits of open data in civic life and engagement.

The only way OGD initiatives will make sense and add value is by ensuring that the data published is actually used. Data published will be used if the intended users find it relevant and useful in their different contexts. Ascertaining the users' expectations and working towards them would ensure behavioural use of the data if users find it satisfactory making OGD initiatives more sustainable.

2.2.2 Value of the user perspective in realizing benefits of open data

Through the arguments of several authors like (Jason Shueh, 2014); (Janssen et al 2012); (Harrell 2013) on open data, its adoption and use, it is clear that simply making data open might not be sufficient because there might be a gap between the supply and demand for data. The assumption is that addressing data consumer needs will contribute to valuable feedback on what datasets they need and good quality data that is frequently updated. Establishing a user perspective also gives insight into types of data and information collected and made available to the public, how this information is used for enhancing transparency and accountability, the gaps in the data and the challenges in the implementation of the respective projects and how they can be overcome.

2.2.3 Intermediaries and their role in the Open Data Ecosystem

In the groups of users categorized, there was a group of intermediaries which in our Ugandan context is very crucial for the success of effective open data use. (Francois et al, 2014) defines open data intermediaries as:

- (i) An open data intermediary is an agent positioned at some point in a data supply chain that incorporates an open dataset,
- (ii) Positioned between two agents in the supply chain, and

(iii) Facilitates the use of open data that may otherwise not have been the case.

The group of Intermediaries is one that encompasses several other users such as civil society organizations, researchers, civil hackers, data journalists among others who structure the data provided into a form understandable by interested users and disseminating it to them. This is because of the various challenges in the access and use of open data such as lack of access, low levels of data literacy, lack of human, social and financial capital to effectively use open data, and also to open up and combine several datasets that together can create value for citizens (Gurstein 2011; Magalhaes et al. 2013; Canares, 2014).

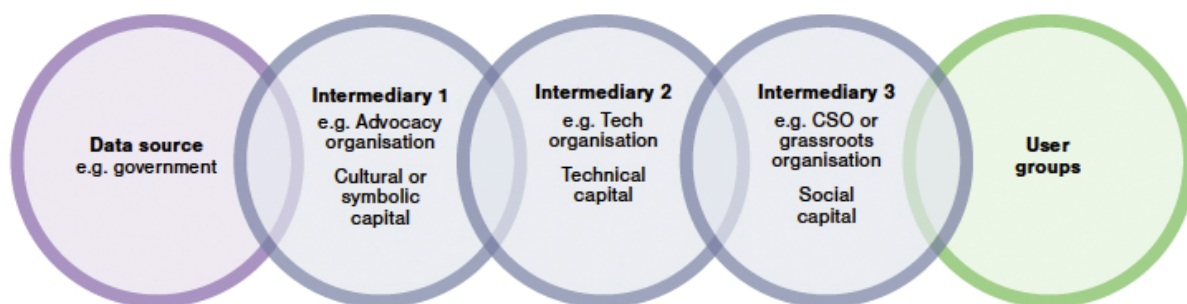


Figure 1: Open Data Intermediaries (Web Foundation, 2015)

The model illustrates the three types of Intermediaries namely; Cultural or symbolic capital, Technical capital, and Social capital. That is the Advocacy Organisations, Technical Organizations that may come up with apps or such other innovations to bring the data closer to the users and the community based organizations that can access the data provided and make out how best to make it understandable to the users.

Depending on the level of access of the user, users might need one or more intermediaries to be able to accrue value from the open government data.

2.3 An overview of best practices, strategies and standards for effective Open Data Use

2.3.1 Open Data International Best Practices

The Open Data International best practices are guidelines and ideas that represent the most efficient course of action for Open Data initiatives. The best practice is that Open data Initiatives should be handled holistically clearly showing that setting the user needs as priority goes a long way in informing open data initiatives thus the criticality of addressing the user perspective that informs the need. It considers the relevance of all stakeholders in the ecosystem and that open data policies, strategies and regulatory frameworks are inspired by the need and so are the other components related to the use of open data. It also illustrates that the continuous use and improvements made rely of reviews and feedback from the stakeholders.

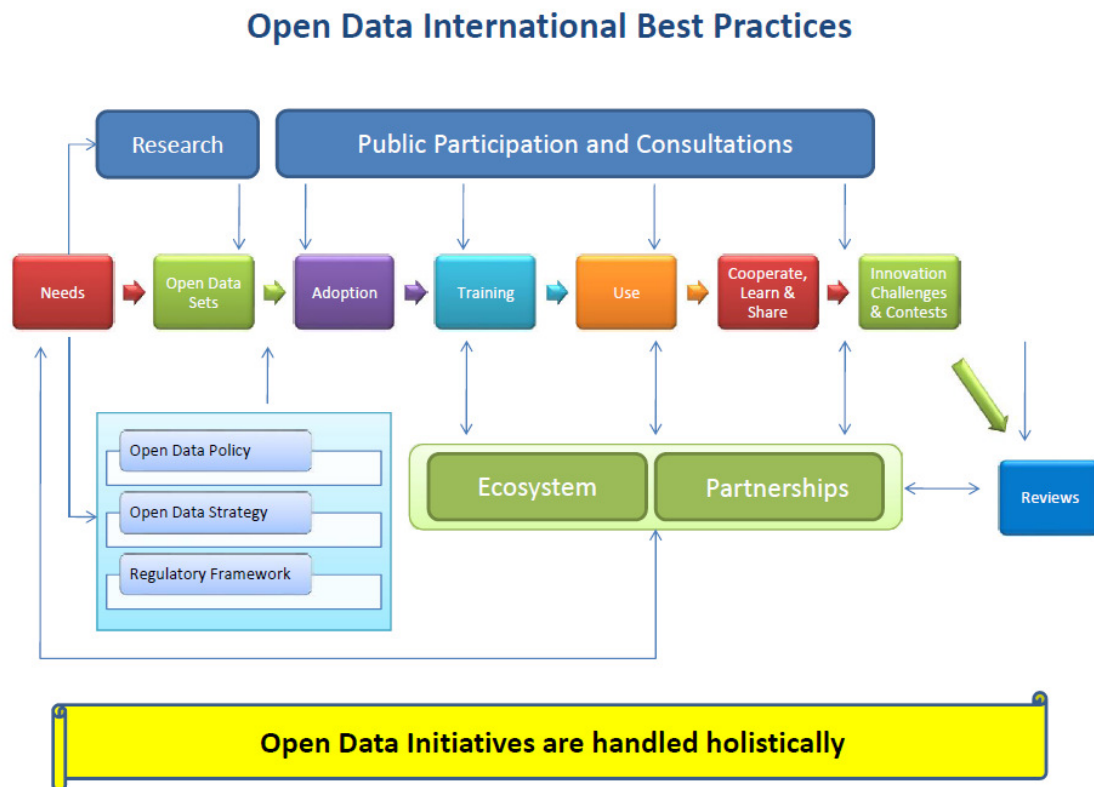


Figure 2: Open Data International Best Practices (Kitoogo, 2016)

2.3.2 Open Data strategy and approaches for publishing and access of OGD

Open data strategy is crucial to the successful adoption and use of open government data initiatives laying out a roadmap and aligning the different players and stakeholders of open data. According to Socrata, as part of the transition from closed to open governance, governments are realizing the importance of creating a formal policy to define strategic goals, describe the desired benefits, and provide the scope for data publishing efforts over time. These strategies would look at the would-be consumers of open data, their characteristics and needs and establish suitable approaches for publishing of data by the government and access by the users. An official open data policy is one of the most effective ways to obtain organizational support and transformational change with open data initiatives. While the main implementations of open government data initiatives are data portals, there exist a number of different implementations with various characteristics. The greater availability of interoperable and linkable open government data catalyzes secondary use of such data, so they can be used for building useful applications which leverage their value, allow insight, provide access to government services, and support transparency (Lnenicka, 2015). (De Boer et al., 2012) encourages the re-use of published data using print -outs, mobile phone-based services, offline access, community radio and participatory workshops to take the data to local settings. This can provide for approaches that can be used by intermediaries to provide data to potential users and beneficiaries of open data that would otherwise not have access to data published by government on data portals. An important way to ensure that the government allows private parties to compete on equal terms in the provision of government data is to require that national open data portals themselves use the same open systems for accessing the underlying data as they do to make them available to the public at large (Ubaldi, 2013). The following are strategies that have been formulated to foster use of open data putting into consideration that it ought to be used for it to have value addition.

2.3.2.1 Linked Open Data

Linked Data is defined by Wikipedia as a term describing a recommended best practice for exposing, sharing, and connecting pieces of data, information, and knowledge. Organizations are increasingly publishing their data in an open format to increase transparency and foster economic activity. In so doing, organizations strive to open up as many datasets as possible, without considering the strategic importance of open data. One of the strategies identified as fostering the use of open data is linking data to other datasets. An issue that is often not addressed before opening up data is the format of the dataset. Common practice for open data is that the format is machine readable to allow for automated processing. However, data being merely machine readable is not sufficient. Therefore, if the publishers of data wish for data to be used, they need to link this data to other relevant information. Tim Berners-Lee's five stars of linked open data model illustrates this phenomenon of linking data for effective data access and use.

Five star open data model

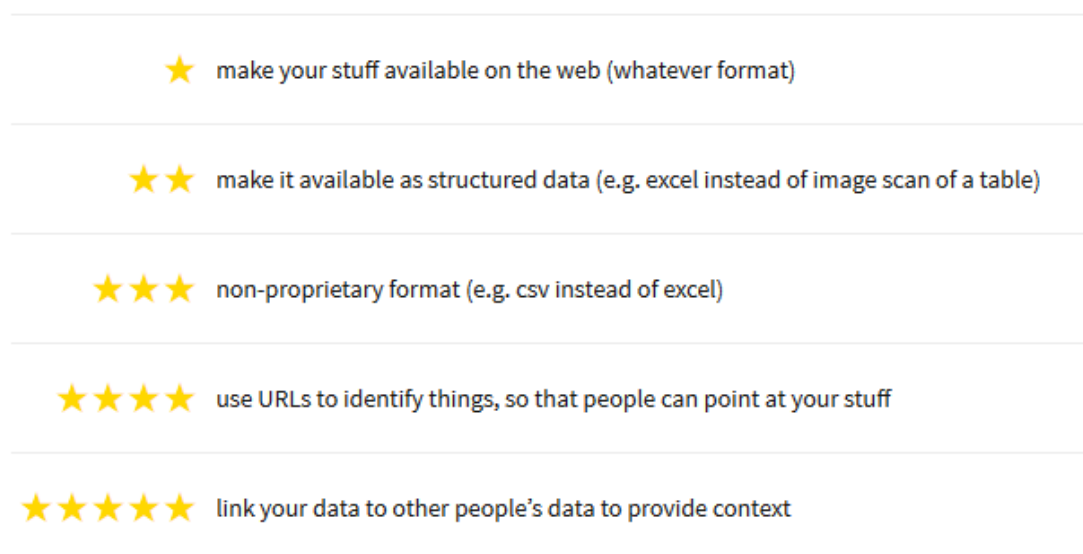


Figure 3: Five star open data model (Tim Bernes-Lee, 2009)

★ Data should be available on the web (whatever format) but with an open license.

★★ Data should be available as machine-readable structured data (e.g. excel instead of image scan of a table).

★★★ All in (2 star) apply in plus being provided in a non-proprietary format (e.g. CSV instead of excel).

★★★★ All the above apply plus the use of open standards from W3C (RDF and SPARQL) to identify things, so that people can point at your stuff.

★★★★★ All the above apply plus linking data to other people's data to provide context.

(Tim Davies, 2012) further expands on Tim Bernes-Lee's model and explains that Engaging open data should:

★ Be demand driven

- Choices about the data released, how it is structured, and the tools and support provided around it should be based on community needs and demands.
- There should be mechanisms to collect user feedback like people's requests for data, and responding with open data

★ ★ Put data in context

- Clear information should be provided to describe that data published, including information about frequency of updates, data formats and data quality.
- Qualitative information such as details of how the data was created and manuals for working with the data should be provided.
- Links from data catalogue pages to analysis of the data that has already been carried out with it, or to third-party tools for working with the data should be made.

★ ★ ★ Support conversation around data

- A feature to facilitate comments on datasets or to create a structured conversation around data to network with other data users should be enabled.
- Data publishers and owners should join the conversations so that they can answer questions raised in the conversations around the data that they have provided.

- There can also be offline opportunities to have conversations that involve the data provided.

★ ★ ★ ★ Build capacity, skills and networks

- Users should be provided with a link to tools to work with the datasets.
- Guidance should be given on using open data analysis tools to enable people build their capacity and skills to interpret and use data in the ways they want to.
- Skill-building sessions on using data in particular ways, or using particular datasets should be given to users
- Consideration should be made to do capacity building to help the community work with open data.

★ ★ ★ ★ Collaborate on data as a common resource

- Develop feedback loops so people can help you improve your datasets
- Collaborate with the community to create new data resources (e.g. derived datasets)?
- Provide support to people to build and sustain useful tools and services that work with your data.
- Work with other organizations to connect up your data sources.

Therefore, this model gives a guide on the formats that open data can be published in and illustrates that there's value added with the addition of another star. The principle is that by linking open data you keep in mind the users of open data an enhance user access and use of the data published.

However, this model also only focuses on the structure of data as an enabler of the use of open data yet there are several other strategic aspects that need to be considered in order to have a holistic approach towards enhancing open data use especially in e-governance given its numerous benefits.

This research therefore viewed other existing approaches suggested to have an impact on the adoption and use of open data initiatives since open data can only have value if used and used correctly.

2.3.2.2 The Open Data Canvas

The Open Data Canvas (Terpolilli and Trichot, 2014) is a strategy tool enabling structured conversations around management and strategy to formulate an interface between the supply and demand of open data. This clearly sets out to identify the objectives, activities entailed in opening up data, customer segments, the environment for the open data initiatives and who the targeted users are among others. It also looks at the actors that can transform or add value to the provided data for the greater benefit of those who are not able to access the data. It also looks at the datasets concerned, how to enable Data Users to create value with data and the internal activities towards opening and using of data.

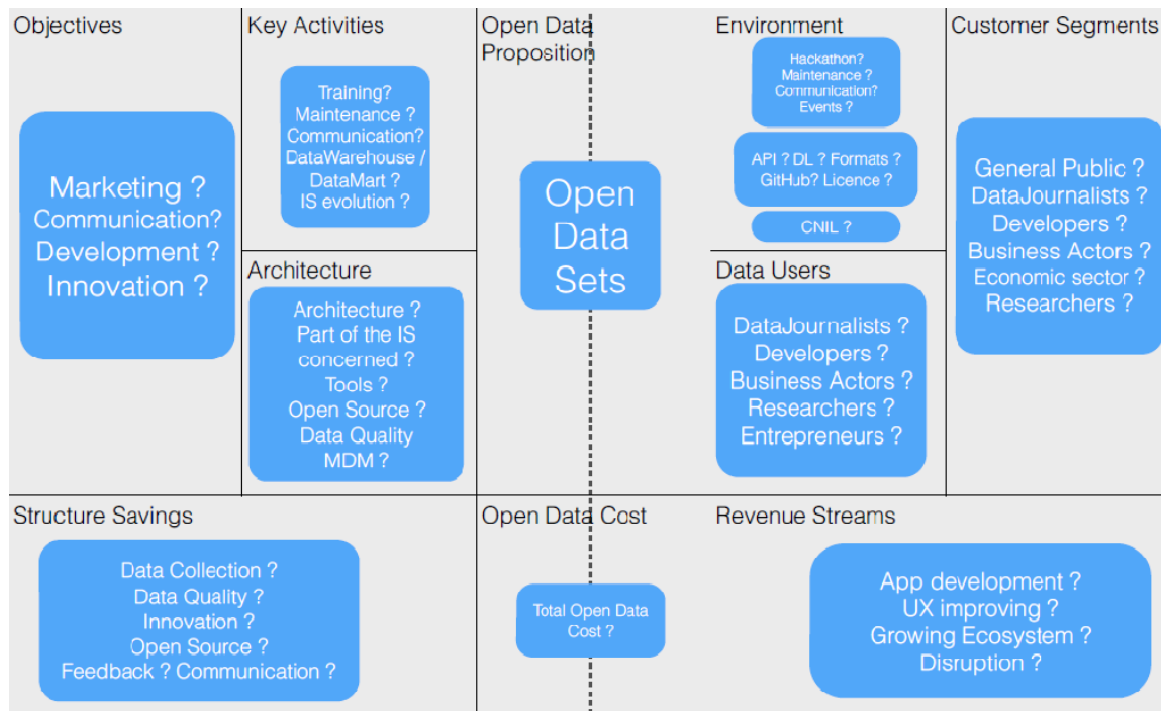


Figure 4: Open Data Canvas (Terpolilli and Trichot, 2014)

As much as the open data canvas might cover most areas that need to be addressed in the consideration based, it is inspired by economic value that might be accrued in the long term use of open data published and might not explore technical and functional aspects to ensure that the data published is actually used since the value will be created if and only when the open data is actually used.

2.3.2.3 Linked Open Data lifecycle phases

Van den Broek et al. (2011) identified five common phases of opening up data: identification, preparation, publication, re-use and evaluation through analysis of seven lifecycle models describing the process of opening up linked data and guiding organizations through this process and formulated common actions identified based on these existing models. The resulting lifecycle phases are as shown;

Table 2: Linked Open Data Lifecycle Phases

Lifecycle phase	Steps per phase
Identification	Setting the strategy
	Selecting the data
Preparation	Setting requirements
	Modelling and describing data
	Converting to machine-readable data format
	Linking data
	Storing data
Publication	Publication of data
	Publication of metadata
Re-use	Exploiting of published data
	Data management
Evaluation	Developing business propositions
	Monitoring and improving data

Source: Van den Broek et al. (2011)

Consequently, a linked open data lifecycle model was developed based on the notion that a clear strategy needs to be in place to successfully open linked data.

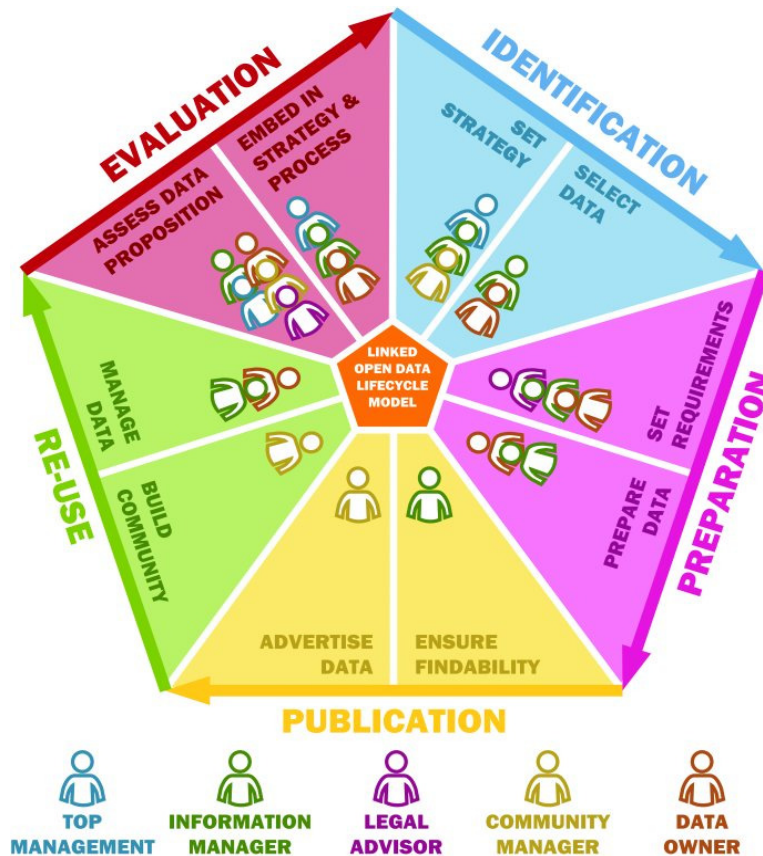


Figure 5: Open Data Lifecycle Model (Van den Broek et al., 2011)

The open data life cycle model comprises phases that should be undertaken to ensure that data opened will be used and will create value. It identifies various users involved at each phase in the data lifecycle thereby showing that involvement of users in open data initiatives is key.

The first phase of identification consists of two steps of setting the strategy and identifying the data for opening up. This involves developing a vision on what value linked open data will create, identifying data to publish, and which data to re-use from others. It is at this stage that to-be users of the data to be released are identified and involved to capture their requirements and demands which. It is critical to have top management support at this level since the success of the project would greatly rely on the strategy set. In the second step of the

identification phase, datasets to be opened up, based on the strategy are identified. Since the aim is to ensure that published data is used or deemed useful, then data according to the user's needs is identified at this stage taking into account the costs for opening up the data and data that is classified as open. This step also includes the mobilization of the data owners of the datasets that are identified.

The second phase of preparation entails steps of setting requirements, modeling and describing data, converting to machine-readable data format, linking data, and Storing data. Much as the datasets that are identified maybe of high quality, exhaustive data preparation needs to be done before publication. Technical (data quality level, standards and metadata), economic (value proposition and business model) and legal (open license) requirements are formulated involving all relevant stakeholders for comprehensive requirements formulation. Depending on the data requirements set, data is then modeled, described, converted to desired format and stored.

The third phase of publication is basically about publishing the data and its metadata. This ensures that the data published can easily be found by the users. This could involve advertizing the data or creating sensitization to potential users. This is because apart from technical findability of data, engagement of potential users and advertising the data is essential in ensuring that data published is used. The data can then be registered with its metadata in an existing data catalogue, for example the national data portal. Finding the right platform for publishing datasets is essential for attracting attention and users.

The fourth phase of re-use of data involves exploiting the data published and data management. Exploiting the data published greatly depends on the previous stage of publication where data is published in a way that it can easily be found, how it is advertised and how much sensitization has been done. Data can be used differently at this stage depending on the access level of the users. Some users are able to access the data sets and

analyze them providing information that can easily be accessed and used by others. Others would rely on the information analyzed from the datasets and others use apps developed by the programmers. This stage would use a lot of help from the different Intermediaries to ensure that data provided creates value. These Intermediaries would come in as external stakeholders to build an active network around the data. These could include civil rights organizations, web entrepreneurs, incubators, and research institutes. Value could also be created through re-use of published data using print-outs, mobile phone-based services, offline access, community radio and participatory workshops to take the data to local settings. Having linked data could also enable more data to be accessed and used thus creating value. In the second step, data is managed to make sure that the data quality remains at the desired level. This would involve regularly updating the data and publishing updates, tracking visitors and users and receiving feedback from users. Being prepared to receive feedback from users and requests for support during re-use is key for data providers to ensure its use. Active community building may also help the process of attracting feedback on the published data, which will help to improve the quality of the data.

The last phase of evaluation is very crucial evaluate use of the data that were opened up. In instances where this data isn't being used as anticipated, it would require actively engage with users that may want to use its data and support them in the process.

The first step is to assess the impact value proposition of linked open data of the published datasets evaluating whether set goals have been satisfied. This could use indicators such as number of downloads, users, applications developed from published data and end-users of the applications.

Evaluation therefore embeds open data in the organizational strategy and processes. There's need to follow up the lessons learned in the open data implementation. This may mean an adjustment of the initial strategy.

Therefore, the Linked open data lifecycle model considers the strategic importance of open data taking into account all the other disciplines to ensure that data published is actually used for open data initiatives to be able to realize the mission and goals for opening up data especially in enhancing governance. Of the strategies covered by this model it incorporates the linking of data in the second stage of preparation and setting an open data strategy under the first stage of Identification and strategy formulation. This makes it the ideal model to be used for this research incorporating ideas from the other two models considering the detail given under each of them to ensure developing of a comprehensive open data use model to enhance the use of open data in e-governance.

However, it doesn't consider mechanisms to enable the different players in the ecosystem accrue value from data made available to the public. In our Ugandan context, this is very relevant since there's still a wide gap in the digital divide thus the need to bring this data provided closer to the citizens at all levels. This is an aspect that the proposed model needs to address.

2.3.3 Uganda's Open Data Initiatives Progress

2.3.3.1 Uganda Open Data Readiness Assessment

The Uganda Open Government Data (OGD) readiness study (CIPESA and APC, 2012) was conducted between January and April 2012 to assess the country's readiness to implement OGD. It primarily engaged senior government officials, mid-level public servants, members of the media, academia, private sector, and donor agencies.

The readiness assessment engaged a number of stakeholders as this is crucial to gauge the level of commitment, interest, and capability to implement OGD initiatives and for them to be adopted and used by the intended audience.

The study found that there is readiness to initiate an OGD programme, and this was reflected by the initiatives that have been undertaken, such as the legal and policy

environment in place, infrastructure, and appropriate human resources. The Access to Information Act 2005, Information Management Services (IMS) Policy³, the National Development Plan (2010), and the draft Uganda National e-government framework (2010) are legal frameworks providing for a conducive OGD environment.

At top leadership and middle level, there was willingness to open up government data and competence to implement OGD evidenced but was yet to translate into clear and total commitment as well as a clear goodwill at the Executive level. The study report attributes this to the still existing fear of the negatives that the opening up of government data and information might have. With regard to competence to re-use the data by the public and private sectors, it was evident that there was substantial capacity to use and re-use the open data.

The most important recommendation made by the study among others was the call on government to fully commit to open government data which will pave the way for a number of opportunities for government, private and public sectors. It also recommended the need to task a government body, preferably the National Information Technology Authority –Uganda (NITA-U), as the in-charge of championing OGD in the country since a number of initiatives had been running but without effective coordination and direction and it was imperative that leadership be established to champion OGD in a structured and coordinated manner.

The study also established the need for awareness creation for public officers, citizens, and private sector on the benefits of OGD and to ensure adoption of OGD initiatives and effective use of the data published.

Among other aspects, the report indicated that government data is not harmonized as every unit has its own set of data and it is difficult from the user perspective to know which piece of data is valid or should be trusted. This goes to show that implementation of OGD initiatives needs to carefully consider the users' expectations during data preparation for publication.

The Study therefore established that there was substantial evidence to demonstrate Uganda's readiness to implement OGD if only a few structural issues were put in place.

Following the Readiness Assessment, a number of steps have been made towards implementation of structures to harness Open Government Data in Uganda. These include; Draft of the Open Data Guidelines for Uganda, Draft Open Data Policy, Uganda Open Data SCOT Analysis, and Strengthening the Open Data Ecosystem.

2.3.3.2 Uganda's Open data Ecosystem

In 2015, Development Research Training in collaboration with Indigo Trust UK, carried out a mapping project for Open Data Actors in Uganda, to identify the geographic location of open data, what they do and the data they deal with, as well as the level of their collaboration and partnership to improve cohesion and partnership. The project was carried out with the following objective;

- i. Enhanced efficiency and effectiveness of Open Data interventions in Uganda for playing an effective part in the Post-2015 Sustainable Development Agenda.
- ii. Information made more readily available on the wide range of open data actors through a web based tool that acts as a one stop centre for information on all known open data actors in Uganda.
- iii. A web based discussion forum established for Open Data actors for constant interaction on challenges and opportunities they face in the Open Data space.
- iv. Identify and widely share previously unidentified gaps and opportunities for new interventions among existing and potential actors and donors.
- v. Offer capacity development opportunities (such as an ICT-based training guide) to new and potential Open Data players and operatives.
- vi. Secured buy-in by donors to more effectively promote synergy and enhance efficiency and effectiveness among Open Data actors they support (some form of a Sector-Wide approach, which is already the norm with other sectors)

The study adopted a holistic “ecosystem” framework; A stakeholder-based open data ecosystem as shown below;

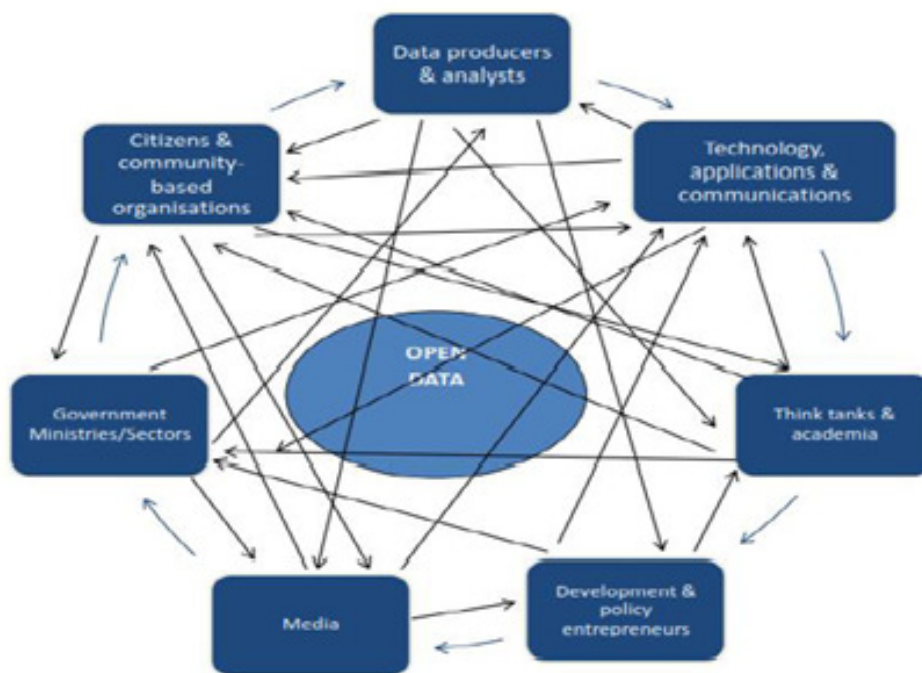


Figure 6:Open Data Ecosystem (Development Research and Training, 2015)

The study established that there is a significant presence of a variety of open data stakeholders in Uganda. It states that most are located in Kampala and other urban areas but also that there is big digital and gender divides, between rural and urban Open Data actors as well as lack of adequate collaboration and interaction among different open data actors.

Individual users from the identified group of actors will constitute the study population who will validate the proposed model to enhance use of open government data.

2.3.3.3 Uganda Open Data SCOT Analysis

The Open data SCOT analysis is one of the many activities that have been embarked on towards identifying the strategic priorities for open data in Uganda. The Open Data SCOT analysis was conducted by Dr. Fredrick E. Kitoogo, the Director Planning, Research & Development at the National IT Authority Uganda (NITA-U).

A number of opportunities, strengths, challenges and threats were identified during the analysis. It is clear that the need to make government more accountable is one of the biggest drivers inspiring stakeholders to embrace open data as an e-governance practice. It indicates that players can strategically use the existing strengths to leverage on the opportunities by implementing the open data guidelines and recommendations from the Open Data Readiness assessment carried out in Uganda as well as developing open data stakeholder, partnership and collaboration strategy to strengthen the open data ecosystem. Additionally challenges preventing full utilization of the existing opportunities need to be overcome through developing open data policies and standards; integrating databases to provide integrated datasets and supporting the private sector open data initiatives to ensure collaboration with all stakeholders.

Utilization of the National Data Centre and National backbone infrastructure to support provision of open data and the operationalization of the open data guidelines are strengths identified to reduce the likelihood and impact of the threats identified in the analysis. This would also address the challenges to minimize weaknesses that can make the eminent threats become a reality.

Therefore, since an analysis was already carried out in our Ugandan context, it will inform the model to be validated from a user's perspective so as to enhance the use of open data for good governance.

<i>[Translate into Strategic Priorities for Open Data in Uganda]</i>	Strengths	Challenges
Opportunities <ul style="list-style-type: none"> • Access to Information Act Existence • Pronouncement by Government for Government to provide information • Large number of Open Data Actors & Initiatives • Data Protection and Privacy Bill in place • Established policy development approval processes in Government • Creation of New Apps, software, tools • Mandate to develop Standards • Mandate to Integrate National Databases 	<i>[How do we use these strengths to take advantage of these opportunities?]</i> <ul style="list-style-type: none"> • Implement the recommendations from the Readiness Assessment • Implementation of the Open Data Guidelines • Open Data Ecosystem through developing a Open Data Stakeholder, Partnership and Collaboration Strategy 	<i>[How do we overcome the Challenges that prevent us from taking advantage of the opportunities?]</i> <ul style="list-style-type: none"> • Development of an Open Data Policy • Development of Open Data Standards • Integrate National Databases to provide integrated data sets • Support the Open Data Private Sector Initiatives
Threats <ul style="list-style-type: none"> • Digital Divide • Privacy and Security requirements • Insufficient responsibility and Liability • Storage (Cost, infrastructure) • Insufficient collaboration and Partnerships 	<i>[How do we use these strengths to reduce the likelihood and impact of these threats?]</i> <ul style="list-style-type: none"> • Development of an Open Data Policy • Operationalize the Open Data Guidelines • Utilize the National Data Centre and National Backbone Infrastructure to support Open Data Initiatives 	<i>[How do we address the weaknesses that will make these threats a reality?]</i> <ul style="list-style-type: none"> • Utilize the National Data Centre and National Backbone Infrastructure to support Open Data Initiatives • Develop an Open Data Strategy

Figure 7: Uganda Open Data SCOT Analysis (Kitogo, 2016)

2.3.4 Frameworks relating to use of Technology Innovations

2.3.4.1 ISO Standard 9241 – 11 Usability Frameworks

ISO 9241-11 also emphasizes that usability is dependent on the context of use and that the level of usability achieved will depend on the specific circumstances in which a product is used.

The context of use consists of the users, tasks, equipment (hardware, software and materials), and the physical and organizational environments which may all influence the usability of a product.

This framework will guide the research in components and disciplines that need to be handled holistically to ensure use of open government data initiatives.

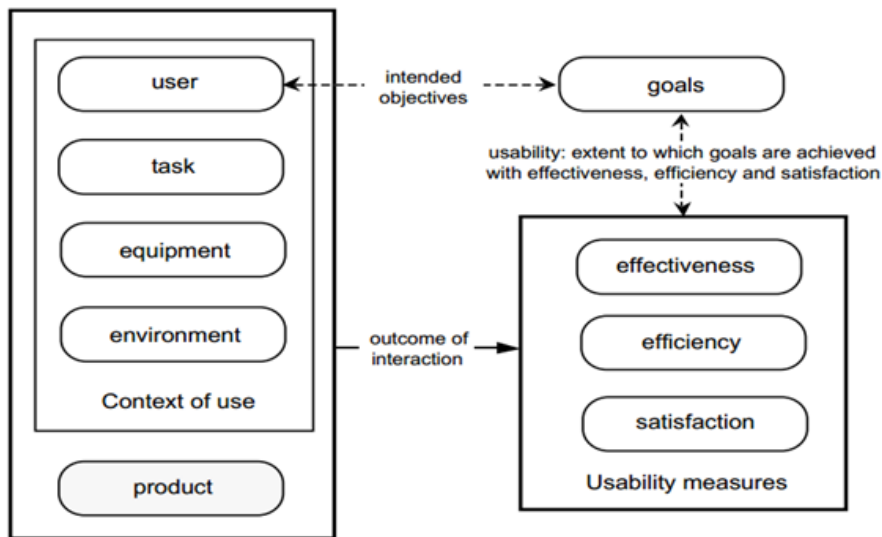


Figure 8: ISO Standard 9241 – 11 Usability Frameworks (Hassan Aftab, 2014)

2.3.4.2 ISs Success Model

The model above is a commonly cited model for Information Systems (IS) success developed by Delone & McLeon (1992). Their model proposed six interrelated variables to measure the success of IS including: system quality, information quality, system's use, user satisfaction, organizational impact, and individual impact.

This particular model has been chosen to inform this research on variables that are crucial in the success of Information Systems governance which are principles that can widely be adopted to reflect success of other technology initiatives other than Information Systems.

Therefore the proposed model will incorporate activities and features for System and Information Quality for effective use of open government data initiatives and to meet user satisfaction

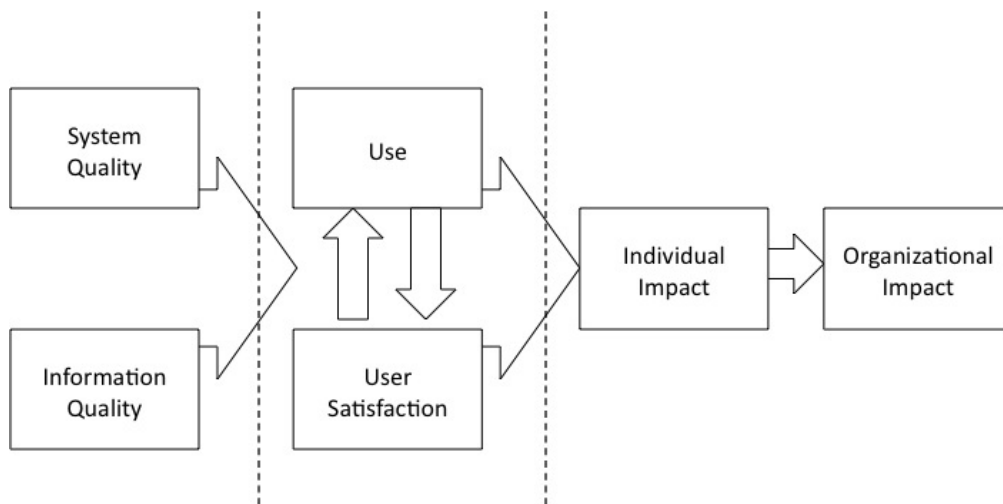


Figure 9: ISs Success Model (DeLone & McLean, 1992)

2.4 Comparative Analysis of the Open Data Models reviewed

A comparison of Models reviewed has been summarised as follows;

Table 3: Comparative Analysis of Models reviewed

Model Reviewed	Abilities	Shortcoming	Remarks
Five Star Open Data Model	<p>The Model addresses:</p> <ul style="list-style-type: none"> • Availability of data in various formats on the web • Use of Open standards • Linking of data to other people's data for context 	<ul style="list-style-type: none"> • Doesn't take into account other disciplines that affect open data use other than data formats that make the data more accessible and easy to find 	<p>Other than making data available and in formats that enhance open and easy access, there's a need to have a holistic approach to the different stages the data goes through and other factors determining continuous use of Open data</p>
Open Data Canvas	<p>It provides for;</p> <ul style="list-style-type: none"> • Structured analysis of management and strategy around data to be published • Various aspects to take into account for optimum use of data 	<ul style="list-style-type: none"> • Doesn't put into account the technical and functional dimensions to the data to be published to ensure that it will 	<p>Has very good approach towards open data strategy but the technical and functional aspects of data to be published are the ones that make the data openly</p>

	<p>once provided</p> <ul style="list-style-type: none"> • Key activities in the process of data publishing, customer segments, data users and value proposition identification • Interfacing the Demand and Supply sides of Open Data 	<p>actually be accessed and used</p>	<p>and easily accessible leading to value proposition of data on which this model is based</p>
<p>Linked Open Data Lifecycle phases</p>	<p>Takes into consideration;</p> <ul style="list-style-type: none"> • Careful planning for data through four stages namely; Identification, preparation, publication, use and re-use and Evaluation • Provision of strategy for data to be published • Takes into consideration stakeholders at various levels • Building of communities to enable value creation of data of even those without direct access to data • Incorporating feedback from users at the strategy stage 	<p>Doesn't consider mechanisms to enable the different players in the ecosystem accrue value from data made available to the public. In our Ugandan context, this is very relevant since the gap in the digital divide is still wide and there's need to bring this data provided closer to the citizens at all levels</p>	

Source: Primary Data

2.5 Theoretical framework

The Technology Acceptance Model (TAM) by Davis is tailored towards the acceptance of information technology (IT). A key purpose of TAM is to provide a basis for tracing the impact of external variables on internal beliefs, attitudes and intentions.

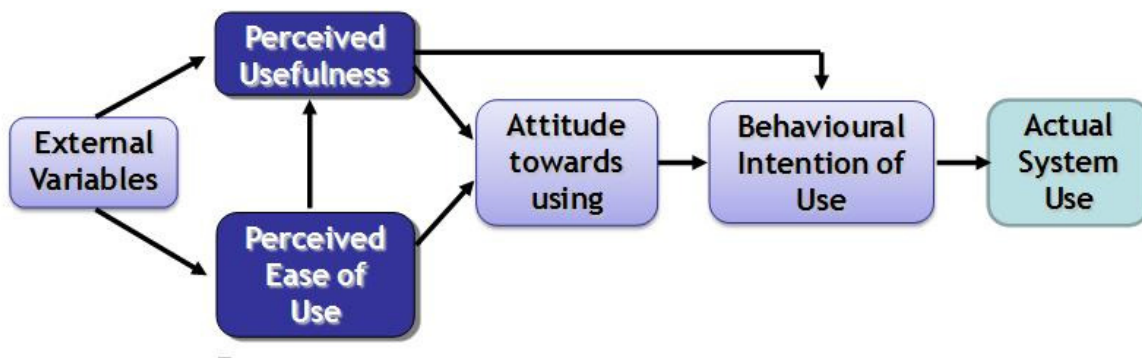


Figure 10: Technology Acceptance Model

In the Ugandan Open Data context, the Technology Acceptance Model (TAM) relates the users' perspective in adoption and use of open data. The external factors affecting appreciation and use of Open Data initiatives aside publishing and availing data need to be established and addressed towards implementation of sustainable Open Data initiatives that will lead to yielding expected benefits of OGD. Addressing these external factors ensures relevance of OGD and ease of use of availed data in their respective contexts. Jason Shueh, (2014); Janssen et al (2012); Harrell (2013) all identify with the fact that simply making data open might not be sufficient because there might be a gap between the supply and demand for data. This implies therefore that data published need to be used to give credit to open data initiatives. The Technology Acceptance Model is appropriate in establishing users perception of the relevance and ease of use of data provided since there's a need to ensure that consumers of open data actually use data made available to them by the government in order to fully realize the benefits of open data.

2.6 Research Process of academic research

Research Approach

Discussion of research approach is vital for any scientific study regardless of the research area. Research approach can either be deductive and inductive. The distinction between inductive and deductive research approach relates to the existence and use of hypotheses and

theories. The deductive approach develops the hypothesis or hypotheses upon a pre-existing theory and then formulates the research approach to test it (Silverman, 2013). This approach is applicable to contexts where the research project is concerned with examining whether the observed phenomena fit with expectation based upon previous research (Wiles et al., 2011). If there are existing hypotheses adopted by research and aims at exploring them, then it becomes deductive research. A set of hypotheses are formulated to be confirmed or rejected during the research process. If the hypotheses are absent at the start then inductive research applies. This approach does not involve formulation of hypotheses. Research questions, aims and objectives are formulated at the start of research to be achieved during the research process. The inductive approach is characterised as a move from the specific to the general (Bryman & Bell, 2011). In this approach, the observations are the starting point for the researcher, and patterns are looked for in the data (Beiske, 2007). There is no framework that initially informs the data collection and the research focus can thus be formed after the data has been collected (Flick, 2011). This method is more commonly used in qualitative research, where the absence of a theory informing the research process may be of benefit by reducing the potential for researcher bias in the data collection stage (Bryman & Bell, 2011). Interviews are carried out concerning specific phenomena and then the data may be examined for patterns between respondents (Flick, 2011).

Inductive approach to research will be adopted for this particular research because it involves validating a model from the users' perspective and thus the meaning of human attachment to the use of OGD needs to be explored while aiming at understanding the research context in a deeper manner. Qualitative type of data will be collected and this approach is more flexible to research structure to ensure provisions for changes during the research. It also favours this research as the researcher will be perceived to be a part of the research process and research findings do not have to be generalised.

Research Strategy

The research strategy is how the researcher intends to carry out the work (Saunders et al., 2007). The strategy can include the different approaches, such as experimental research, action research, case study research, interviews, surveys, or a systematic literature review.

Experimental research strategy creates a research process that examines the results of an experiment against the expected results (Saunders et al., 2007). The relationship between the factors are examined, and judged against the expectation of the research outcomes.

Action research is a practical approach to a specific research problem within a community of practice (Bryman, 2012). It involves examining practice to establish that it corresponds to the best approach.

Case study research is the assessment of a single unit in order to establish its key features and draw generalisations (Bryman, 2012). It offers insight into the specific nature of any example, and can establish the importance of culture and context in differences between cases (Silverman, 2013).

Grounded theory is a qualitative methodology that draws on an inductive approach whereby patterns are derived from the data as a precondition for the study (May, 2011). Interview data can be transcribed, coded and grouped accordingly to the common factors established between respondents. Results of the research are derived fundamentally from the completed research, other than examining data to establish whether it fits into a pre-existing frameworks (Flick, 2011).

Surveys are used in quantitative research projects, and involve sampling a representative proportion of the population (Bryman & Bell, 2011). The surveys produce quantitative data that can be analysed empirically.

Ethnography is a study and close observation of people, examining their cultural interaction and their meaning (Bryman, 2012). The observer conducts the research from the perspective of the people being observed, and aims to understand the differences of meaning and importance or behaviours from their perspective.

An archival research strategy is one where the research is conducted from existing materials (Flick, 2011). It may involve systematic literature review, where patterns of existing research are examined and summed up in order to establish knowledge on a particular study, or to examine the application of existing research to specific problems.

Research Methods

Research Methods are categorized as Qualitative and quantitative in nature. Qualitative Research is primarily exploratory research. It is used to gain an understanding of underlying reasons, opinions, and motivations (Wyse, 2011). It provides insights into the problem or helps to develop ideas or hypotheses for potential quantitative research. Qualitative Research is also used to uncover trends in thought and opinions, and clearly study the problem. Qualitative data collection methods vary using unstructured or semi-structured techniques. Some common methods include focus groups (group discussions), individual interviews, and participation/observations. The sample size is typically small, and respondents are selected to fulfill a given quota.

Quantitative Research is used to quantify the problem by way of generating numerical data or data that can be transformed into useable statistics. It is used to quantify attitudes, opinions, behaviors, and other defined variables – and generalize results from a larger sample population. Quantitative Research uses measurable data to formulate facts and uncover patterns in research. Quantitative data collection methods are much more structured than Qualitative data collection methods. Quantitative data collection methods include various forms of surveys – online, paper, mobile and kiosk surveys, face-to-face interviews, telephone

interviews, longitudinal studies, website interceptors, online polls, and systematic observations.

2.6 Conclusion

The Literature review chapter was aimed at providing a deeper understanding of open government data concepts, the need for understanding and describing user perception of open data and its use in e-governance towards a strategic model that can guide implementers of OGD in the relevant disciplines that need to be tackled and to give basis to methodologies to be used in order to collect sufficient data that will inform the research.

CHAPTER THREE: RESEARCH METHODOLOGY

3.0 Introduction

This chapter presents in detail the research methodology that this research employed. It discusses the methods that were used to address the research objectives of this study. The methodology justifies methods chosen in line with appropriateness to the needs of the research question, specific objectives, and constraints that may be faced.

3.1 Research design

The study adopted a case study design. (Yin, 2004) defines the case study research method as an empirical inquiry that investigates a contemporary phenomenon within its real-life context. This method of study was used as it was deemed to be useful for trying to test theoretical models by studying their relevance in the real world situations. Therefore the case study research gives an understanding on how OGD use can be enhanced from a user perspective extending experience and adding strength to the proposed model from components of existing previous research. The descriptive case study design was adopted as this type of case study describes the intervention in the real-life context in which it occurred (Yin, 2003). The qualitative research method was used to gain an understanding of underlying reasons, opinions, and motivations in the use of OGD.

3.2 Area of Study

The area of study was Enhancing the use of OGD for e-Governance. It was carried out in the Ministry of Finance, Planning and Economic Development with focus on the department handling the Budget Information Portal as the identified OGD initiative area with an objective to improve government's transparency and accountability to citizens among others.

3.3 Study Population

The study population was in line with the area of study to include; representatives of the general public users, private sector users and developers, technically oriented OGD users, government-based OGD advocates and providers, and NGO-based users who were chosen through purposive and snowball sampling methods. This was because by nature of open data, the users are not necessary from within but their different perspectives collectively affect use of the data published by the data provider.

3.4 Sampling Procedure

The sampling procedure is explained in the subsections below. This section was divided into two subsections, namely, sample size and sampling techniques, which explains the number of individuals that were contacted during the study and the techniques through which they were selected.

3.4.1 Sample Size and selection

There are no specific rules in determining an appropriate sample size in qualitative research (Statistics Solutions) and therefore this research selected a sample size large enough to obtain feedback for most or all perceptions to ensure saturation by ensuring inclusion of representatives from each of the defined user categories both on the supply and demand side of OGD. (Fusch and Ness, 2015) recommend the concept of saturation for achieving an appropriate sample size in qualitative studies stating that failure to reach data saturation has an impact on the quality of the research conducted and hampers content validity. (Mason, 2010) indicates that Samples for qualitative studies are generally much smaller than those used in quantitative studies because there is a point of diminishing return to a qualitative sample—as the study goes on more data does not necessarily lead to more information. This is because an occurrence of a piece of data, or a code, is all that is necessary to ensure that it

becomes part of the analysis framework. The sample size was determined by the time allotted, resources available, and study objectives (Statistics Solutions).

3.4.2 Sampling Techniques

Non-probability sampling guided the sampling process. Non-probability sampling represents a group of sampling techniques that help researchers to select units from a population that they are interested in studying (Lund Research, 2012). Considering that open data is a relatively new field and not many people might have in-depth knowledge on the subject, the study took on techniques that would sample individuals with knowledge on the subject matter. One of the sampling techniques used was the purposive sampling since the research intended to examine specific perspectives of users thus the need to seek research participants who would cover the full range of perspectives. This ensured that all pre-classified user groups that intend to be studied are well represented so that important details about the experiences of some categories are not left out.

The other was the snowball sampling, identifying a range of individuals with relevant experience and different roles. Snowball sampling is an approach for locating information-rich key informants (Depi, 2013). Using this approach, a few potential respondents are contacted and asked whether they know of anybody with the characteristics that you are looking for in your research. Players within government and the private sector who were known to be involved in the OGD movement were contacted first and interviewed to gain a better understanding of the initiatives. These initial participants helped to identify additional study participants thus building and making a larger the sample.

3.5 Data Collection Methods

Data collection is “a systemic way of gathering information, which is relevant to the research purpose or questions” (Burns & Grove 1997:383). Since qualitative research is about collecting information based on beliefs, opinions and perceptions of individuals towards a

particular phenomenon, this research used flexible and varied strategies comprising of questionnaire survey, interviews, and document review. Questionnaires were used to get information from the various categories of users. Interviews were carried out with key personnel involved with OGD initiatives in Uganda. Respondents were interviewed directly to avoid misinterpretation and to ensure clarity on all issues. Document review involved critical examination of any recorded information related to the study.

3.5.1 Data Collection Instruments

3.5.1.1 Interview Guide

The researcher used a set of pre defined questions to guide the face to face interviews. This ensured that the questions asked got responses that would inform the objectives of this research. The questions in the interview guide were useful triggers as respondents discussed their understanding and definitions of terms, from their own experiences. It had open ended questions to solicit more detailed information from the experts in the area that supplemented and gave clarity to responses given by respondents in the questionnaire.

3.5.1.2 Questionnaire

The questionnaires were used to find out the experiences the different users had with the use of open data, their beliefs and opinions. The questionnaire was designed in such a way that participants will had the freedom to express their views in response to the question asked in addition to clues from the interviewer.

3.5.1.3 Document Review

Documents in line with this research to include but not limited to presentation papers, policy documents, related research papers and published books, assessment reports , newsletters, conference papers, journals, and recognized Websites will be reviewed to complement findings

3.6 Quality Control Methods

3.6.1 Validity Controls

Validity determines whether the research truly measures that which it was intended to measure or how truthful the research results are. In order to address the validity of data collected, the researcher ensured that all the techniques of data collection used well complemented each other. To ensure valid data collected through questionnaires, the researcher used the interview technique to authenticate and ensure that the responses to the questionnaire questions tally with the objectives.

Review of available documents was done to cross check the information from all the respondents in this study. For content validity of instruments used, the design of the questionnaires was based on literature from previous similar studies and pre-existing questions were modified to suite the study ensuring that questions have a logical link with the objectives and cover the full range of issues being measured for relevance of the research findings. (Hyman, Lamb & Bulmer 2006) observe that using preexisting survey questions provides accurate measures as they are pre-tested before first usage, such that the degree of validity and the quality of data are likely to be high. All the data collection instruments were reviewed by colleagues and the supervisor and later pre-tested for accuracy. The contents obtained helped to improve on the research instruments that were administered by the researcher.

3.6.2 Reliability Controls

To ensure reliability of data collected, the researcher chose a sample that was adequate and representative and more than one instrument was used. The instruments were pre-tested and reviewed by the researcher, colleagues and with guidance from the supervisor to ensure reliability before they were applied in the study. Questions were reviewed basing on the comments and suggestions from the respondents. Effort was made to carefully introduce the

study and its aim to the respondents to ensure that they fully understood what the study is about thereby giving appropriate responses.

3.7 Data Management and Processing

Data management describes how research data was collected or created, how data was used and stored during research and how it will be made accessible for others after the research is completed. (Finish Social Science Data Archive, 2015).

The study progressed through three major stages namely; preparation for data collection, data collection and analysis; and reporting. During the first stage, the research selected the participants for the interviews from whom the rest were determined. Copies of the interview schedules and guidelines were printed and permission to collect data from the respective categories of users was obtained. During the second stage, data was sought through the various data collection techniques chosen. Any personal data that may allow identification of research participants was removed. Data collection methods and data content were carefully documented to enable subsequent data sharing. Basic information about each interview was included. Data collected was analyzed qualitatively using a descriptive method based on themes to be able to distinguish the responses and then establish the relationship among these themes to come up with clear explanations and interpretations. In the final stage, a report was compiled for submission.

3.8 Data Analysis

The analysis of qualitative research involves aiming to uncover and / or understand the big picture - by using the data to describe the phenomenon and what this means. Since qualitative research has no system for pre-coding, a method of content analysis was used. According to (Mayring, 2000), content analysis is a procedure for the categorization of verbal or behavioural data, for purposes of classification, summarization and tabulation. Therefore

content analysis was adopted to classify and categorize data with the aim of making sense of the data collected and to highlight the important messages, features and findings.

3.9 Ethical Considerations

- i. The researcher clearly explained to the respondents the study and its purpose and consent for participating in the study was sought from them before conducting the study.
- ii. The researcher respected and treated the information given with utmost privacy.
- iii. The researcher ensured anonymity of those respondents that will prefer to remain anonymous.
- iv. Plagiarism and confidentiality were given utmost consideration.
- v. The researcher took sole responsibility of ensuring that all the ethical issues are accounted for.

3.10 Limitations of the Study

Limitations of this study included but were not limited to the time and the availability of respondents for the study. The study was conducted in a period of Nine (9 months) which was a relatively short time to have fully studied the various users' perception as a means of enhancing OGD use. The time available did not allow for the proposed model to be implemented and studied in practice. Therefore the model was only validated by the chosen users to whom the model was explained and later questioned on the practicality of the different components of the model and their thoughts on the model as well.

CHAPTER 4: PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS

4.0 Introduction

This chapter presents findings of the study in line with the specific objectives. These are findings both from Library research and from Empirical study through Interviews conducted and questionnaires distributed as discussed under data collection methods. Presentation of data does not follow the any particular sequence or format in the interviews and questionnaires but instead data from these instruments that address a particular research theme, in relation to the study objectives, are presented together. Data from different sources that answer the same research question is presented together.

4.1 Demographic Information

This information gives statistics on characteristics of the sample population chosen for this study. It includes the user categories that the different respondents belonged to, age groups and gender. The relevance of User categories was to ensure representation from each of the user categories defined in. This was to guide research in knowing the different users' experiences with Open Data so far, their expectations and perceptions of OGD. The researcher considered Gender of respondents for objectivity and age groups would to inform the research on the age groups of users promoting OGD and the groups that are most likely to appreciate use of OGD.

Table 4: Characteristics of Respondents

Category	No. of Respondents	Gender		Age			
		Male	Female	20-30	31-40	41-50	Above 50
Public sector	16	9	7	2	8	4	2
Civil Society Organizations	2	0	2	0	2		
Academia and Research	5	2	3	0	2	2	1
Civic Hackers	3	2	1	1	1	1	
Media	4	3	1	0	2	2	0
Public & Business	20	10	10	6	8	6	0
Total	50	26	24	9	23	15	3

Source: Primary data

4.2 Descriptive Data

Data analysis was done through applying inductive reasoning, that is, analysis was done on data as presented by the respondents. A number of themes were developed based on literature reviewed in line with the objectives of the study and information from the different data collection techniques on a particular theme is presented together.

4.2.1 Understanding of OGD

From the data collected from the various respondents of this study, of the total number of respondents to the study (n=50), 56% of the respondents did not know about Open Data, had no idea about the Budget Information Portal that was chosen as a case study for this research nor any other Open Data Portal. 24% had heard about the Budget Information Portal, had some knowledge on Open Data but have never bothered to access it or any other Open Data Portal. 20% had knowledge of OGD understood it and its benefits and were using it. This 20% though included selected Government officials concerned with and promoting use of OGD.

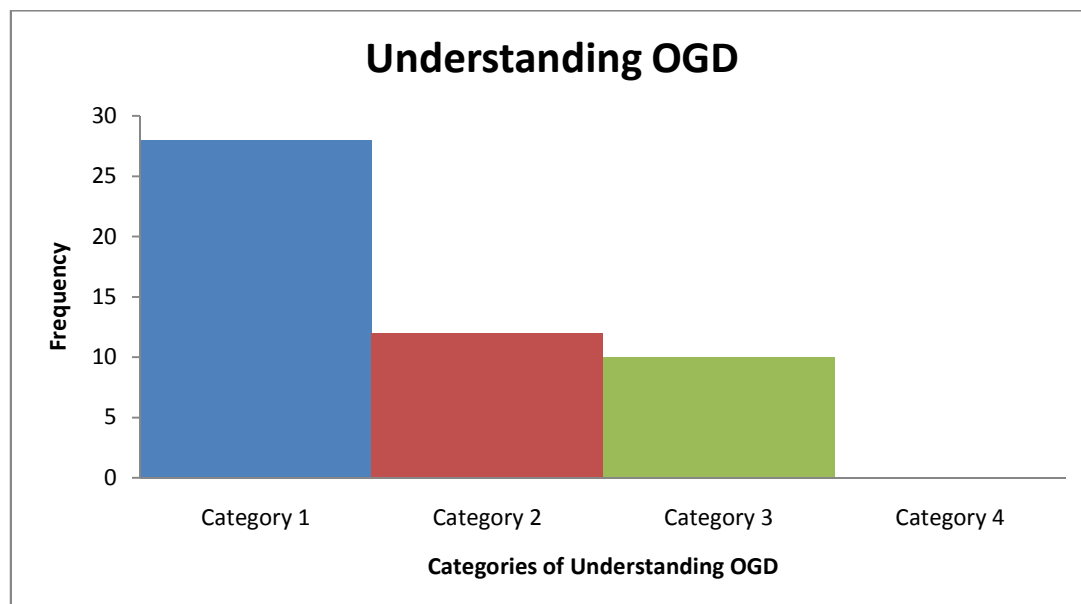


Figure 11: Understanding of OGD (Primary Data)

Category 1: These are users that have no idea about Open Data but are interested

Category 2: Users who have heard about the Budget Information Portal, have some knowledge of Open Data and have never accessed any Open Data but are interested.

Category 3: Know about Open Data and have used it in one way or the other and are interested

Category 4: Are users not interested in Open Data

From the data presented above, it shows that all respondents were in agreement that Open Data can be used in their different contexts because they would be interested in different categories of data from different sectors of Government.

In interviews with the officials working with the Budget Information Initiative in MoFPED, it was indicated that sensitization was being done about the Portal through the Media and Barazas. Barazas are public meetings conducted by the Budget Transparency Initiative Steering Committee. This committee comprises of officials from Office of the Prime Minister, Ministry of Finance, Planning and Economic Development and Ministry of Local Government who together carryout sensitization activities to disseminate various information at Local Government level. The portal is also publicized in form of an advert in the media when publishing budget releases. In addition, training is done and a focal person appointed at every local Government office. The people trained include the Accounting Officers, the District Planner and the Communication officer who have the responsibility to sensitize people in their areas about this initiative.

For OGD to create value, it has to be used by the different categories of users as deemed relevant to their different contexts. And in order for these users to use data made available, they need to understand it, its potential benefits and how they can leverage this data to their own advantage.

However, from the field study conducted, there's implication that not enough awareness has been created on the availability of the various Open Data initiatives more so Government initiatives that are aimed at making Government more transparent to the citizens. This contributes to the low uptake of Government data made public with no value creation since it's not being used as expected. The transparency and accountability objective wouldn't be achieved if the target audience does not access or use this data for what it is intended.

This therefore means that there's need to create more awareness to the masses about OGD, the existing and developing initiatives, their relevance and potential benefits so that people get to know and use the initiatives where need arises. The International Open Data charter, (2015) comprises of six principles and principle 3 is that data should be accessible and usable. It states that to ensure data can be accessed and used effectively by the widest range of users, it requires the creation of initiatives to raise awareness of open data, promote data literacy, build capacity for effective use of open data, and ensure citizen, community, and civil society and private sector representatives have the tools and resources they need to effectively understand how public resources are used. Increasing the level of awareness of OGD and its potential value should be of particular interest to Government, as capturing the attention and imagination of the full spectrum of data users and consumers remains a challenge. There's need to engage the other side—the demand side—of the Open Data phenomenon to grow communities of data users and encourage data “ownership” by the media, community groups, NGOs, labour unions, professional associations, universities and others (The World Bank Group, 2014).

4.2.2 Users' Demands and Expectations for Open Data

The field study conducted revealed that users' data expectations fall in three categories i.e. type of data / information needed, the format or mode of access and products inspired by OGD for example apps that would avail them necessary information or services. The varied categories of OGD users translate into different demands and expectations from the users.

Owing to the different settings of the users, their expectations vary depending on interests and relevance of the data / information needed. Most of the respondents indicated that they would be interested in budget information regarding allocation and expenditure at various levels and in different sectors as much as they were not aware of the budget information portal. The perception was that the transparency and accountability objective couldn't be separated from budget information. The other types of information the respondents said they would be interested in as well as information that would be of interest to citizens in general included information in the sectors of Education and Health, population census statistics, tax information, Licenses, business listings, transport information, land ownership and resource allocation. The users were interested in performance information of Government parastatals, existing opportunities and proximity to different services in the above mentioned areas of interest.

In addition to that, users expect Government to put in place mechanisms that enable those who cannot access the data provided on data portals. The respondents also indicated that they would be interested in a feedback utility where queries and clarification can be directed and be given feedback. It was established that a feedback utility exists on the budget information Portal and enables registered users give their feedback on the various funds allocation items indicated at a certain level. Registered users subscribe to receiving information in particular sectors and can define to what level of Government they are interested in upto the parish level. Therefore when feedback is provided by a certain user, all users who have subscribed to get information in the area of concern are notified and can reply to this feedback if they have information on the query. This however hasnt been so effective as most people hardly receive feedback to their concerns thus not being encouraged to visit or use the portal again. A respondent noted that usage had dropped from about 90% to 40% and attributed this to a poor feedback mechanism that derails users.

This therefore shows that for Government to implement successful OGD initiatives that will be used, there's need to establish the needs of the target audience so as to align the supply and demand sides of OGD. The Open Data Barometer, (2015) suggests that effective open government data initiatives should provide access to a wide range of data because there is a wide range of functions of Government, and the kinds of uses to which data can be applied. Limited research has been done on user demand of ICTs services (Heeks, 2005). To emphasise the need for the demand side analysis of ICT services, (Gillwald, 2005) pointed out that the supply side of the equation must be aligned with an adequate understanding of the demand side.

4.2.3 Strategies and Approaches to ensure use

All the six (6) Government stakeholders involved in activities to steer the OGD movement in Uganda were in agreement that strategy is critical to development and management of any aspect and so does Open Government Data initiatives because it aligns the mission and vision of the initiatives with operations. These also asserted that in order to have an effective and workable strategy, there's need for Government's commitment so that proper policies, guidelines and legislation are put in place for systematic and easy to manage initiatives to be put into place. Two of the stakeholders interviewed in their words said:

“Implementation of OGD initiatives can't be independent of policies and regulation because the various actions taken by both Government and the citizens in publishing and accessing data need to be regulated to ensure coherence.”

“Our Policy and regulation frameworks will be unique in nature to provide for challenges of literacy levels among the general population more so access and use of ICTs as well as aligning the policies to existing laws”

The actions that require to be regulated by clear cut guidelines include but are not limited to; Data preparation and publishing, Security of data and protection from exploitation by intermediaries and re-use of data among others. The stakeholders pointed out some of the strategies by the Government of Uganda towards enhancing OGD use include; the Readiness Assessment Study, Development of the draft Open Data Guidelines, formulation of a draft policy and expansion of the National Backbone Infrastructure to enable internet based services. Other strategies underway include development of a Central Open Data Portal, partnership with Civil Society Organizations and other private sector Open Data initiatives to enable citizens have easy access to needed information and putting in place mechanisms of information access for users who can't access data portals. A respondent from MOFPED indicated that there was a call centre already in place and citizens are able to call the Ministry on a toll free number requesting for information or giving feedback on information they have received. Information was also given that an SMS-based mechanism was being developed to ease citizen access to information. Local Governments also continue to make use notice boards to disseminate information such as budget allocations and as earlier discussed Barazas are also used to disseminate budget information and can be subsequently used to avail citizens with other required information.



Figure 12: Community meetings for information Dissemination

This therefore implies that a number of steps have been taken in the right direction to ensure that OGD initiatives in Uganda are a success by having a wide range of citizens have access to information through various mechanisms. There's need to put Open Data in our Ugandan Context owing to the fact that there's still a wide digital divide gap and there's still about 29% illiteracy (UBOS, 2010). Literacy remains a huge challenge hindering access to information and citizen engagement in holding government accountable in many countries. This is why face-to-face engagement is important, as well as radio and more popular or broad-based communication channels (Linda Raftree, 2013). Certain open data initiatives do not live up to their potential due to a lack of analysis of the context and enabling environment. Country's context and climate in which government data is released and re-used can be grasped using various relevant studies which currently exist (Granickas, 2013). (De Boer et al., 2012) encourages the re-use of published data using print - outs, mobile phone-based services, offline access, community radio and participatory workshops to take the data to local settings. This can provide for approaches that can be used by intermediaries to provide data to potential users and beneficiaries of open data that would otherwise not have access to data published by government on data portals. Open Data Barometer shows that governments worldwide are struggling with implementation hurdles. These hurdles include building capacity to publish and consume open data across institutions and civil society, and sustaining political commitment beyond early successes (Smith, 2015). Therefore there's need for strategy to adequately address the various hurdles so that OGD initiatives are used thus realizing the benefits and promises of OGD.

4.2.5 Impact of OGD

The different respondents to the study were in agreement that OGD can contribute greatly to transparency and accountability of government to its citizens as well as citizen participation, democratic engagement and the reform of public services, Innovation and Economic Development, Inclusion and Empowerment. Releasing freely accessible, standardized and

easily readable government data can increase transparency and accountability. This open government data movement can foster greater civic participation and promote new business opportunities (IDRC, 2013).

The impact of OGD however might greatly depend on how implementation of the initiatives is handled since the value of OGD is accrued if data made available is understood and used for whom it was intended as the Open Data Barometer indicates that Entrepreneurial open data use has overtaken accountability as the most observed impact from OGD. Transparency and accountability impacts are the second most observed impact, though within 'emerging and advancing' countries transparency and accountability impacts come top. The effective use of open data to increase environmental sustainability and support greater inclusion of marginalised groups remains extremely limited.

4.3 Requirements for Proposing a Model

Towards proposing a Model, a number of requirements were established both from review of existing Models and Open Data best practice as well as from the empirical study conducted. These have been categorized and presented as follows;

4.3.1 Requirements from Literature

The following are requirements established through review of the models and Open Data best practices;

- i. A clear strategy to guide implementation of OGD initiatives including policy and regulatory framework formulation. As earlier pointed out, Open data, though straightforward in principle, requires a specific approach based on the agency or organization releasing it, the kind of data being released and, perhaps most importantly, it's targeted audience (Jason Shueh, 2014).
- ii. Thorough data identification and preparation. Data preparation should be done informed by the users' data need so that data is not just published for the sake of it.

The view of data being a venture driven by an effective transparency objective helping to improve the public's knowledge of Central and Local Government work, analyzing performances and expenditure, and questioning how services are run, has resulted into “data littering”: dumping data in public repositories without particular care to building structure, defining procedures, or clarifying responsibilities around the release process (Sollazzo, 2015).

- iii. Publishing of data that is easily accessible and easy to find. The five stars of Open Data illustrates that data can be published and made available in any machine readable format but that different formats of data provide for access differently and that it is recommended to link data to other relevant information for it to be easily found and used.
- iv. Evaluation of data published. This involves evaluating whether set goals have been satisfied through use of indicators such as number of downloads, users, applications developed from published data and end-users of the applications.

4.3.2 Requirements from Empirical Study

- i. Disaggregation of information dissemination per sector. This is due to the fact that different users will require different types of data/information from various sectors.
- ii. Policy and regulation framework to govern Open Data related activities in the Ugandan context and in line with existing laws
- iii. Technical support and technology management through provision of central point of data access, enabling a wider range of citizens to have access to availed data and provision of alternative Information access.
- iv. User Engagement through enabling a network of intermediaries that can analyze data provided producing information that is easily understandable and of value to othe citizens, developing apps or such other innovations to bring the data closer to the people and provision of a feedback mechanisms

4.4 Proposing the Model

The proposed model adopted a benchmark model among the models reviewed. This model was found to have requirements in line with the study towards enhancing use of Open Data in e-governance. This model, however, was also found to be lacking in areas of data/information access by the various categories of users as the study aimed at addressing the users' perspective owing to the fact that for OGD to be of value it has to be appreciated and used.

4.4.1 Bench mark Model

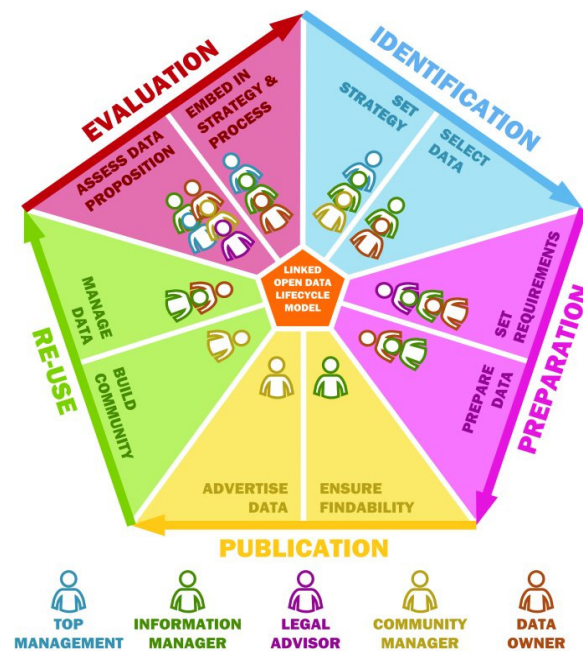


Figure 13: Benchmark Model (Van den Broek et al., 2011)

The benchmark model was developed by Van den Broek et al. (2011) after identifying five common phases of opening up data through analysis of seven lifecycle models describing the process of opening up linked data and guiding organizations through this process. Consequently, a model was developed based on the notion that a clear strategy needs to be in place to successfully open data. It identifies the steps taken in each of the five phases and the various users involved at each phase in the data lifecycle. The five stages are identification, preparation, publication, re-use and evaluation

4.4.2 Weaknesses of the Benchmark Model

The benchmark model doesn't consider mechanisms to enable the different players in the ecosystem accrue value from data made available to the public as well as steps that can be taken to enable users with the skills to manipulate the data provided have easy and affordable internet access. In our Ugandan context, this is very relevant since the gap in the digital divide is still wide and there's need to bring this data provided closer to the citizens at all levels. Certain open data initiatives do not live up to their potential due to a lack of analysis of the context and enabling environment. Country's context and climate in which government data is released and re-used can be grasped using various relevant studies which currently exist (Granickas, 2013).

4.4.3 New Model

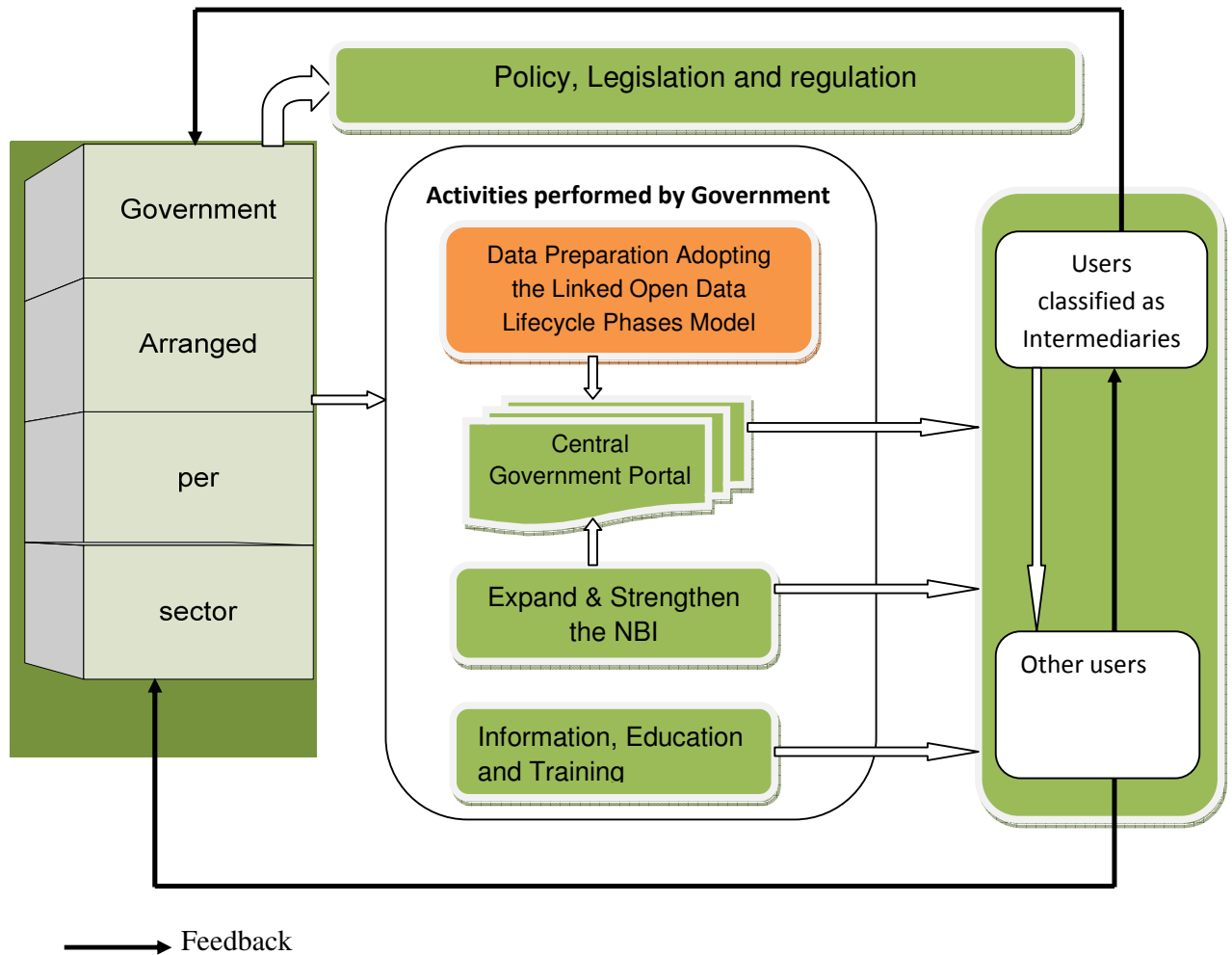


Figure 14: Proposed Model to enhance use of Open Data for e-governance

Model Explained

The proposed Model is a result of putting together requirement results both from the Library research and Empirical study methods. It incorporated the concepts of ease of access through enabling infrastructure, capacity building through Education and training, Intermediaries and feedback from users which had not been addressed by the models reviewed.

The model starts with a strategy of arranging the Government into sectors for a more organized way of preparing and publishing data. The sector based arrangement puts responsibility of ensuring quality of data/information provided by having it lie with the respective sector as this addresses specialized feedback from users interested in that particular sector's data making it easier to tailor make data to the user's needs. Some sectors apart from preparing data for publishing are entrusted with the responsibility to formulate Policies, legislation and regulations that regulate all other subsequent actions i.e. the preparation of data, the development of the Central OGD portal, Expansion and strengthening of the National Backbone Infrastructure, training and sensitization of the citizens and access, use and re-use of data/information by intermediaries and the other users. The model assumes a continuous loop of feedback from users through the intermediaries or directly to Government and subsequent improvements made by Government to ensure perpetual use of OGD initiatives. Therefore all Government actions are informed by feedback from all stakeholders and users thereby providing for inclusion.

The model has another section of Actions to be taken by Government. As already demonstrated different designated sectors of Government will be entrusted with various tasks under each activity as discussed

Data will be prepared by responsible departments in the various sectors adopting the Linked Open data Lifecycle model. This is a model that was reviewed in literature and found to be sufficient in guiding effective and efficient provision of quality data that will be used by the intended target groups

This data will be made available through the central Government Data portal another action to be taken by Government. This central Government data portal will provide a one stop platform for access of data. As much as not all data may directly be available on this portal, there will be mechanisms to link data in other locations so that a user can have ease in accessing required data.

The access of this data however on the central Government Open data Portal will be supported and enhanced by the expansion and strengthening of the NBI and sensitization and training of users to the lowest level possible of society. This way focal people at the grassroots empowered with necessary infrastructure and skills to manipulate data provided can be appointed as intermediaries to easily disseminate information to their communities.

With the activities to be performed by Government handled holistically, users in their respective categories will have easily accessible data and can manipulate it to suit their various contexts. The intermediaries to include Civil Society organizations, Development Hubs/Civil Hackers and developers, Academia, businesses and media can manipulate this data to provide meaningfully analyzed information and applications to the end users who would otherwise might not be able to make sense of the data provided.

The users will provide feedback through the available mechanisms i.e. directly from the users to their Government representatives or through the intermediaries to Government. All feedback provided informs the subsequent Government activities and actions providing for a continuous loop of use enabling sustainability of OGD initiatives. The different colour codes orange and green are used in the Model to differentiate the Benchmark Model adopted to be used in data preparation and the other requirements determined through field research respectively.

4.5 Validating the Model

Some of the respondents to the study either by Interview or questionnaire and other ICT experts were chosen to validate the model. These respondents were given an illustration on how the model works and thereafter given a questionnaire to confirm the model's acceptability. Of the twenty (20) respondents to whom the model was presented, 45% of them strongly agreed that the model would be applicable in the Ugandan context, 35% agreed to the same and 20% couldn't give a clear position because they said the model would be applicable if Government commits to all the necessary actions and if there was will to use the data by a wider majority. Therefore the model was validated with average acceptance of 80%.

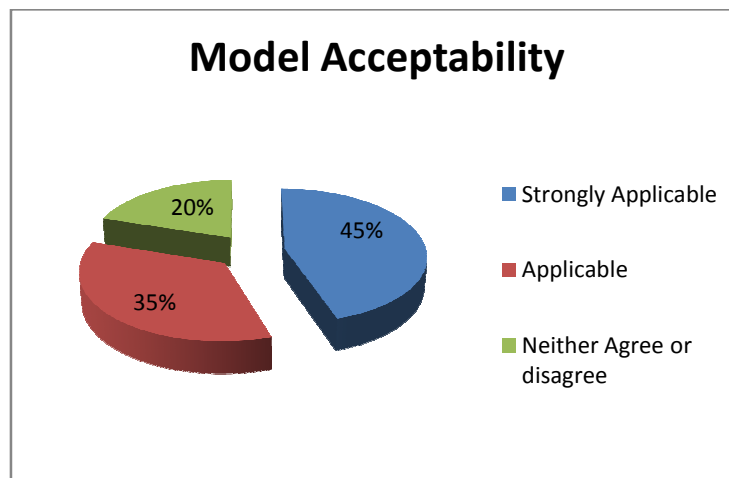


Figure 15: Model Acceptability (Source: Primary data)

4.6 Conclusion

This chapter presented the complete analysis of the study identifying areas of concern critical to enhancing use of Open Data in E-Governance. The findings presented in this thesis show that although Government through identified stakeholders has made steps towards adopting Open Government Data, there's still a need to have full Government commitment and backing to reap the potential benefits. Making data available in itself is not sufficient to ensure OGD impact, but there's need to provide for incentives to enable wider access to this data either directly or through other users.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter provides a summary of the findings, conclusions and recommendations of the study, based on the data presented and interpreted in Chapter 4, and the research experience gained during the research process. It also gives suggestions for further research that can be built upon by other research. A summary of the research report from the study objectives to the results is also presented in this chapter.

5.1 Summary of findings

Review of Models to determine requirements for a Model

Requirements for a model to enhance the use of Open Data for e-governance were determined through Library research by reviewing some of the existing models that were in line with filling the gap of addressing the demand side of Open Data by establishing the user perspective. This gap was identified through literature and was a recommendation by Janssen et al, 2012 stating that; “Much of today’s focus is on the suppliers of data, whereas achieving the success of open data systems depends to a large extent on the use and the quality of the data provided. Open systems require an understanding of the external world and must consider the feedback and insights of users in order to continuously improve.” The study therefore aimed at proposing a model to address use and access aspects in the Ugandan context since both Government and Private sectors are adopting Open Data. The Models reviewed were the Five Star Open Data Model, the Open Data Canvas and the Linked Open Data lifecycle phases and were presented in Chapter Two, section 2.3.2, pages 21-28)

Proposing a Model to Enhance use of Open Data for E-Governance

Subsequent to Library research done and the Empirical research conducted requirements to propose a model were established through the two methodologies.

A benchmark model identified was adopted into this model to guide data preparation and publishing.

The other requirement to include arrangement of Government per sector, Policy, Legislation and regulation, development of a Central Government Portal, Expansion and Strengthening of the National Backbone Infrastructure, Information, Education and Training, the provision for Intermediaries and a feedback mechanism were identified through empirical research supported by literature.

Validating the Model

The validation of the model aimed at ascertaining if the proposed model was relevant to the context in which the research was done and whether it would be applicable. It was presented to key respondents of the study because they are involved with OGD initiatives in one way or the other. It was validated at average acceptance of 80%.

5.1.1 Research Report Summary

Table 5: Research Report Summary

OBJECTIVES	METHOD	CONTRIBUTION
Review the current best practice Open Data models and determine the requirements for a new model that will enhance effective use of OGD in Uganda.	Library Research	Theoretical Analysis
Propose a usability model to enhance use of open data in e-governance.	Mixed Method: Empirical Study and Library research	A Model was proposed
Validate the proposed evaluation model.	Empirical Study	Model presented for acceptance

5.2 Conclusions

If openly availing data in custody of Government agencies is said to have such tremendous impact and unlock great potential, it is worth a try but strategic Implementation of these initiatives is critical to ensure that they do not end up as just another failed Government initiative because there's a great amount of resources committed in their implementation.

Open Government strives to enable leaders in their communities to create change and transform their lives and those of people in their communities. The process of implementation involves many actors and several goals and interests that may vary from one organization to another. It's a new phenomenon that all who are interested are trying to learn and experiment with, but implementation of some initiatives has been done in a hurry to jump on the Open Data bandwagon with no time put into knowing what works and what the impact is. Open Government is something that can transform communities at all levels and there is a lot of excitement about it. However, there's need to acknowledge challenges associated with it in order to address them.

5.3 Recommendations

It is recommended that Open Government Data initiatives moves from merely focusing on the transparency and accountability objective and aiming at releasing data for the sake of portraying Government as transparent and accountable to the citizens but take on a holistic approach to meeting the goals for which the initiatives are meant to meet. A commendable amount of resources are committed to such projects and it will be accountability in itself to have initiatives achieving their goals of improving governance through the use of technology. Once such initiatives are successful and there's measurable impact, then Government will have achieved the accountability objective.

5.4 Suggestions for further research

There's need to conduct research on all existing Open Data initiatives, the portals so far developed and their goals. This would enable Government to know the existing initiatives that they need to partner and interface with so as to ease citizen's access to needed information. This would also help to avoid duplication of data published and create engagement between the various Government sectors and Organizations whose goals and vision might require publishing of data / information similar to that of a particular Government sector.

Research should also be done to establish if the existing initiatives followed a systematic and strategic approach to implementation, what their impact has been and what it would have been if they had adopted a systematic and strategic approach if otherwise.

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Appendices

Appendix I: Interview Guide

Interview Questions

Name of the respondent (optional)

Date of the interview.....

Designation.....

1. To what extent has the Government and its leadership made a commitment to Open Data?
2. Are there existing transparency and political initiatives or other initiatives related to similar themes as Open Data?
3. Where does responsibility for the open data initiatives lie?
4. Who are the stakeholders and what are their roles?
5. Could there be some excluded stakeholders who are expected to be involved in the open data initiative?
6. What existing initiatives use technology to address the key social issues facing the country?
7. What laws, regulations and policies exist for Open Data?
8. What other laws or regulations have an impact on Open Data initiatives and Open Data use?
9. How widespread is the use of ICT among the target audience?
10. What plans does Government have to enhance use of ICTs and ICT skills for effective Open Data use?
11. What strategies does Government have for Open Data Initiatives?

12. Does implementation of Open Data initiatives follow a specific framework? If so, which one and what has been its impact?
13. Are there any feedback mechanisms for the existing OGD initiatives?
14. What is the state of ICT economy?
15. What specific policies or programs support technology Innovation?
16. What are the potential benefits (Social, Political/Governance and Commercial)?

Appendix II: Questionnaire for research

UGANDA MARTYRS UNIVERSITY

ENHANCING THE USE OF OPEN DATA FOR E-GOVERNANCE

Dear Respondent,

My name is Racheal Mbabazi, a Masters student conducting research on the topic 'Enhancing the use of Open Data for e-governance'. Open Government Data is an E - Governance concept that data in custody of Government or Government controlled entities should be produced or commissioned by the respective entities, making it available for anyone to freely access, use, and redistribute as they wish, without restrictions from copyright, patents or other mechanisms of control for any purpose. This means that one can easily and freely find information they need that could be in custody of Government.

You are kindly requested to participate in this ongoing study by filling in this questionnaire. Your contribution will lead to the successful completion of this study. All information given will be treated confidentially and purely for academic purposes.

Thank you for and God bless you.

SECTION 1: BIOGRAPHIC INFORMATION

Please tick where applicable

1. In what category of Users do you fall

- Public sector
- Civil Society Organizations
- Academia and Research
- Civic Hackers
- Media
- Public & Business

2. Gender

Female Male

3. Age

20-30 41-50
31-40 Above 50

SECTION 2: UNDERSTANDING OF OPEN GOVERNMENT DATA

1. Have you heard about Open Government Data

- Never heard about it but are interested
- Have heard about it and are interested
- Not Interested

2. Have you heard about the Budget Information Portal?

Yes No

If yes, have you ever accessed or used it

Yes No

3. If you were to access Information in Custody of Government what would be interested in?

Please list all that apply

_____	_____
_____	_____
_____	_____
_____	_____

4. Do you have an available internet connection to access the data Portals?

Yes No

5. How else would you like to access Open Data

- | | |
|--|--|
| <input type="checkbox"/> Notice Boards | <input type="checkbox"/> Community Meetings (Baraza) |
| <input type="checkbox"/> Radios | <input type="checkbox"/> News Papers |

6. Do you think it is relevant to have a utility where you can raise queries or seek clarity and be given feedback

- | | |
|---|--|
| <input type="checkbox"/> Strongly Agree | <input type="checkbox"/> Agree |
| <input type="checkbox"/> Disagree | <input type="checkbox"/> Strongly Disagree |

7. How would you like to give and receive feedback?

- | | |
|---|--------------------------------------|
| <input type="checkbox"/> Post query on Portal | <input type="checkbox"/> Call Centre |
| <input type="checkbox"/> SMS | <input type="checkbox"/> Middleman |

SECTION 3: IMPACT OF OPEN GOVERNMENT DATA

To what extent do you think Open Government Data contributes to the following?

- | | |
|--|--|
| <input type="checkbox"/> Transparency and accountability | <input type="checkbox"/> Citizen Participation |
| <input type="checkbox"/> Democratic engagement | <input type="checkbox"/> Reform of Public Services |
| <input type="checkbox"/> Innovation and Economic Development | <input type="checkbox"/> Inclusion and Empowerment |

Appendix III: Questionnaire for Model Validation

UGANDA MARTYRS UNIVERSITY

A MODEL TO ENHANCE THE USE OF OPEN DATA FOR E-GOVERNANCE

In respect to the Information you and other respondents provided in an Interview towards enhancing use of Open Government Data, A Model has been proposed taking a strategic and holistic approach to implementation of OGD from a Users' Perspective. Below are questions to address how relevant you think the components of this model are and how acceptable the overall Model is?

1. Have you understood the presentation of the model, the relationships and its purpose?
2. Which of the components are relevant to OGD use in Uganda?
3. Which of the components are relevant to OGD use in Uganda?
4. Do you think if adopted it the model will add value to the OGD initiative thereby impacting its use?
5. How applicable is the overall model?
6. Do you think the model will achieve the set goal of enhancing use of OGD?