

**THE DYNAMICS OF OPENING
GOVERNMENT DATA
CASE STUDY FOR GEOSPATIAL
DATA IN HANOI, VIETNAM**

HOANG TUAN ANH
March, 2014

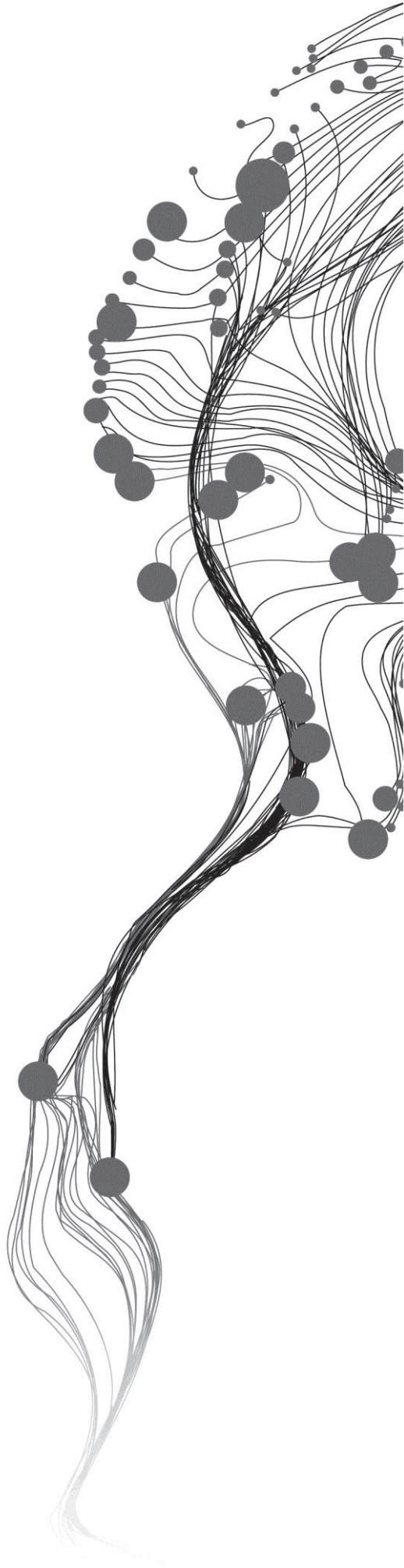
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ABSTRACT

Open Data seems to be high on agenda not only in Western countries, but also in developing countries. Vietnam is not the exception of that trend. ICT has been being used in the Vietnam public sector for more than 20 years and the advent of the Internet has given this usage more than just a new name e-Government and a higher profile. Along with that, some projects under foreign investment into Vietnam to develop ICT in public administration. However, these achievements are generally still limited. 2001 marked the first step in Vietnam's e-government with project 112. Unfortunately, in 2007, the project was suspended due to many different reasons. Following in the footsteps of previous achievement, in August 2010, the Prime Minister made a decision number 1605/QĐ-TTg to approve national program for ICT application in the State agency's activities in the period 2011 – 2015 orient to 2020. The objective of Vietnam government leaders is developing towards a transparent, participation, collaboration, efficient and convenient government.

This research aims to identify the factors that contribute the process of open government data, using those factors to model how geospatial government data will be opened. Systems dynamics will be used in this research as the main tool to manage that complex process. To derive the variables which are used as the input of models, some interview and survey will be conducted. A matrix is created to obtain information about definition and characteristics of e – Government, Open Government and Open Government Data, and plays role as a tool to pose also to manage questions. On the other hand, collecting and analysing secondary data is one of the most important steps to build, test and compare the models.

The results of this research will show the dynamics of open government data, from time to time. SWOT analysis is one of the most efficient methods in deriving the strengths, weaknesses, opportunities and threatens when a government open their data, especially geospatial data. In the case study, the use of systems dynamics support to visual the mechanism of OGD in Hanoi, Vietnam where there are many barriers to this sensitive issue.

Key words: *e – Government, Open Government, Open Government Data, Geospatial data, dynamics model*

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ACRONYM

MoNRE	Ministry of Natural Resources and Environment
GDLA	General Department of Land Administration
DoSM	Department of Survey and Mapping Vietnam
VIGaC	Vietnam Institute of Geodesy and Cartography
RSC	National remote sensing centre
OGD	Open Government Data
OD	Open Data
ICT	Information and Communication Technology
NSDI	National Spatial Data Infrastructure
PPP	Public – Private Partners

1. INTRODUCTION

1.1. Background

Open government data (OGD) is defined by (Albano 2013) as the availability of information on the Internet that can be reused by citizens, the accessibility of data so that it is able to manipulate data and generate applications, and the basis of transparency, participation and collaboration. Likewise, (Machado and de Oliveira 2011) mention in their research that OGD is the publication of data in open raw formats that is accessible and available to all and allow reuse. Both of the definitions indicate the key terms of OGD as open formats, accessibility, availability and reuse. However, these definitions seem to lack of the term of government. (Open Knowledge Foundation 2013) define OGD as data produced or commissioned by government or government controlled entities and it can be freely used, reused and redistributed by any one.

The rise of OGD in recent years has been an innovation of government for many countries. Currently, according to International OGD Catalogue Search, there are more than one million datasets from 188 catalogues in 24 languages from 43 countries (Rozell, Erickson et al. 2012). It was a significant step. This data exists in various formats, covering many different categories as environment, transportation, applied science and technologies etc. The United State is the world leader in publishing government data with more than 450000 datasets meanwhile one of the Southern East Asia country, Singapore, also has published more than 6000 datasets. The trend of releasing of the data provided by the government has opened new possibilities in terms of transparency, improved reuse of government information or more efficient government services and enhanced citizen participation.

(Helbig, Cresswell et al. 2012) assume that opening government data as more free data and in more formats will lead to more use and value creation and so far will motivate government to make the necessary changes to make data more open and accessible. But they experienced that providing more data does not necessarily affect the interest of using data or more valuable use. Nevertheless, if governments want to pursue opening, through the use of new technologies or information-driven activities, then they need a good understanding of how these things work.

Vietnam Government is now pursuing e-Government for the target of building a “government of, by and for people”. In 2001, there was a project call 112 which was considered as a milestone for e-Government in Vietnam. However, in April 2007, the project 112 was halted. After that, Vietnam Government still has some efforts to make a better e-Government. Every year, from 2003 until now, the government leaders organize a symposium for discussing and reporting the current status of e-Government in Vietnam or how to make it better. This year, at the 11th Vietnam e-Government symposium (IDG Vietnam and National Steering Committee of ICT 2013), for the first time the term open government was mentioned, thereby fundamentally changing the paradigm of future e-government in Vietnam. The first action related to this paradigm shift concerns however providing appropriate policies and good management coordinating this process toward more open data.

(CabinetUK June 2013) mentioned the key factor of open government is open data. Open government is the new means of developing e-Government (Nam 2011), what is being pursued in Vietnam. Following the first UK National Action Plan for open government, they focused on the commitments to open up government data and this year, they planned to press forward to make open government data available online. However, the expansion of freely available data sets and use are constrained by agency and user capabilities, data management practices of agencies, agency effort, politics, interactions between citizens

and data that create meaning conflict, and relationships with citizens and other stakeholders (Helbig, Cresswell et al. 2012). Therefore, an OGD initiative requires a proper model to describe and to visualize possible impacts of those factors to make it more efficient and reliable.

1.2. Related work

This section is for reviewing some literatures relate to this research. There is a large number of researches relate to the term of OGD. Reviewing each of them would be out of scope of this research. Therefore, I try to use a strategy for searching base on some key words and then synthesize the results. I use two webpages for the searching strategy as: Web of Science (Thomson Reuters 2013) and Science Direct (Elsevier 2013), two of the largest databases of research in the world. The idea is to use some keywords relevant to this research by overlaying these keywords to get proper results.

	Web of Science	Science Direct
Search for keyword: “ Open data ” within the results of “ Open government ” from 2005 until now	27 results	229 results
Search for keyword “ e-Government ” within results for keywords: “ Open government ” from 2005 until now	21 results	260 results
Search for keyword “ e-Government ” and “ Policies ” within results for keywords: “ Modeling impacts ” from 2005 until now	1 result	34 results
Search for keyword “ e-Government ” within results for keywords: “ Vietnam ” from 2005 until now	1 result	47 results
Final step	All of the results are limited to the subject of geography and geospatial	All of the results are limited to the subject of geography and geospatial

The target of the combinations using those keywords is to find out what is researched and what is not by giving some examples from the results collected. The first combination of “open data” and “open government” is to figure out that OGD is on progressing. (Karin 2012) mention in their research about Open government data in Brazil that in September 2011, Brazil became a member of Open Government Partnership and has built up datasets using Brazil’s Linked Open Government Data infrastructure. (Karin 2012) discuss about the current status of OGD in Brazil and the lesson learned from Linked Open Government Data in Brazil. They demonstrated that information is bounded by RDF vocabularies and during the process of creating triple sets. This vocabulary provides a mean to publish multi-dimensional data on to the web and then that can be linked to related data sets and concepts by using the W3C RDF

standard. This research can help to bring an idea of processing and management open geospatial data. (Prieto, Rodriguez et al. 2012) do their research in the “Implementation framework for open data in Colombia”. Colombia was in the same situation as Vietnam at present. In Colombia, e-government program started in 2000, followed in 2008 with a general framework for e-government strategy was defined. In 2011, a new model was developed, new terms such as Open Government and Open Data have been included. The model is for open government data and the authors aim to introduce this model as a framework, plus the strategic guidelines needed for the framework implementation. This research provides a visualization of how to implement the open data in a country, especially the strategies for opening up government data.

The second combination is to find out that some countries is engaging in e-Government projects which may embrace the idea of OGD. (Nam 2011) in the research of “New ends, new means, but old attitudes: Citizens’ view on Open government and Government 2.0” show that citizens are one of the end-users. This research focuses on what influence citizens’ attitude about open government. At the end of this research, the author gives some propositions that people, who use conventional e-government services and have some benefits of e-government have a trend to think about open government. This could be one of the key terms in opening up government data. Focus on the users. Make the information or data easy to reuse and understandable. (Machado and de Oliveira 2011) mention in their research about open data architecture for e-Government that the problem of e-Government Web Portals that the data available on the Portals is unstructured formats using current web languages. The aim of this research is to show architecture called Delivering Information of Government (DIGO) for the accessibility to primary data in open data and this will lead to fitness for reuse of data. First, they bring some concepts of data background that data can be further classified into structured data, semi-structured data and unstructured data. Then they discuss about the implementation of open data using W3C standards and their follow in considered principles of Open Government Data of the W3C e-Government interest group such as: complete, primary, timely, accessible, machine processable, non-discriminatory, non-proprietary and license-free. After the open datasets are available, they provide the next step is to reuse data, and link data with other sources for data combination, information and application productions. They also mention some problem of e-Government Web Portal. Therefore the DIGO, a standard architecture can provide semantic agreement between heterogeneous data sources and to minimize the conflict of data generate by e-Government Web Portals. It is a very good structure for open government data. Good structure and good management of open government data will decrease the risks, costs and make data fit for reuse.

To make this point more clear, I try to search for the Vietnam e-Government projects in some other proper sources. One of the results is E-Government project implementation: Insight from interviews in Vietnam (Obi and Nguyen Thi Thanh Hai March 2010) Vietnam government is now pursuing e-Government for the target of building a “government of, by and for the people”. In 2001, Vietnam Government started to bring e-Government with the project 112, which was considered as a milestone for e-Government in Vietnam. However, in April 2007, the project 112 was halted. This research is to apply a theoretical framework to investigate the failure of project 112. The research also point out some evidences which show the dissatisfaction of the end-users. Beside the failure of project 112, Vietnam government still keeps pursuing an effective e-Government. In 2013, at the 11th Vietnam e-Government Symposium, this is the first time Vietnam government brings the term Open Government in to the conference (IDG Vietnam and National Steering Committee of ICT 2013). Open government seems to be the new end of e-Government.

The third combination is to figure out that other countries has started to model and evaluate possible impacts of e-Government policies. (Helbig, Cresswell et al. 2012) in their research of the dynamics of opening government data try to give a broader understanding of the shapes that the value generated

through open data initiative. They use an approach of context and dynamics to analyse and model open data initiatives. For the context, they bring some concepts for:

- Identifying and understanding stakeholders, how they are interested in opening government data.
- Helping planners and decision makers anticipate some changes of the stakeholder. With this, government can give an effort to deal with the power, expectation, and performance changes.
- Developing hypotheses for interactions and relations among stakeholders.

After using a holistic approach for the context, they give two cases of open data initiatives to point out:

- The relevant of open government data to agency performance and public interest.
- The estimation how different stakeholders will use data.
- The idea of sustainability

Last, they create a functioning simulation model of an open data initiative. The model shows how stakeholders, technologies and information flows will impact the system and affect the value creation. The results of their research can help governments to evaluate the costs, risks and benefits of open data initiatives.

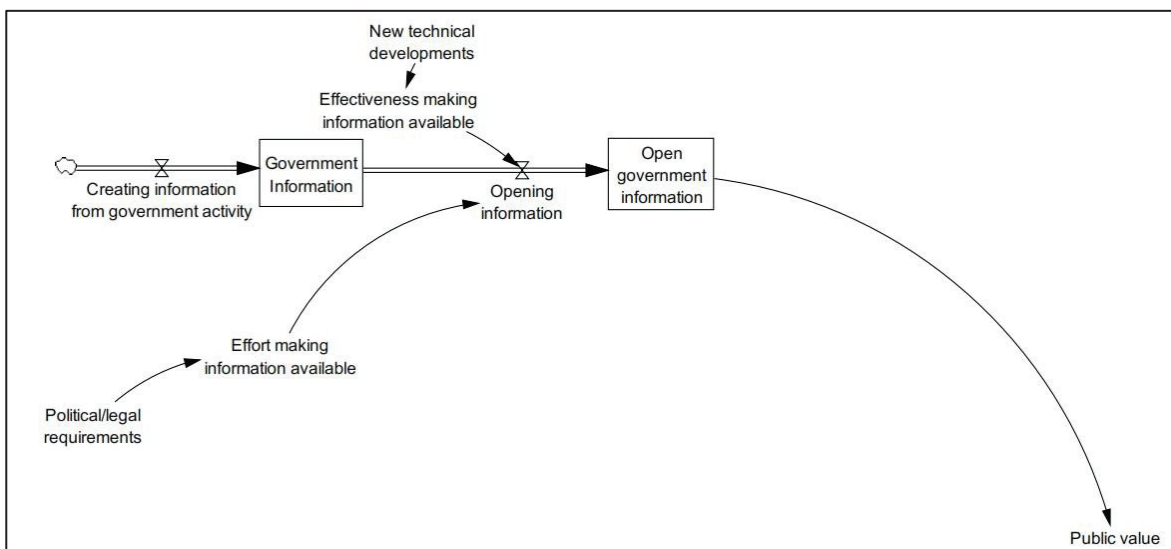


Figure 1.1 Sample of dynamics of OGD

The figure above is an example of dynamic model for making government information available. The box Government Information represents the accumulation of government records created from government activities. The second box - Open government information - represents the accumulation of all open data which is available to the public. The valve 'Opening information' represents the activities necessary to make that information available. Opening information adds to the accumulation of available open government information over time. To make this happen, governments need to allocate some effort to opening information. On the one hand, agencies' efforts to make information available may be increased or decreased by political or legal requirements. On the other, new technical developments will contribute to people's effectiveness in making this information available.

My research is to design a dynamic model for opening up government data base on the contextual, theoretical framework and analytical tools of the research above. My aim will focus more on the circumstances and initiatives that foster the provision and the use of open data.

The final step of this searching strategy is to overlay all of the keywords to find if the model of specific possible impacts of the specific policies or projects that Vietnam is engaging in exists. There is no result for this.

1.3. Research problem

According to the details on the introduction parts and especially in the literature review, for the first strategy of searching, there is a lack of information about the impacts in opening up government data or geospatial data. What we found is:

- We know that OGD is on progress in many countries such as: United Kingdom, Brazil, Colombia, Albany etc. (Hoxha, Brahaj et al. 2011, Karin 2012, CabinetUK June 2013).
- We also know that Vietnam is engaging in e-Government projects which may embrace the idea of OGD (IDG Vietnam and National Steering Committee of ICT 2013).
- We know that in other countries, research has started to model and evaluate possible impacts of e-Government policies or some motive for open up government data (Helbig, Cresswell et al. 2012).

However, we do not know how to model the specific possible impacts (on government, public administration and society in Vietnam) of the specific policies or projects that Vietnam is engaging in.

Especially, at the symposium in Vietnam each year (IDG Vietnam and National Steering Committee of ICT 2013), it is impossible to find any term about open government data. The government seems to focus on technology, datasets and the trends of e-Government than an open government. This year is the first time the term open government appears on the symposium. As mentioned above, government needs to open up government data by developing the appropriate policies and management practices and so far, build up an open government.

Following these ideas, there is a need for this research in dynamic of opening government data.

1.4. Research objectives

As discussed in the research problem, there is a gap in research for OGD in Vietnam, which foster me to do this research. This thesis is to design a dynamic model to show which factors impact the process of opening up government data for the case of geo – information data in Vietnam. This research uses an approach to bring the significance of context, in terms of the actors and their interests in the governance of government data and access to it. These aspects of opening government data affect how information is acquired, understood, and used to impact government and public life, especially in Vietnam, there is a notion that data is very precious, very few people own it, and not easy to share. After that, this research highlight the dynamics of open data initiatives that impact value creation, in terms of making data available, making it reusable, and the introduction of new stakeholders by using a dynamic model. These dynamics represent changes over time resulting from new technologies, interests, issues, and patterns of interaction that result in new practices, governance arrangements, policies, and ways to express the value generated. One of the key factors for opening up government data is to explore the motive of opening geo – information data, have a broader understanding of the research datasets publication by distinguishing between intention to share and the action of sharing data.

Main objective

To design a reference dynamic model of the factors which impact the process of opening up government data in case of geospatial data?

To design a dynamic model, first, there is a need to have a broad knowledge about OGD, some good tools, updated information and finally a valid model that specify as below:

Sub – objectives

- Synthesize the literature and documentation to figure out:
 - a. OGD objectives, experiences and cases in general
 - b. Current Vietnamese e-Government projects and e-Government policies which embrace (elements of) OGD.
- Synthesize the literature and identify possible technical tools to conduct impact modelling and visualization of e-Government policies. Generate out of this a way or step-by-step approach to apply dynamic modelling to evaluate the Vietnamese case.
- Collect up-to-date information on how e-Government policy embracing OGD is carried out, and assemble relevant indicators / factors for the research dynamic model (step-by-step) process.
- Construct a valid dynamic model which clearly identifies possible impacts of the current policies and intensions. Then generate policies, technical and professional recommendations for the Vietnamese government out of this model.

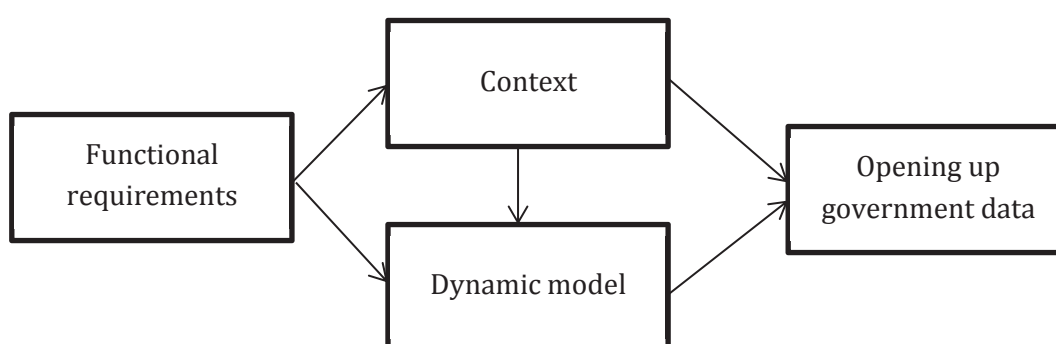
1.5. Research questions

	Objectives	Questions
Sub objective 1	<p>Synthesize the literature and documentation to figure out:</p> <ul style="list-style-type: none"> -OGD objectives, experiences and cases in general -Current Vietnamese e-Government projects and e-Government policies which embrace (elements of) OGD. 	<ul style="list-style-type: none"> - Generally, what are the objectives, experiences in an OGD initiative? - What is the context of current e-Government in Vietnam that may impact the OGD?
Sub objective 2	<p>Synthesize the literature and identify possible technical tools to conduct impact modelling and visualization of e-Government policies. Generate out of this a way or step-by-step approach to apply dynamic modelling to evaluate the Vietnamese case.</p>	<ul style="list-style-type: none"> - What are context of the tools which are considered to conduct impact modelling and visualization of e-Government policies? - What do we generate out of those tools to apply dynamic modelling to evaluate Vietnamese case?
Sub objective 3	<p>Collect up-to-date information on how e-Government policy embracing OGD is carried out, and assemble relevant indicators or factors for the research dynamic model (step-by-step) process.</p>	<ul style="list-style-type: none"> - How e-Government policy embracing OGD is carried out? What are the factors that impact on the process of opening up government data? - What are the factors or indicators that influence in the dynamic model?
Sub	<p>Construct a valid dynamic model</p>	<ul style="list-style-type: none"> - How current policies and intensions impact to

objective 4	which clearly identifies possible impacts of the current policies and intensions. Then generate policies, technical and professional recommendations for the Vietnamese government out of this model.	OGD in a dynamic model? How factors that collected link to each other and impact to OGD? - What are the effects of designing this model in an OGD initiative? - What are the benefits of this model related to the future government projects and policies?
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1.6. Anticipated results

1.6.1. Conceptual framework



For the dynamics of OGD, first, a broad understanding of context (government context and the context of information) will influence in designing a dynamic model. A dynamic model, specifically a system dynamic policies modelling should be developed to support the decision maker on opening up government data.

1.6.2. Anticipated results

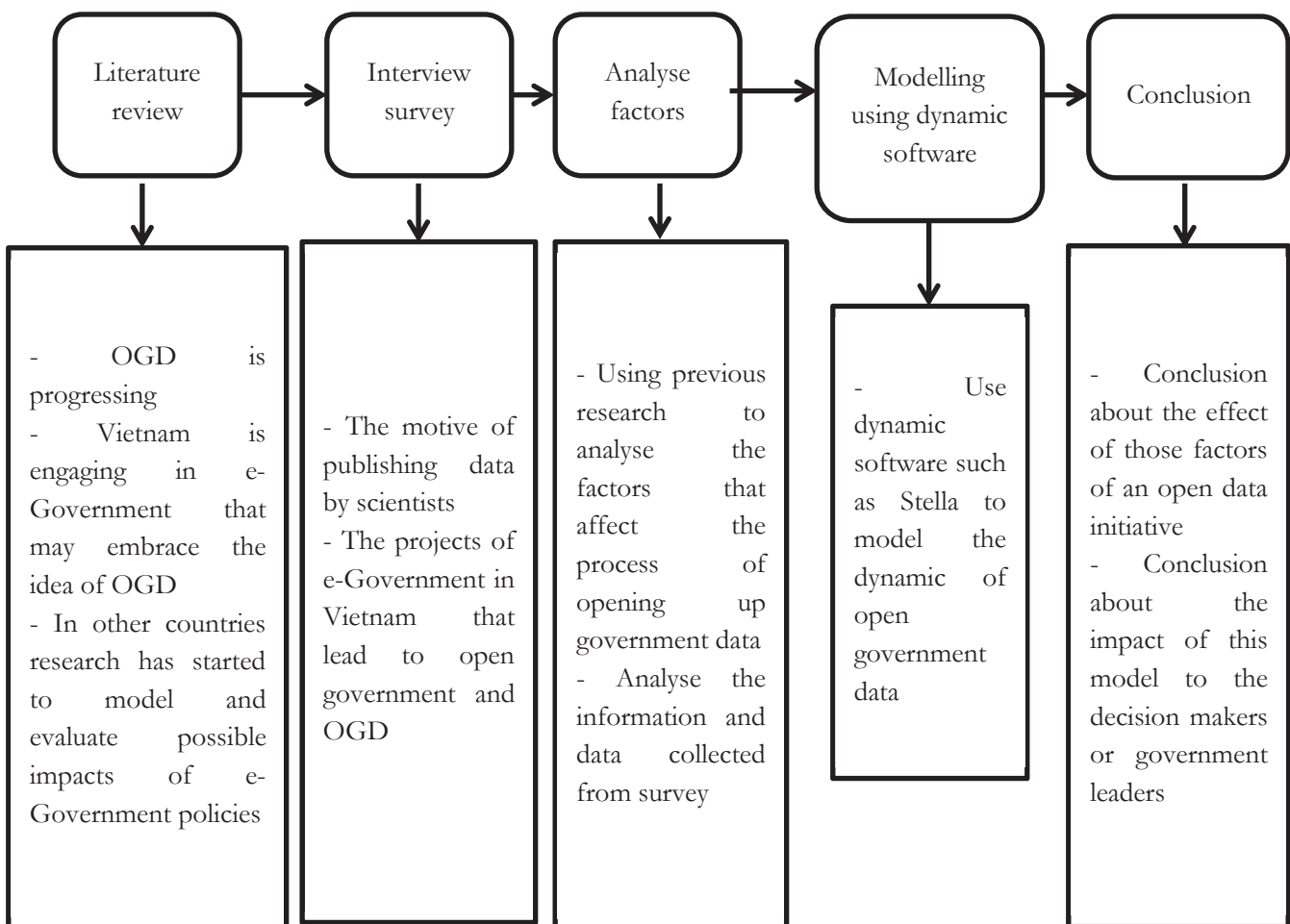
Objectives	Methods	Results
Sub objective 1	Literature review	The synthetic knowledge of objectives and experiences positively influence the dynamic of opening up government data in Vietnam
Sub objective 2	Literature review	Define the factors that impact the process of opening up government data as the input of the dynamic model positively influence the dynamic of opening up government data in Vietnam
Sub objective 3	Surveys: there are 2 types of survey - Some questionnaires for the organization leaders for the policies that impact in the model. - A survey on some geographic scientists for the motive of	Analyze and evaluate the information collected from the organization leaders and the scientists to figure out the factors or indicators collected from surveys significantly influence the dynamic of opening up

	publishing data.	government geospatial data in Vietnam.
Sub objective 4	Use dynamic software to construct the dynamic model with the indicators or factors that collected from the surveys.	Dynamic model show the way that current policies and intensions impact to each other significantly influence the dynamic of opening up government geospatial data. This is the main the output of this research.

1.7. Research design

The research consists of major tasks:

- The first task is to define which factors that affect the dynamic of open government data.
- The second task is to evaluate the way it affects to the process of opening up government data.
- The third task is to propose the impact of the dynamic model to the decision makers or government leaders



1.8. Thesis structure

Chapter 1: Introduction

This chapter introduces the research and contains, background and justification of the research, the research problem, research objectives and research questions.

Chapter 2: A literature review of open government and the impacts of open government initiatives

This chapter review some literature pertaining to open government and OGD initiatives, some general challenges, and benefits of OGD. It also gives an overview of current Vietnam e – Government status, the data sharing mechanism in Vietnam and the tool which is used in this research.

Chapter 3: Data collection process, strategy and methods

This chapter will present the methodology and activities of the primary and secondary data collection

Chapter 4: Representation and interpretation of results of data collection

This chapter will summarize and interpret the results of data collection from the field trip to identify the factors or variables using in dynamics model

Chapter 5: Construct dynamics model for opening government data in Hanoi, Vietnam

This chapter will construct dynamics models base on the results that interpreted in chapter 4.

Chapter 6: Conclusion and recommendation

2. A LITERATURE REVIEW OF OPEN GOVERNMENT AND THE IMPACTS OF OPEN GOVERNMENT INITIATIVES

2.1. Introduction

The aim of this chapter is to address research objective 1. In this chapter, the author will synthesize and evaluate literature for definitions about e-Government, Open Government, Open Data and Dynamics Model. Besides, this chapter also derive the characteristic of those concepts from their definitions preparing for the data collection method, the benefits, general challenges, and the impact of open government data initiatives. Finally, the chapter also explore the current status of e-government and open government in Vietnam that may embrace the idea of open government data.

This chapter is built up with 7 sections. Section 2.2 is the exploration about Open Government, Open Data, their characteristics and some OGD initiatives from other countries. Section 2.3 brings a broad picture of how information is made available, the requirement of publishing data. Some impacts, benefits and challenges are provided in section 2.4 and 2.5. Section 2.6 is about the current status of e-government and data sharing mechanism in Vietnam. Section 2.7 is a short definition and some use of dynamics model. And the last section is the conclusion.

2.2. OGD and current status of OGD initiatives in the world

For the better understanding of OGD initiatives and their impact, in this section, the author will bring some definitions of the concepts related to the context of this research such as: e-Government, Open Government, Open Data. After a broad understanding of the concepts above, for preparing for the data collection strategy, some characteristic of those concepts will be derived. With each characteristic, there will be a question follow as the factor of the dynamics model. The status of OGD in the world is also discussed in this section.

2.2.1. Some definition of e-Government, Open Government and Open Government Data

The term ‘electronic government’ or ‘e-government’ appeared about a decade ago and there is no commonly accepted definition (Bhatnagar 2004). Some people see e-government as the migration of government information and services to an online delivery mode (Oliver and Sanders 2004). Some see e-government as the provision of routine government information and transaction using electronic means, most notably those using Internet technology, whether delivery at home, at work, or through public kiosks (Marche and McNiven 2003). In sum, we can understand the term ‘e-government’ as the use of Internet technologies to improve the way which government serves its citizens and the way which citizens interact with public institution.

On the trajectory of e-government development, open government seems respectively a new ends and a new means of e-government, not just in the United States but across other developed and even some developing countries (Nam 2011). As President Obama explained the idea during his campaign: “We must use all available technologies and methods to open up the federal government, creating a new level of transparency to change the way business is conducted in Washington, and giving Americans the chance to participate in government deliberations and decision making in ways that were not possible only a few years ago.” (The White House 2009). Allowing citizens to see and share in the deliberations of government and creating a “new level of transparency” are remarkable and ambitious goals, and would indeed “change the way business is conducted in Washington”, so that, the Open Government was born.

Like many aspirational concepts, open government is frequently defined by its characteristics. Thus, open government is often identified as an active initiative that is both characteristic of and required for a democratic society and typically associated with the concepts of government transparency and accountability (Bertot, Jaeger et al. August 2010). The White House operationalized this commitment through the release of the ambitious Open Government Directive which requires federal agencies to institutionalize the principles of transparency in their operations, public participation in agency decision-making, and collaboration with their stakeholders. Table below briefly identifies the goals and motivations for each Open Government principle.

1. Transparency
<ul style="list-style-type: none"> - Goal: Promote accountability and provide information for citizens about what government is doing. - Driver: Information maintained by the Federal Government is a national asset
2. Public participation
<ul style="list-style-type: none"> - Goal: Enhance the Government’s effectiveness and improve the quality of decision-making. - Driver: Knowledge is widely dispersed in society; government should tap this wider pool of knowledge.
3. Collaboration
<ul style="list-style-type: none"> - Goal: Engage Americans in the work of their government, by collaborating across all levels of Government, and with non-profit organizations, businesses, and individuals. - Driver: Partnerships and cooperation improve the effectiveness of Government.

Figure 2.1. Characteristics of Open Government (Linders and Wilson 2011)

In addition to the narrow understanding of Open Government (transparency, participation and collaboration) there is also a wider definition of Open Government and its impact to govern: The so called “family of open government” consists of more than Open Data, Transparency, Participation and Collaboration. Further dimensions within the discussion about Open Government are the debates about Open Access and Open Knowledge as well as Open Innovation and Open Societal Innovation. Furthermore, Open Process Chains and Open Value Added Economic Chains can be discussed practically besides Open Statecraft and the Open Policy-Cycle theoretically. Further contents are Open Source, Open Standards as well as Open Interfaces (Open APIs) and the Open Markets Approach. This compilation of different ideas which can be included within the Open Government paradigm is exemplary and not conclusive (Geiger and Lucke 2012).

Organizations increase transparency when they expect valuable external influences and are interested in a more intensive interlinking with their surroundings, without the risk of getting damaged. This assumes readiness for an opening process which considers impulses, discourses and exchanges as constructive and welcome. One approach is the free and open access to data, information, knowledge and sources (Geiger and Lucke 2012). Thus, the first understanding of openness is the proceeding of the Open Knowledge Foundation (Open Knowledge Foundation 2006). Works are open if they are available to everybody for less than their reproduction costs, if it is permitted to re-use them, create modifications and derivatives, open file formats are used, nobody is discriminated against during usage and no restrictions exist for possible purposes (Open Knowledge Foundation 2006). This approach can be transferred to data,

information and knowledge. Knowledge can be realized as the result of the interlinking of information in society, in organizations and in the heads of individuals. Information becomes content of knowledge if they are contextualized to an adequate possibility of using them. Each piece of information contains a certain meaning. In this context, information is understood as machine-readable data combined in a special syntax. Continuous functions are used for the presentation of analogous data, signs for digital data (Geiger and Lucke 2012). Due to these considerations and characteristics the following working definition of “Open Data” can be deduced (Open Data - OD):

Open Data are all stored data which could be made accessible in a public interest without any restrictions for usage and distribution.

Content of Open Data could be education material, geo data, statistics, traffic data, scientific publications, medical studies or radio and television programs. Open Data combines not only stored data of the public sector, but also includes data from businesses, universities, broadcasting stations or non-profit-organizations (Geiger and Lucke 2012).

Open Government Data is also defined by the Open Knowledge Foundation as Data produced or commissioned by government or government controlled entities which is open as defined in the Open Definition – that is, it can be freely used, reused and redistributed by anyone, only subject to (at the most) the requirement that users attribute the data and that they make their work available to be shared as well (Open Knowledge Foundation 2013).

(Hoxha, Brahaj et al. 2011) in their research in 2011 bring a broader understanding of Open data. They mention that the term open has been introduced in the late 2000th to generalize the accessibility of the information that can be public and easily accessible by anyone. The concept of information is also generalized to the concept of data, by referring to raw sets of valuable information which can be structured, analysed and presented in different forms leading to knowledge representation. From a technical perspective, they refer as Open Data to any sets of data which can be reused with no restrictions by any form of licensing or patents, data that are well structured and can be easily accessed and reused by institutions, scientist or the web community.

All of the definitions of Open Data mention about the accessibility, here is that the data can be reused by anyone without any restriction. Besides that, they also define the characteristics of open data as the freely use, reuse or data are well structured, can be easily accessed with any form of licensing or patents. On the framework of this research, the author will use all of the characteristics of Open Data in the process of data collection process (such as interview) and then validate them.

2.2.2. OGD in the world

Open Data seems to be high on agenda not only in Western countries, but also in developing countries. This subsection focuses on providing the overview of some OGD initiatives in some countries, especially about Brazil, a developing country that may give a driver for Vietnam government. Although the number of open data initiatives in developing countries is still limited, the following years will see a large increase of open data initiatives in developing countries (Schwegmann 2013).

According to International OGD Catalogue Search, there are more than one million datasets from 188 catalogues in 24 languages from 43 countries (Rozell, Erickson et al. 2012). The United State is the world leader in publishing government data with more than 450000 datasets meanwhile one of the Southern East Asia country, Singapore, also has published more than 6000 datasets.

The steady increasing of OGD initiatives has created both opportunities and challenges for all of stakeholders including government employees, journalists, researchers, scientists and engineers. Current datasets have been made available by governments around the world, at national, regional and local levels. These datasets cover a large proportion of the activities in which governments are involved such as:

political boundaries, transportation networks, education performance, health related data, budgets and financial reports. The trend of releasing of the data provided by the government has opened new possibilities in terms of transparency, improved reuse of government information or more efficient government services and enhanced citizen participation. While it is not clear if all of these promises have been fulfilled, there are many success stories that indicate OGD is a beneficial initiative to society. From mapping financial transactions to garbage collection notification systems, citizens with different interests are using and consuming OGD for a wide range of purposes (Schwegmann 2013).



Figure 2.2. Countries have Open National Data sites

Move to some developing countries, it is still early days for Open Data in so called developing countries. Among the 43 countries around the world that have set up the national open data platforms, there are only 13 developing countries, all of which have been created in the last three years. Kenya is the first country has an open data platform in Africa and until now there are only three more OGD initiatives in Africa in Tunisia, Morocco and Ghana. In Europe, Moldova is the only developing country with an open data initiatives. In Asia and the Pacific there are only four countries have national open data sites, namely China, India, Indonesia and Timor-Leste. Latin America has five countries that already have national open data sites are Chile, Peru, Uruguay, Brazil and Mexico. However, beside the national platforms there are a growing number of OGD initiatives at municipal level. Several are still in beta version, others only hold a very limited number of data sets and others do not allow data re-use for commercial purposes.



Figure 2.3. OGD initiatives map in developing countries (Schwegmann 2013)

(Blue markers are existing national open data initiatives, yellow markers are sub-national initiatives, red markers are planned national open data initiatives (not comprehensive) and pink markers indicate membership in the Open Government Partnership)

Zoom into a developing country, Brazil to find out about their situation. Brazil is one of the most recent country provide their government data. Begin in 2009, the Information Organizing Committee of the Presidency of Brazil (COI) started to gather large amounts of aggregated government data for digital publication. The goal was to create a central information catalogue of public activity, with the intent to improve governance and to monitor government activity. This catalogue at first was originally created to serve the President of the Republic and his advisors team, as a reliable source of official data. The project was so successful that, reflecting open data principles, the catalogue was made available to the public in 2010. The DadosGov information catalogue is comprised of slightly over 1,300 historic data series representing 8 years of public records that reflect government actions during Luiz Inácio “Lula” da Silva’s presidency (2003–2010).

In September 2011, Brazil became a member of the Open Government Partnership, a multinational initiative to promote worldwide adoption of OGD. As a member, Brazil is committed to public transparency and action in securing open publication of official data. The commitment comprises both political and technical landmarks and includes a presidential mandate for the launch of the Brazilian Open Government Data portal.

2.3. How information is made available in open government initiatives?

In order to support the dynamics of open government data, after exploring some characteristics of ‘open data’, understanding of how information is made available should be referred. The way information flow in a polity, the role of stakeholders and the format of data will be addressed in this section.

2.3.1. Information polity

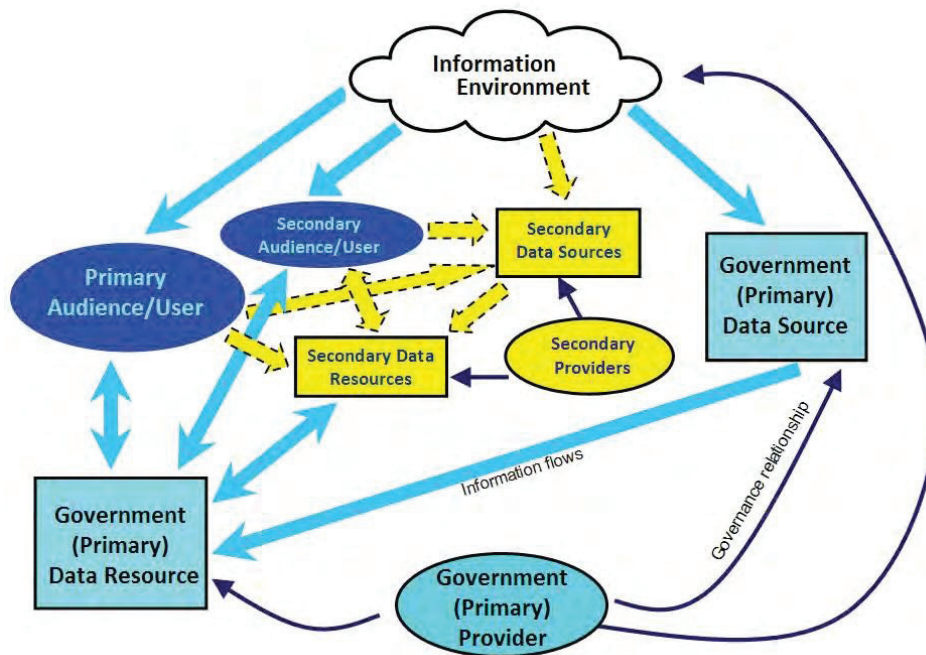


Figure 2.4. Information polity (Helbig, Cresswell et al. 2012)

- Information Environment is the multiple contexts from which data is extracted, encoded, and otherwise made visible.
- Primary Data Providers are the government agencies with the authority and responsibility for creating and maintaining the primary data sources and resources. In this role, government providers acquire and structure data files, create requisite policy, governance, and management arrangements necessary to establish and maintain the primary data resource.
- Primary Data Sources are the public employees that interact with the information environment and encode the original data required as part of a government program, process, or reporting requirement. This data is then entered into a government information system.
- Primary Data Resources are the access/ interface tools combined with primary data sources that are created that provide users with the data. The resource includes the data files, the software, networks, platforms, and organizational arrangements needed (such as creating a website or an application).
- Primary Audiences/Users are the persons or groups who are part of the government program, process, or reporting requirement (inside or outside of government) that are the intended users. The government data source and resource were created for them to advance some government objectives.
- Secondary Audiences/ Users are the persons or groups that want access to or use the primary data in ways other than 'originally' intended.
- Secondary Data Providers are the persons or groups that acquire the data from the government or secondary data sources and redistribute it in a modified way that provides benefits or additional impacts beyond those resulting from access to the original data resource.
- Secondary Data Sources are data that comes from sources other than the government provider. The data may be social media comments, sensor data, or other types of information collected from the information environment or from users directly.
- Secondary Data Resources are the access/ interface tools that are created that provide users with the data. These resources draw from both secondary data sources as well as primary data sources. The

resources include the data files, the software, networks, platforms, facilities, and organizational arrangements needed (such as creating a mobile app).

In the picture above, open data initiatives are presented as potentially having a primary data source and a secondary data source; both collected as a result of the interactions in the information environment. The data flows of Primary Data Sources are shown by the light blue arrows and the data flows of Secondary Data Sources are shown by yellow arrows. In this picture, government plays a role as the Primary Data Source, Provider, and Data Resources. The Primary Data Source sends the data to the Primary Data Resource governed by the Primary Provider, which is then made available to the Primary Audience/User. The simple picture considers the possibility of the Primary Audience/User obtaining some of the same kinds of data directly from the Information Environment themselves. However, there are also some aspects of the Information Environment that cannot be observed directly by the Audience/User.

In web 2.0 world, Secondary Data Sources, Providers, and Resources represent the explosion of new stakeholders (e.g. app developers, social networking sites, or citizens). Secondary Data Sources can also interact with the Information Environment to create data and initiate additional secondary data flows. The Secondary Data Resources extract Secondary Data Sources, which are managed and governed by the Secondary Providers. Data from Secondary Data Resources can go directly to Secondary Audiences/Users, or be combined with Primary Data Sources and flow to the Primary or Secondary Audience/Users. Of course multiple Secondary Data Sources and Resources are possible, but are omitted from the figure for simplicity and readability.

2.3.2. Standardized data or raw data?

Towards the adoption of the Open Government Data (OGD) paradigm, countries all over the world have started to publish information produced by their public bodies on the Web according with specific standards, such as Linked Data (Breitman, Salas et al. 2012).

When opening up data, the providers also want to deliver a high quality service. They want to know for sure that a dataset is complete, that is easy-to-use and understand, and that the data is updated as frequently as possible. This is a great benefit for re-users. Correct data, often updated and complete gives a very nice foundation to build services on. If a re-user is certain about the data source, he'll be much more likely to start re-using the data and build commercial products on it.

Another aspect of the quality of data is the form in which it is delivered. For every programmer, it's very convenient to be able to immediately understand a file or data stream, and start reading it. If data is published in an .xls or .doc file, every programmer will understand that files like this will have to be read by Microsoft Office or products that also understand these (proprietary) standards. XML, HTML, CSV or plain .txt-files (given that they are also formatted according to the appropriate standards) can be read by a huge variety of programs, and can sometimes even be automatically processed by computer programs (this especially goes for Linked or Semantic Data). In other words, well formatted data will have a much bigger chance of being re-used, because it is much more accessible to programmers.

We move back to Brazil to see what they have done in their OGD initiatives. As a standard, the COI management team proposed to classify the data on two dimensions: territorial (country, states, cities) and temporal (year or month). Data series were classified in several hierarchical thematic trees, which branch from general (e.g., infrastructure, citizenship, and social inclusion) to more specific subjects that define third- and fourth-level trees. The original data comes from spread sheets, provided to the COI team by more than forty different government bodies. The total volume is approximately 2.5 million records. The data received is stored in a relational database and made available through a specific Web site. DadosGov data is also published in XML and JSON. However, neither XML nor JSON offer the semantic expression of RDF or interoperability with the rest of the Linked Open Data (LOD) cloud.

2.4. The benefits of opening government data

There are some key benefits of opening government data. First, and perhaps the key benefit, is the potential for better governance achieved through citizens being more informed about the workings of government and better able to engage in the political process. Second, and closely related to the first benefit, is the potential to provide greater transparency and therefore accountability of government and parliamentary representatives to citizens. Finally there is the potential for greater engagement of citizens, journalists, and others in policy problems. Specific benefits are on the list below, following the Europe Public Sector Information:

a. Improves the function of a democratic society

- Informed citizenry and accountability government form the milestone of a functioning participatory democracy.
- Ease of access to all forms of data ensures the transparency of government and public process.
- Fosters the building of relationships between organizations, both public and private.
- Improved emergency planning preparation resulting in increased public safety.

b. Facilitates the expansion of functional uses of the data and enhances the value of the data itself

- Eases and speeds the development of data-based services, tools, and applications for a variety of private enterprises and public purposes.
- Promotes and facilitates the planning, development and maintenance of the physical infrastructure.
- Promotes innovation and entrepreneurship.
- Promotes and facilitates the understanding and preservation of the natural environment.
- Increases the number of individuals who find and report potential errors found in the shared data set.

c. Creates opportunities to realize cost savings for organizations

- Reduces or eliminates duplication of effort in regards to data development.
- Allows organizations to more effectively deploy their resources, providing better services at a reduced cost.
- Partnerships with other organizations result in cost savings on acquisition of new data and the maintenance of existing data.

d. Provides for improved analytical and decision making capabilities

- Allows organizations to leverage shared data to drive core business decisions.
- Promotes use of data from authoritative government sources rather than other public services like Google, Bing, and Yahoo, while encouraging those services to use the authoritative data.
- Promotes better and more consistent cross-jurisdictional and cross-organizational analysis and decision making.
- Makes analysis results available to a wide audience allowing for more rigorous testing of the results and data, which can create increased confidence in the analysis and data used.

2.5. General challenges

Whilst there are benefits in opening up public sector information for re-use custodians of public data also perceive risks that can hamper the opening up of PSI. In particular, there are issues relating to resources,

data quality and institutional change. However, where there is a commitment to opening public data there is evidence that these risks can be managed.

Many countries are currently experiencing budgetary constraints leading to reluctance to take on more tasks particularly where the public sector body itself may not benefit. However, data publishing need not be complicated or costly if a step-by-step approach is taken and effort can be made to identify agency benefit from investment in data publishing, for example, transaction costs in responding to queries or Freedom of Information requests can be reduced. The possibility of an increased workload due to enquiries from the public or media about published data can be managed by providing information about the data and the level of support that can be expected. In addition, contact with the public can lead to an increased awareness of the importance of data accuracy which can benefit the custodian.

Publishing public data can reveal inaccuracies that embarrass the PSI custodian or cause harm but such anxieties can be minimized by a gradual approach, where stakeholders are consulted and the reliability of the data explained. When the UK government published crime data journalist criticized inaccuracies (in part caused by the recording of some crimes at the police station itself) and reported fears that the information could impact negatively on house prices. However, even in this high profile case with the site receiving 18 million hits per hour, it was possible to manage expectations. Journalists argued that the data will improve through exposure, that not all stakeholders had been consulted and that crime should not be swept 'under the carpet' simply because of fears about house prices.

Public bodies also worry that they may release personal data (or confidential business data) and believe that determining whether or not data can safely be published requires expert legal advice. However, it is usually the case that datasets which contain personal data have already been identified and marked with privacy flags to meet data protection legislation.

Cultural barriers are difficult to address because they are often unacknowledged. There is a perception that to publish data is to relinquish the power associated with the data to a wider audience, described as a fear of loss of 'interpretational sovereignty'.

However, if other barriers are removed PSI holders can be persuaded of the benefits.

If there is a lack of supportive policy measures - often determined by higher level political action -this can make it harder to publish data. Even so, where there is a lack of policy there may be sufficient interest amongst public administrators to take some steps forward. In the Netherlands, there is an active community of civil servants, which discusses issues around digitization and PSI re-use.

Many public administrators want data to flow for the purposes of e-government if not PSI re-use. Where public data is subject to cost recovery policies resistant to releasing data can become more entrenched because of the potential loss of a secure income stream. In many cases, the decision cannot be made by the PSI holder acting alone. This can impact on the realization of the democratic, social and economic benefits and may require higher level political engagement. The approach of the open data movement has been to seek open access to some datasets even where cost recovery remains in place. As result, even PSI holders who charge for data have been willing to open up access to some datasets whilst maintaining a charging policy.

2.6. Current status of e-Government, Open Data and data sharing mechanism in Vietnam

This section will provide a summary of e-government in Vietnam from the early days to the present. Besides, the information data sharing mechanism in Vietnam is also mentioned in this section

2.6.1. History of Vietnam e - Government

ICT has been being used in the Vietnam public sector for more than 20 years and the advent of the Internet has given this usage more than just a new name e-Government and a higher profile. During the last 20 years, 4 projects have been implemented: two of which were financially supported by the French government (in the 1991 – 1993 and 1994 – 1996 periods); one invested by the State budget (a part of the national IT program, period 1996 – 1998); and the other under the Prime Minister’s Decision in 1997. However, the achievements were still very limited. Going along with the new trend of e-Government in the world, in 2001 the Vietnam government decided to start the new project (project 112) which was considered as the milestone for e-Government in Vietnam. Unfortunately, in April 2007 the project 112 was halted (Obi and Nguyen Thi Thanh Hai March 2010).

2.6.2. DPSIR in evaluating Vietnam e - Government

a. DPSIR overview

The Driver – Pressure – State – Impact – Response (DPSIR) methods is a framework that can be used to support the decision makers in many steps of decision process. DPSIR was initially developed by the Organization for Economic Co-operation and Development (OECD 1994) and has been used broader by many other organization including United Nation and European Environment Agency. DPSIR has been widely used for many applications. One of them is Sustainable development, the target of an OGD initiative.

According to the DPSIR framework, there is a chain of causal links. The first element is Drivers or Driving forces (human activities, social activities) then go to Pressures (social development, corruption) through States (state of society, e-Government and OGD in Vietnam) that Impact on the social, human activities, eliminate the cumbersome procedures eventually leading to political Responses in preventing, compensating, ameliorating or adapting to changes in state of the society.

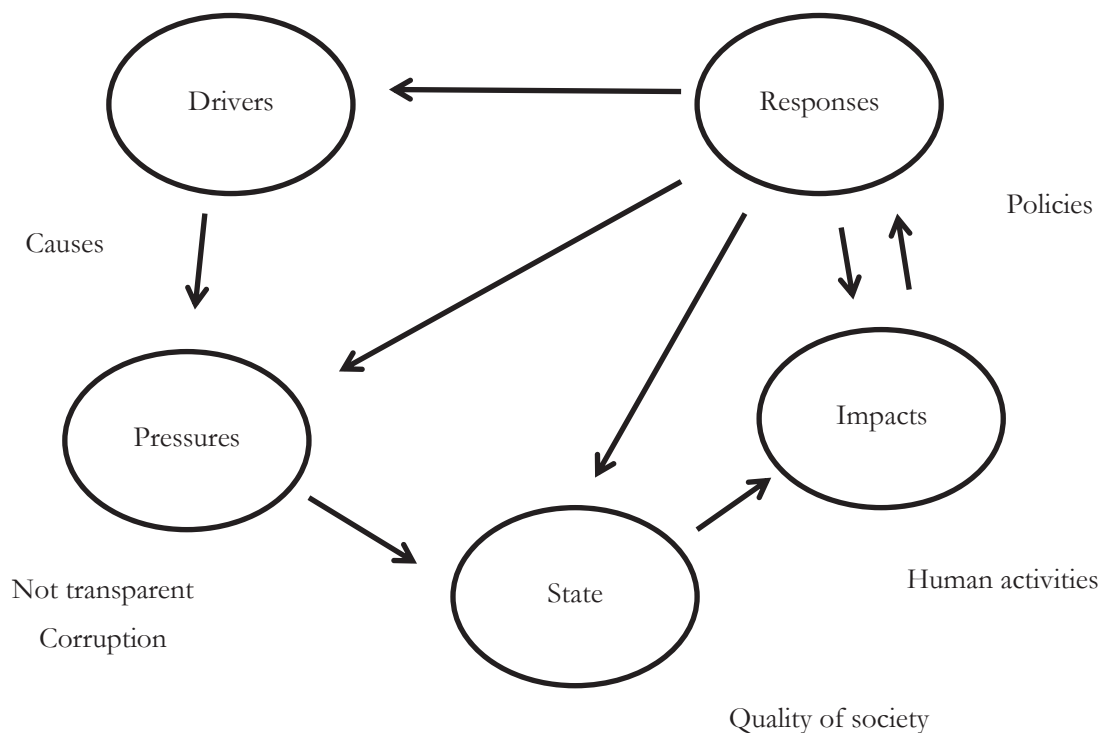


Figure 2.5. The DPSIR framework (Kristensen 2004)

DPSIR is a very simple and transparent framework with five concepts that are obvious to everyone. It helps to enhance communication between scientists and stakeholders by simplifying the complex connections between factors. Especially, the elements of DPSIR can be mapped onto other frameworks for developing models or decision support tools which can be used to evaluate and compare decision outcome.

b. DPSIR for Vietnam e-Government

The figure below shows the DPSIR method applied for e-Government in Vietnam. This overall picture is very consistent for evaluating the status of e-government development in Vietnam. It stretches from the district level to central level.

Drivers

The driver factors here can be the rapid growth in social and economy in Vietnam or the political and cultural factors related. Besides, citizens demand for accountability and transparency. They also need on – demand services. Meanwhile the innovation comes from anywhere or anyone at any time, especially on technology. ICT has been being used in Vietnam public sectors for 20 years. During the last 20 years, 4 projects have been implemented but the result is still limited. In 2001, Vietnam government started a huge project called 112 but it was failed and halted in April 2007. Since then, the Prime Minister continues to direct and decide about the application of information technology communication in the operation of state agencies.

Pressure

The most important thing is the requirement of synchronous development between technology and human resources to meet e-government demand and enhance efficiency in State governance for serving the citizens. The failure of project 112 adversely affecting people, the 112' objective at that time is to build up the State administrative management computerization systems, particularly national databases and integrated database centres, training the State public servants, providing online-services and lastly boosting the reform of administrative procedures. There are many reasons for the failure of project 112 including asynchronous development, human resources did not meet computerization quality, corruption, dubiousness in project operation and the lack of government leaders in directing the project.

However, in August 2010, the Prime Minister made a decision number 1605/QĐ-TTg to approve national program for ICT application in the State agency's activities in the period 2011 – 2015 orient to 2020. The overall objectives of this program are:

- Develop and complete ICT infrastructure, provide the foundation of e-government development.
- Widespread application of ICT in the internal operations of state agencies towards raising labour productivity, reducing labour costs.
- Provide information, online services at broad and high level for people and businesses, making the operation of State agencies more transparent, better serving people.

Each year, the United Nation E-government survey assesses the level of e-government development from every country around the world, including Vietnam. This annual assessment is not only chance for Vietnam who can observe and learn from other countries, but also the challenge for the Vietnam government in the maintenance and development of e-government.

Status

According to Mr Nguyen Thien Nhan, former Deputy Prime Minister in August 2012, all provinces have had government portal. There are also about 9800 level 1 and 2 online services, 860 level 3 services and 11 lever 4 online services (highest level). The figures below show the rank of Vietnam e-Government


Country	E-Government 2012	Rank 2012	Rank 2010	Rank Change
 Singapore	0.8474	10	11	+1 ↑
 Malaysia	0.6703	40	32	-8 ↓
 Brunei Darussalam	0.6250	54	68	+14 ↑
 Viet Nam	0.5217	83	90	+7 ↑
 Philippines	0.5130	88	78	-10 ↓
 Thailand	0.5093	92	76	-16 ↓
 Indonesia	0.4949	97	109	+12 ↑
 Lao People's Democratic Republic	0.2935	153	151	-2 ↓
 Cambodia	0.2902	155	140	-15 ↓
 Mvanmar	0.2703	160	141	-19 ↓

Figure 2.6. E-Government development index

Country Data Comparison	
Compare to: <input type="text" value="World Average"/>	
E-Government Index ?	Online Service Index ?
Viet Nam	Viet Nam
0.522	0.425
World Average	World Average
0.496	0.440
Infrastructure Index ?	Human Capital Index ?
Viet Nam	Viet Nam
0.397	0.743
World Average	World Average
0.326	0.721
E-Participation Index ?	
Viet Nam	
0.105	
World Average	
0.268	

Figure 2.7. Compare to world average

Country Data Comparison	
Compare to: <input type="text" value="Sub-regional Leader"/>	
E-Government Index ?	Online Service Index ?
Viet Nam	Viet Nam
0.522	0.425
Leader: Singapore	Leader: Singapore
0.847	1.000
Infrastructure Index ?	Human Capital Index ?
Viet Nam	Viet Nam
0.397	0.743
Leader: Singapore	Leader: Singapore
0.692	0.850
E-Participation Index ?	
Viet Nam	
0.105	
Leader: Singapore	
0.947	

Figure 2.8. Compare to South East Asia leader – Singapore

Although the ranking of e-government in Vietnam has increased 7 levels, from No. 90 to No. 83, but Vietnam e-government still have the e-participant criteria with only 0.1 point, and e-Information index with 0 point. The e-government development index is still at low level compare to the world average especially to Singapore, the South East Asia leader.

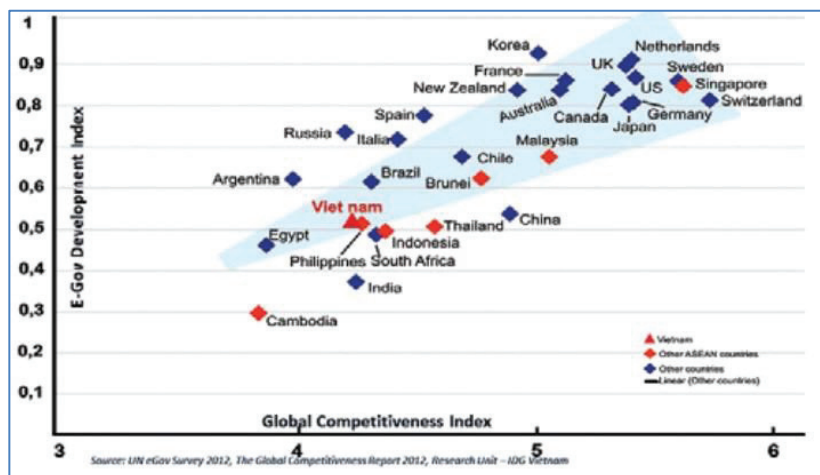


Figure 2.9. Position of Vietnam e-Government in the world e-Gov map

Impact

In some ways, E-government reduces corruption, takes away discretion, therefore curbing opportunities for every arbitrary action. It also increases chances for exposure by maintaining detailed data on transactions, making it easier to track and link the corruption with their wrongful acts. By making rules more transparent and simple, E-Government encourages citizens and businesses to question unreasonable

rules and procedures and their arbitrary application. The list below gives examples of some types of information can achieve transparency through e-Government, discouraging corrupt bureaucrats in government:

- The rules and procedures of government services.
- Result of the Government's decision.
- Land information data, payment of taxes etc.
- The Government's decision that grant such licenses and travel documents for goods etc.

Overall, e-government has impact on citizens as well as businesses such as:

- Provide sufficient information for all subjects.
- Simplifying administrative procedures.
- Ensure the handling of administrative procedures publicity, equity, reliability, stable and timely.
- Save time and money.
- Increased convenience when using the services of the Government.

Response

According to Mr Nguyen Thien Nhan, Former Deputy Prime Minister in his speech in 2012 e-government symposium, Ministry of Natural Resources and Environment is leading departments to build up specialized database integrated from bottom to top, in which, cadastral data and natural resources data are under construction. The financial sector with its characteristic and investment with hundreds of millions dollars have completed synchronously specialized database.

Besides, some provinces are underway to build and complete the government portal, improve the quality and quantity of online services.

DRIVERS	PRESSURES	STATUS	IMPACTS
<ul style="list-style-type: none"> - Rapid growth in social and economy. - Demand for accountability and transparency. - The need of on – demand services. - Innovation comes from anywhere or anyone at any time. - International integration. - Increased 	<ul style="list-style-type: none"> - The requirement of synchronous development between technology and human resources. - Enhance efficiency in State governance for serving the citizens. - The failure of project 112 adversely affecting people. - In August 2010, the Prime Minister made a decision number 	<ul style="list-style-type: none"> - Vietnam was ranked at number 83 in e-government development with about 9800 level 1 and 2 online services, 860 level 3 services and 11 lever 4 online services (highest level). - All provinces have had government portal. - However, some 	<ul style="list-style-type: none"> - Reduces corruption. - Takes away discretion. - Increases chances for exposure by maintaining detailed data on transactions, making it easier to track and link the corruption with their wrongful acts. - E-Government encourages citizens and businesses to question unreasonable rules and procedures and their

<p>competition between private enterprises and state agencies.</p>	<p>1605/QD-TTg to approve national program for ICT application in the State agency's activities.</p> <ul style="list-style-type: none"> - Annual assessment by the United Nation E-government survey. 	<p>index of Vietnam e-government is still very low such as e-participant criteria with only 0.1 point, and e-Information index with 0 point.</p>	<p>arbitrary application.</p> <ul style="list-style-type: none"> - Simplifying administrative procedures. - Save time and money. - Vulnerable to attacks by hackers.
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<p>RESPONSE</p> <ul style="list-style-type: none"> - Build up specialized database integrated from bottom to top (synchronous). - Keep building and completing the government portal, improve the quality and quantity of online services. - Focus on developing E-GOVERNMENT: DRIVING Collaboration, TRANSPARENCY AND CITIZEN Engagement.

2.6.3. Data sharing mechanism In Vietnam

Information sharing mechanism for science and technology has been initiated rather early in Vietnam, since 1980s. The National Agency for Scientific and Technological Information (NASATI) - under former National Committee on Sciences and Technology, now MOST - is responsible for management, update and sharing the most widely science and technology information network (Figure 2.12).

In the chart below, NASATI plays a central role in science and technology information and data exchange. At the lower level are 63 Information and Document Centres, which belong to provincial DOSTs, and information and library centres/divisions at research institutes/universities (Figure 2.10). NASATI has 200 staff and an annual budget of approx. 2 million USD. Of which 1 million USD from this budget for document procurement (both hard copy and digital form) and the rest for information network establishment and maintenance (VISTA, VINAREN). At the provincial level, the science and technology information centre has only 5-10 staff and annual budget of 10.000 – 15.000 USD. There is an existing of the sharing mechanism between science and technology information centres in term of resources (mostly digital document) and technical issues (methodology, training, standards). Recently, many international standards for science and technology information exchanged were adopted into science and technology information system of Vietnam via international cooperation projects (MARC 21, Dublin core on Metadata etc.) (Hoang Van Thang, Vu Minh Hoa et al. 2010).

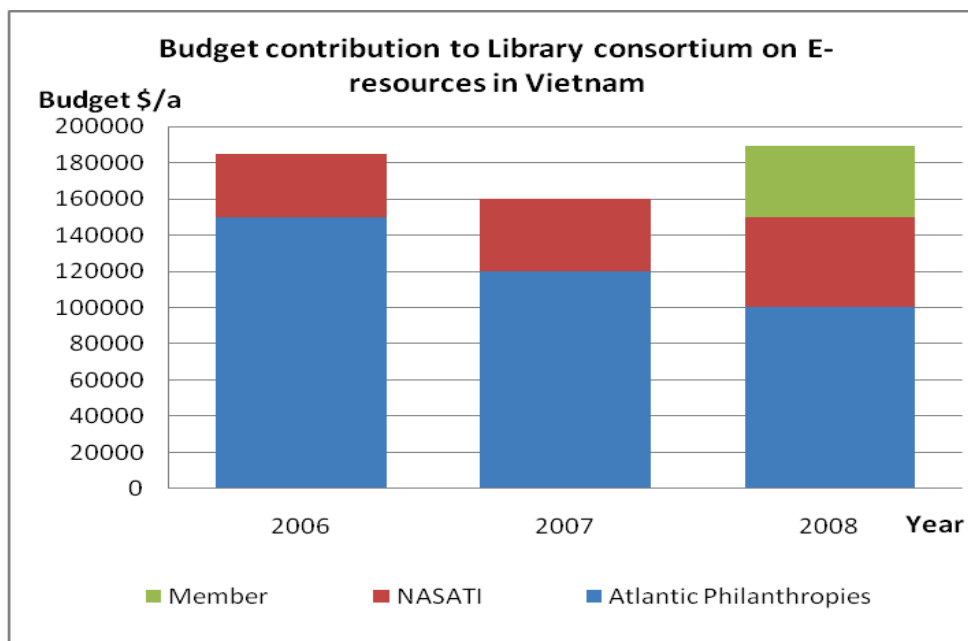


Figure 2.10. Budget contribution to library consortium on e-resources in Vietnam

Science and technology exchange mechanism has been improved recently because of the development of and popularity of internet. The library consortium was established for sharing books and electronic journals. Library consortium on e-resources in Vietnam shares capacity to assess e-resources with very low fees (EBSCO, Blackwell, INASP/PERI, VJOL...), led by NASATI and 50 members (institute/university libraries/information centres), budget contribution for e-resources procurement by members is increased.

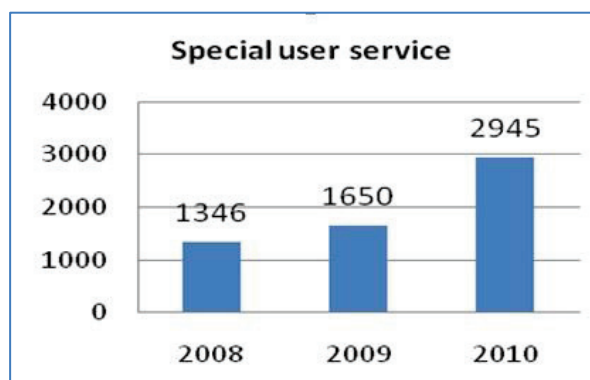


Figure 2.11. Special user services in e-resources

Since 1998, the Special Reader services package for exploring online full text databases has been offered by NASATI. With this service users can access to million records/full text records situated in national and/or international science and technology databases. They are the Comprehensive and Inter-discipline Database on Science, Technology and Environment (Abstract/150.000 full text articles); Database on completed R&D projects (7000 Full texts reports); Dozens of imported overseas databases on CD-ROM; Science@Direct (2184 online full text journals); Springerlink (2000 online journals); Proquest Central (11.000 online full text journals); ACS – American Chemistry Society; EBRARY (35000 full text books); ISI Knowledge (8600 journals)... To subscribe to this service, users have to pay an annual fee of 300.000

VND for the Centre. The user number of this service has been increased recently and distributed nationwide.

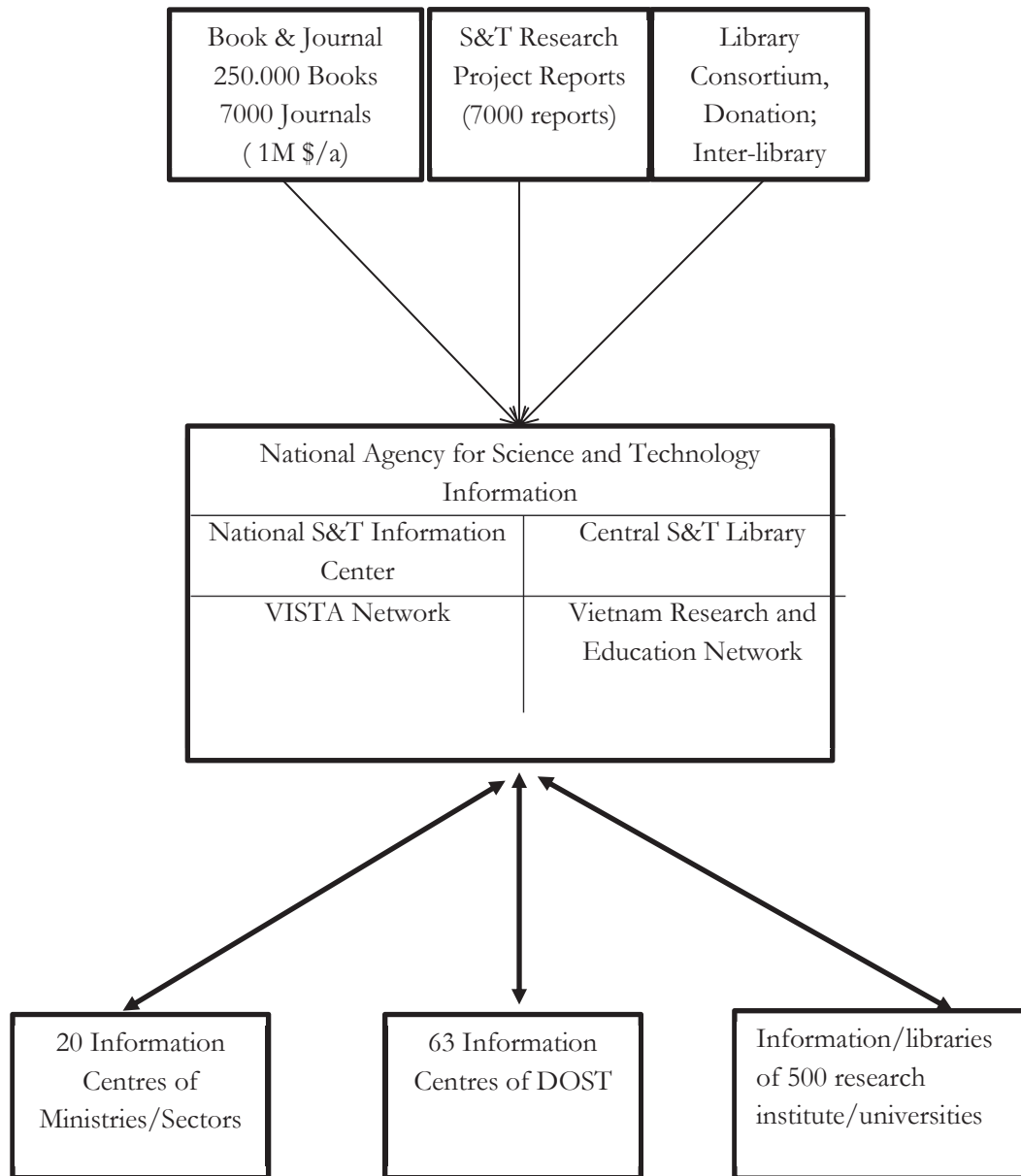


Figure 2.12. Network for Science and Technology Information Exchange in Vietnam

2.7. Why system dynamics?

System dynamics is a method for studying and managing complex feedback systems (Sterman 2000). One of the basic principles of system dynamics is that a system's performance over time is closely linked to an underlying structure of endogenous feedback processes. So that patterns of behaviour in the system are explained mainly by endogenous processes, not by exogenous factors. The processes of modelling and simulation are mainly intended to learn about how the world works, helping policy makers to improve their way of thinking (Luna-Reyes and Gil-Garcia 2011). Usually, a computer model is needed because of human limitations to predict and manage the behaviour of these complex structures. In this way, the

modelling process becomes a formal way of developing and testing hypotheses about the impact of feedback processes on specific problematic behaviours in a system. This view has been successfully applied in the public sector. Many examples can be drawn particularly from the System Dynamics Group at the University at Albany, who applies system dynamics to understand public policy problems with groups of managers since 1987 (Luna-Reyes and Gil-Garcia 2011). System dynamics has been also successfully used to better understand information technology problems in organizations.

System dynamics practitioners have described the modelling process as a series of steps going from problem understanding to model validation and use (Sterman 2000). The modelling process involves analysis of problem dynamics and problem structure. In this way, a system dynamics computer model is the result of an iterative process of comparing and contrasting a set of assumptions about the system structure and the known behaviours of it. In fact, system dynamics is best suited for problems that show dynamic behaviours, particularly when the pattern can be explained by actors' decisions and actions, as endogenous, recursive relationships represented by feedback loops.

A feedback loop is a closed path of causal links. "A feedback loop exists when decisions change the state of the system, changing the conditions and information that influence future decisions" (Richardson, Andersen et al. 2004). A reinforcing loop (or positive loop) represents a changing process where the characteristic is growing, decaying, destabilizing, or accelerating. A counterbalancing loop (negative or balancing) represents a process implying resistance to change, goal seeking or stabilizing behaviour.

A common structural representation of system dynamics simulation models are stock-and-flow diagrams (see Fig. 4). Stocks (or state variables) represent accumulations in the system (rectangles in the figure), and are increased or decreased only by inflows or outflows, which represent activities in the system. The "clouds" at the origin of the inflows in the figure represent conceptual boundaries of the system. That means things flow from somewhere outside the representation of the problem. This graphical representation is consistent with the basic assumptions of institutional theory and the technology enactment framework. As shown in Fig. 4, the Organizational and Institutional Framework either constrains or enables organizational activity oriented to the development of a particular Technology Enactment. It is also demonstrated that organizational activity can be represented as a combination of actors' effort and actors' effectiveness. We can think that institutions – cognitive, normative or regulative – constrain or improve organizational activity by constraining or promoting either effort or effectiveness. Technological artefacts accumulated in the stock of Technology Enactment are just software components, processes, or documentation with no particular characteristics at all. However, technological characteristics are co-created along with these artefacts as shown in Fig. 4. It is reasonable to expect that in this co-creation process, different artefacts have different levels of any characteristic such as quality. Subsequently, needs that emerge from the average characteristic of a particular technological development can potentially create pressures to modify the institutional framework. The feedback loop in the figure (marked with thick arrows) represents the recursive interactions among variables or the process of enacting technology.

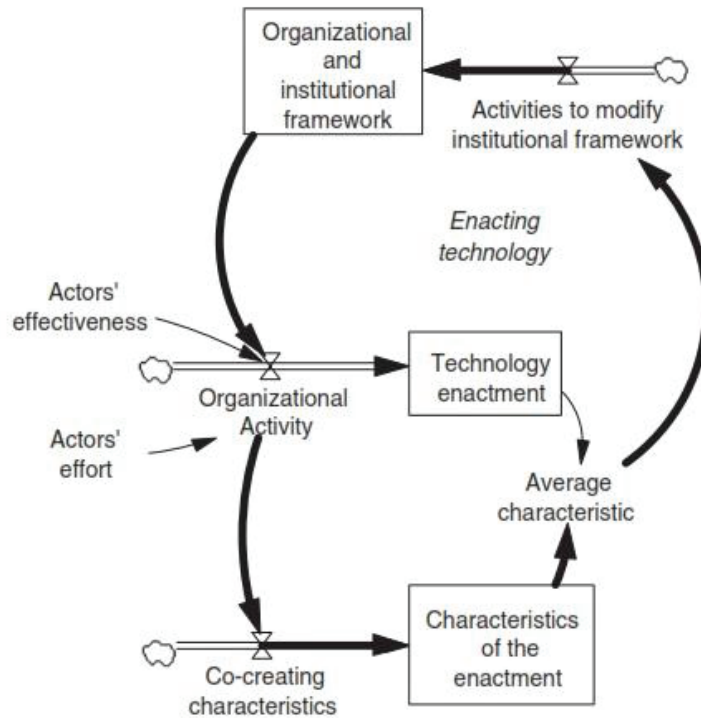


Figure 2.13. A system dynamics stock and flow diagram (Luna-Reyes and Gil-Garcia 2011)

2.8. Conclusion

The chapter has brought some definitions of OGD, Open Government and also their characteristics. Besides, the author put some effort to give an overview of current e-Government and OGD situation from some other countries. Understand the impacts, difficulties, challenges and benefits will be very useful for Vietnam in opening government data. Furthermore, the history, current status of Vietnam e-Government has also been stated along with the mechanism of sharing data between government, citizens and scientists. Because of the complex of OGD, system dynamics will be used for modelling this process. System dynamics is very useful in managing and understanding complex feedback systems.

3. DATA COLLECTION PROCESS AND STRATEGY, METHODS

3.1. Introduction

In chapter 2, the definition and characteristic of Open Government and Open Data has been defined, generate out of that way the framework for activities to open government data. Following that framework, this chapter will address the research objectives 2 and 3, which will explore the factors, the tool that impact modelling and visualizing the dynamics of opening government data mainly based on the results of interview and survey during the fieldwork conducted in Hanoi, Vietnam.

This chapter is built up with the following subsections: section 3.2 describes the field work method and design. Section 3.3 provides the activities needed for collecting data on the field. Section 3.4 has some conclusion of the data collection process.

3.2. Field work method and design

For a better efficiency of data collection, before going to real field trip, a strategy with targets, process and methods that fit for each target was conducted. The data needed here come from two sources, primary data and secondary data, which are also collected during the field work.

3.2.1. Fieldwork objectives

A large number of research methodologies have been identified, a case study is one of those. Case studies involve an attempt to describe relationships that exist in reality, very often in a single organisation. Case studies may be positivist or interpretivist in nature, depending on the approach of the researcher, the data collected and the analytical techniques employed. Reality can be captured in greater detail by an observer-researcher, with the analysis of more variables than is typically possible in experimental and survey research. Case studies can be considered weak as they are typically restricted to a single organisation and it is difficult to generalise findings since it is hard to find similar cases with similar data that can be analysed in a statistically meaningful way. Furthermore, different researchers may have different interpretations of the same data, thus adding research bias into the equation (Benbasat, Goldstein et al. 1987).

The case study is considered to be viable for three reasons:

- It is necessary to study the phenomenon in its natural setting;
- The researcher can ask "how" and "why" questions, so as to understand the nature and complexity of the processes taking place;
- Research is being conducted in an area where few, if any, previous studies have been undertaken.

In this research, in order to answer research questions regarding to objective 3, a case study was conducted in Hanoi, Vietnam with 2 main objectives as follow:

- Objectives 1: to acquire responds and opinions from some government leaders and maybe some stakeholders. The results would be the factors or variables for the dynamics models, especially for evaluating these models.
- Objectives 2: to collect primary data and further related secondary data for the interpreting procedure phase of the research. Secondary data was the legal documents and samples from government leaders or some other researchers. For further purpose was to observe the interaction and behaviour of these leaders.

According to these 2 main objectives, there will be 2 main activities on the strategy of data collection. First is to archive the primary data from structured or semi-structured interview. Secondary is to find some document related to the open government data.

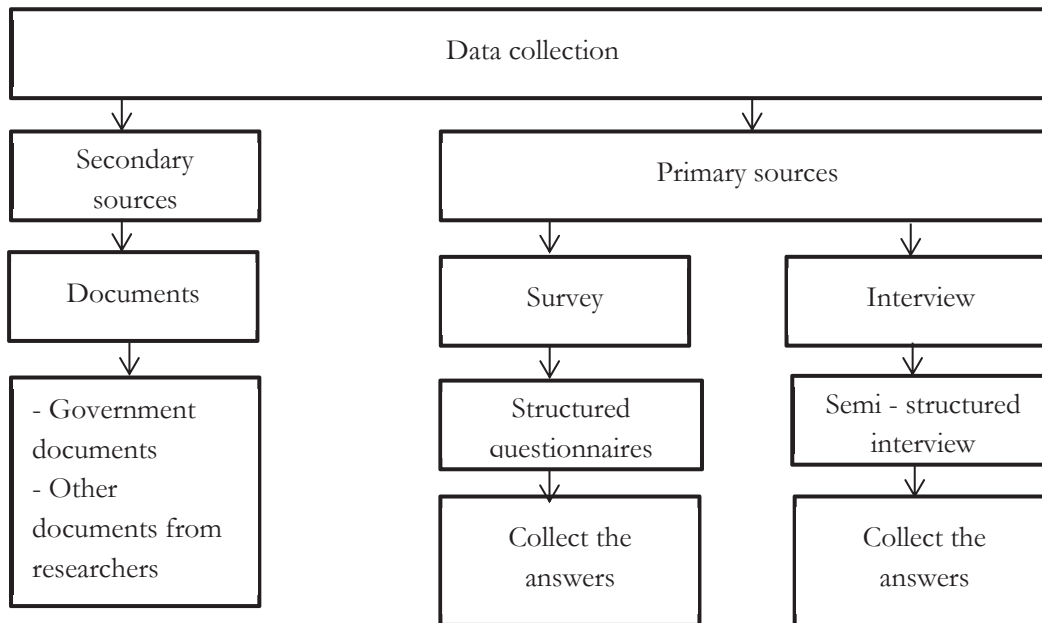


Figure 3.1. Data collection strategy

3.2.2. Primary data sources

a. Data collection method

To collect data, social scientists make use of a number of different data collection strategies. It can be experiments and quasi – experiment or surveys, interview using structured questionnaires etc. In this research the author will use the survey and interview with structured questionnaires and semi – structured questionnaires for the primary data collection. These methods typically involve collecting data on a large number of variables from a large and representative sample of respondents.

Structured/semi – structured questionnaires: open – ended and closed – ended interview schedule

This research uses semi – structured interviews for some government leaders and a survey for some participants from agencies that related to the geospatial data. They are General Department of Land Administration (GDLA), Department of Survey and Mapping Vietnam (DoSM), Vietnam Institute of Geodesy and Cartography (VIGaC), National remote sensing centre (RSC). The questions focus on their attitude of open government geospatial data, the institutional environment, costs and benefits they expect, strengths, weaknesses, opportunities, and threaten of open government data in Vietnam.

b. Interview/questionnaires designing

Semi – structured interviews and surveys may include both open – ended and closed – ended questions. All of the questions were conducted for understanding the context of OGD in Vietnam, its characteristics, definitions etc. The questions and their structure are shown in the matrix below.

Definitions, characteristics	Description	Data collection method	Sources for data collection	Key questions
Characteristic				

s of open government data				
Complete	All public data is made available. Public data is data that is not subject to valid privacy, security or privilege limitations	Interview/ survey	Director of GDLA, Director of DoSM	<ul style="list-style-type: none"> - Questions about the policy of OGD. - Questions about the data that will be made available
Primary	Data is as collected at the source, with the highest possible level of granularity, not in aggregate or modified forms.	Interview/ survey Document analysis	<ul style="list-style-type: none"> - Staff of GDLA, DoSM, VIGaC, RSC - White paper, policy report at http://egov.org.vn 	<ul style="list-style-type: none"> - Questions about the source of data. - Questions about the agency that manage and store data.
Timely	Data is made available as quickly as necessary to preserve the value of the data.	Interview/ survey	Director of GDLA Director of DoSM	<ul style="list-style-type: none"> - Questions about the orientation of OGD
Accessible	Data is available to the widest range of users for the widest range of purposes.	Interview/ survey Document analysis	<ul style="list-style-type: none"> - Director of GDLA - Director of DoSM - White paper, policy report at http://egov.org.vn 	<ul style="list-style-type: none"> - Questions about the target users of OGD. - Question about accessibility of OGD
Machine processable	Data is reasonably structured to allow automated processing	Interview/ survey Document analysis	<ul style="list-style-type: none"> - Staff of GDLA, DoSM, VIGaC, RSC - White paper, policy report at http://egov.org.vn 	<ul style="list-style-type: none"> - Questions about the form of data. - Questions about the structure of data.
Non-discriminatory	Data is available to anyone, with no requirement of registration.	Interview/ survey	Director of GDLA Director of DoSM	<ul style="list-style-type: none"> - Questions about the privilege of accessing to OGD.
Non-proprietary	Data is available in a format over which no entity has exclusive control	Interview/ survey Document analysis	<ul style="list-style-type: none"> - Staff of GDLA, DoSM, VIGaC, RSC - White paper, policy report at http://egov.org.vn 	<ul style="list-style-type: none"> - Questions about standardise the data.
License-free	Data is not subject to	Interview/	Director of	<ul style="list-style-type: none"> - Questions about the

	any copyright, patent, trademark or trade secret regulation. Reasonable privacy, security and privilege restrictions may be allowed	survey Document analysis	GDLA Director of DoSM - White paper, policy report at http://egov.org.vn	source of data. - Questions about the data owner commitment.
Characteristics of open government				
Transparency	Transparency is the principle that government processes and actions should be visible to citizens. This means government making available more official information, making the available information more useful, and making that information easy to access	Interview/survey Document analysis	- Director of GDLA Director of DoSM - Staff of GDLA, DoSM, VIGaC, RSC	- Questions about the current status of government, the transparency in government activities.
Collaboration	Collaboration is the principle that citizens can and should take an active role in government processes	Interview/survey Document analysis	- Director of GDLA Director of DoSM - Staff of GDLA, DoSM, VIGaC, RSC	- Questions about the collaboration of citizens in building, updating, managing information
Participation	The principle of participation holds that citizens' right of access extends beyond receiving information to include providing input and feedback	Interview/survey Document analysis	- Director of GDLA Director of DoSM - Staff of GDLA, DoSM, VIGaC, RSC	- Questions about the interaction between government and citizens through internet (online).

Table 3.1. Data collection matrix

3.2.3. Secondary data sources

For some social research questions, it is possible to use data collected earlier by other researchers or for other purposes than research, such as official statistics, administrative records, white paper, policy reports, or other account kept routinely by organisations. Those documents were necessary for insightful

understand the theory about framework of organisation activities. In addition, it also support validating what interviewee's responses in the interview.

3.3. Fieldwork activities

The process and pre-process of collecting data will be presented in this section. The study area will also be introduced here.

3.3.1. Study area

The study area in this research is Hanoi, the capital city of Vietnam. Hanoi is located in the centre of Red River delta, which is in the East North of Vietnam. Hanoi is a city that has a long history with a lot of changes in the economic, social and cultural. Hanoi has also gone through many changes in the administrative boundaries. By 2013, Hanoi has an area of 3323.6 square km, with a population of about 6.7 million people with 10 inner districts, 1 town and 18 outer districts. Among 6.7 million people, Hanoi has 60% of the population are farmers, which will affect in an OGD initiative.

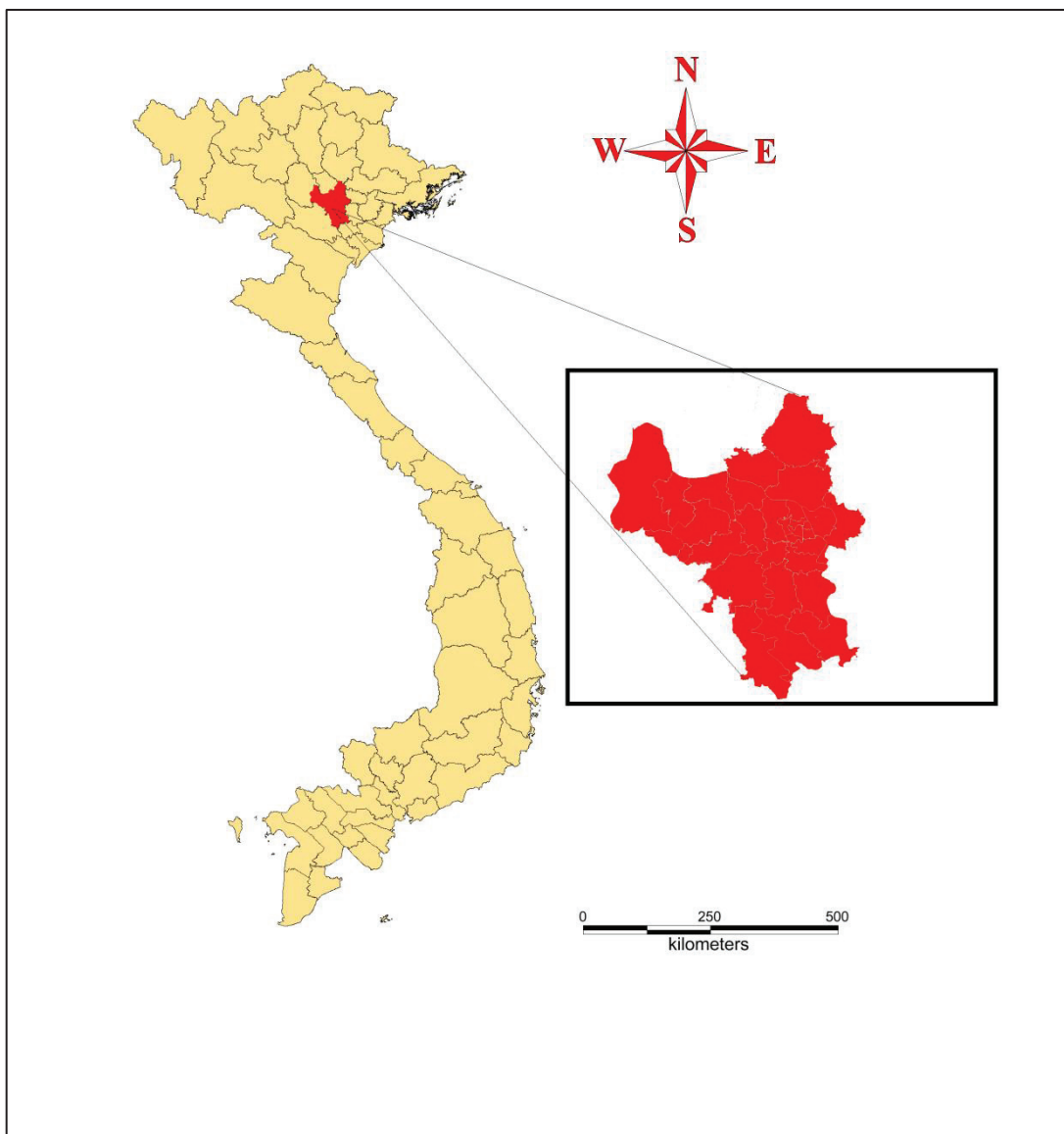


Figure 3.2. Study area

3.3.2. Data collection

The data collection process has been taken in Hanoi, Vietnam with some main activities as follow:

- Prepared a data collection matrix before conducting question.
- Modified questions by having conversation with people who have experience in e-Government and open government.
- Contracted interviewees and arranged the interviews.
- Went to field to talk with some leaders.
- Collect secondary documents.

a. Primary data activities

Interview and survey are the two main activities for collecting primary data in this study. The process of these activities can be divided into 4 steps as following:

• **Preparation phase**

Before going to the field, everything should be prepared first such as data collection strategy, questionnaires, discussion with people that have experience and knowledge about Open Government and OGD. Some documents and researches about these terms will play an important role for modifying and testing questions. The author also uses a matrix for data collection strategy with the characteristics and definitions about these terms.

• **Identify the interviewees/survey respondents**

Ministry of Natural Resources and Environment is the organism in charge for managing data and information. However, the agencies under the Ministry are the direct responsible units in data management and maintenance. The MoNRE has 41 departments and institutes, 4 of them will be the targets for the interview and survey, who is directly related to the geospatial data and information, they are General Department of Land Administration (GDLA), Department of Survey and Mapping Vietnam (DoSM), Vietnam Institute of Geodesy and Cartography (VIGaC), National remote sensing centre (RSC).

- General Department of Land Administration (GDLA): is the organisation that can provide information about land such as: cadastral maps, procedures of land and property registration, land mortgage, land use planning map etc.
- Department of Survey and Mapping Vietnam (DoSM): is the organisation that has every kind of maps and information related to the surface of Vietnam.
- Vietnam Institute of Geodesy and Cartography (VIGaC): is the organisation that has function in scientific research and technology development in surveying and mapping, post-graduate educating in surveying and mapping.
- National Remote sensing centre (RSC): is the organisation that has function in investigation, evaluation, monitoring of natural resources and the environment by using remote sensing technology and geo informatics for supporting national management and national economy, two mains activities that support this research are
 - + Develop and update databases National Geographic, establish and modify the existing terrain, sea and islands map with remote sensing technology and geo informatics, supporting the planning and management of boundary, sea and islands;

+ Develop geographic information systems, land information systems using remote sensing technology and geo informatics, supporting management, economic development of the national industry.

- **Statistics of interviewees and survey respondents**

Before going into the field, numbers of expected interviewee was set out. The table below shows the number of expected interviewees, survey respondents and number of interviewee and respondent conducted.

Name of interviewee's organisation	Number of interviewee expected	Number of interviewee conducted
General Department of Land Administration (GDLA)	3	1
Department of Survey and Mapping Vietnam (DoSM)	3	1
Vietnam Institute of Geodesy and Cartography (VIGaC)	2	2
National Remote sensing centre (RSC)	2	2

Table 3.2. Statistic of interviewee expected and conducted

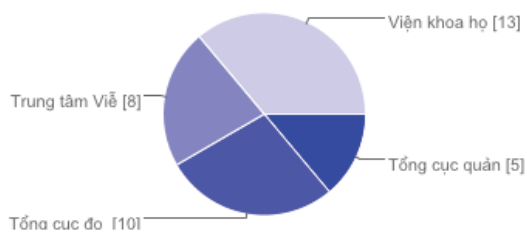
The number of survey respondents conducted is shown below using Google Drive surveyor:

37 responses

[View all responses](#) [Publish analytics](#)

Summary

Xin cho biết đơn vị công tác của ông/bà



Tổng cục quản lý đất đai	5	14%
Tổng cục đo đạc và bản đồ	10	28%
Trung tâm Viễn thám quốc gia	8	22%
Viện khoa học đo đạc và bản đồ	13	36%

Figure 3.3. Summarise of survey respondent's organisation

Name of respondent's organisation	Number of respondent expected	Number of in respondent expected
General Department of Land Administration (GDLA)	10	5
Department of Survey and Mapping Vietnam (DoSM)	10	10

Vietnam Institute of Geodesy and Cartography (VIGaC)	10	13
National Remote sensing centre (RSC)	10	8

Table 3.3. Statistic of survey respondents expected and conducted

- **Contact the interviewees and survey respondents**

- Contact the interviewees: the interviewees are the leaders and staffs at state agencies so that to contact them, first I need the introduction from my professors at Hanoi University of Science. Second, sometime I have to provide the introduction letter from ITC to prove that I am doing Msc at ITC., the results of the interview is just for scientific research. They will arrange date and time also the location for the interview.
- Contact the survey respondents: the survey was sent to another staff by their leaders after interviewing. I also used the relations of my professors. A link of survey was sent to the survey target using Google Drive Surveyor.

b. Secondary data activities

The secondary data was collected from internet at <http://egov.org.vn>, some was collected from interviews. They will include:

- White paper and policy report at the e-government annual symposium.
- Project and policy for NSDI
- Project and policy for Open Government and OGD.

3.3.3. Field work limitation

The term e-Government and especially Open Government in Vietnam are still very sensitive. As I observed in my university (Hanoi University of Science), the term e-Government was changed to one door government in the name of refresher course taken by ITC on September 2013. Besides the field work had to face many limitations such as:

- The government leaders sometimes did not allow recording the interview, taking photos. They also could not provide rules or regulations mention about that prohibition or proper explanation.
- It was very difficult to ask the interviewees to answer the open questions.
- Interviewees sometimes tried to evade the questions.
- It took a lot of time contacting the government leaders or some government official. They were always busy or not at the office.
- Many internal documents could not be accessed.

3.4. Conclusion

In this chapter, a case study was conducted in Hanoi, Vietnam to archive 2 objectives from data collection. A data collection matrix was used to support the strategy of interview/survey. Some of the characteristics of OGD and Open Government were used to find information for secondary data collection. The results of the 2 objectives are shown below:

- Data collection objective 1: the answer of this objective is interpreted in chapter 4 using the results of survey/interview.

- Data collection objective 2: all of the documents, reports are provided at Vietnam e-Government website (<http://egov.org.vn>). Some of the other documents, theses, researches about e-government, open government data were given by the staff at GDLA, Hanoi University of Science. The details of those documents are categorized in chapter 4.

4. PRESENTATION AND INTERPRETATION OF RESULTS OF DATA COLLECTION

4.1. Introduction

This chapter provides the results of interview, survey and secondary data from fieldwork, which regard to Open Government and Open Government Data in Hanoi, Vietnam. It aims to address research objective 3 with research questions as follows:

- How e-Government policy embracing OGD is carried out? What are the factors that impact on the process of opening up government data?
- What are the factors or indicators that influence in the dynamic model?

Through the interpreting process, the factors and variables that impact in the process of open government data are determined, which are necessary for designing dynamics model in the next chapter. This chapter is built up in 3 sections. Section 4.2 bring all of the results from interview and questionnaires, section 4.3 address some results from secondary data collection, section 4.4 is the conclusion.

4.2. Results from interviews/questionnaires

This study uses both interview and survey methods for institutional leaders and their staffs. There are 2 semi – structured interviews for the leaders, 4 semi – structured interviews for the staffs at institutional agency and 37 structured surveys were conducted for the staffs. The results of interviews and survey are synthesized below in the next sub – sections with the definitions and characteristics of Open Government and Open Government Data.

4.2.1. Results from interviews

a. Open government

- **Transparent**

According to the government leaders who were interviewed, the Vietnam government has been becoming more and more transparent. The government have developed very good e-government and online services. There is a lot of information about government activities and information was published. Government and the direct leader here is the Prime Minister made many decisions and resolutions towards the more transparency. For example the Party's Central Executive Committee of 10th made a resolution number 19-NQ/TW in the 31st October 2012 with the content: prioritize investment in building databases, land information system and assets related to land towards modern, open, transparent, serving multiple purposes; gradually shift to electronic services in the land sector. Strive to 2020 basically finish the construction of a land information system.

- **Collaboration**

One of the typical examples of such collaboration, is PPP (public – private partners) towards the decision 71/2010/QĐ-TTg in the 09th November 2011 of the Prime Minister, private and public both invest in construction and also benefit from investment and sharing, here emphasise on the public-private participation in the governance.

According to Mr Do Duc Doi, Director at Centre for Storage and Inform land, Ministry of Natural Resources and Environment, people and especially businesses that have been involved in the process of building a land database for long time. A typical example is in 2012, households had to make the

declaration on non-agricultural land information, set a stage for the construction of land information system.

- **Participation**

The online reporting for some localities is now developed and implemented. Besides, online services and e-government is increasing in quality.

b. Open Government Data

- **Complete**

The interviewees were asked for the data that will be made available. For data related to land, government made regulations that housing, land use planning, land value have to be made available, land users name not be made public due to the civil law, personal information such as the name of land owner is not published available without citizen's allowance. All of the information about feature that exists in the surface will be publish soon, according to the resolution number 13-NQ/TW in 16th January 2012.

- **Primary**

The interviewees were asked about the source of the data, also the organisation that take responsibility in managing and maintaining data. MoNRE is the organisation in charge, GDLA, DoSM and some other agencies under the MoNRE are the direct managing units.

- **Timely**

One of the most difficult problems for updating data is the legislation of citizen, the law abiding by people is not high, for example, when a person sell his land without reporting to the agency, so that the information that was made available will not be fully updated.

- **Accessible**

All of the citizen will have right to access the data that is made available. The Vietnam NSDI is now building, set a stage for organisations also for people to access and share the data.

- **Machine process able**

The information will be standardized. Data can be in the normal form such as. doc., xls., pdf or in the open format.

- **Non – discriminatory**

Public data need to be in compliance with the principles and laws of the state. In addition, the data also need to be assured about the security situation to avoid being attacked by hackers

- **Non – proprietary**

The data will be in easy and simple format, also in open source format. Besides, the data will also be provided for mobile apps.

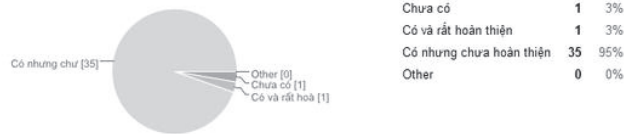
- **License – free**

The data will be also in open source.

4.2.2. Results from survey

A survey was conducted using Google Drive Surveyor. Respondents were also asked about the characteristics of Open Government Data. The survey is in Vietnamese, the results and statistics will be summarised in English below:

Thưa ông/bà, theo ông/bà, hiện nay ở Việt Nam có chính sách nào về việc công khai dữ liệu chính phủ hay không, đặc biệt là đối với dữ liệu địa không gian?



Ngoài các chính sách, hiện nay ở Việt Nam đã có những dự án cụ thể cũng như phương hướng cho việc công khai dữ liệu chính phủ hay chưa?

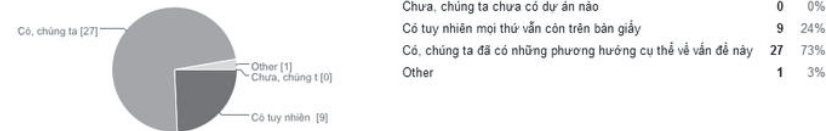
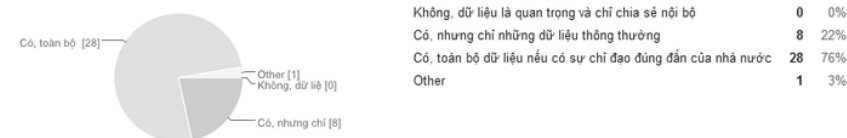


Figure 4.1. Summarise of survey respondent for availability

• Availability	Questions	Answers
The first question is about the policy related to the process of publishing, opening geospatial government data.	According to you, do we have any policies that related to OGD, especially for geospatial data?	- No: 3% - Yes and perfect: 3% - Yes but not perfect: 94% - Other: 0%
The first question is about the project related to the process of publishing, opening geospatial government data.	Beside the policies, do we have any specific project or orientation for the process of opening government data?	- No: 0% - Yes but only on paper: 24% - Yes, we have specific project and orientation: 73% - Other: 3%

Table 4.1. Summarise of survey respondent for availability

Là một đơn vị, cá nhân nắm giữ rất nhiều những dữ liệu về địa không gian (bản đồ, thông tin đất đai, ảnh vệ tinh), liệu ông/bà có sẵn sàng hợp tác với chính phủ để công khai dữ liệu của mình hay không?



Theo được biết, hiện nay trên thế giới có một hiệp hội chính phủ mở bao gồm 63 nước gồm cả các nước đang phát triển và đã công khai trên 1 triệu cơ sở dữ liệu của mình, vậy theo ông/bà, tham gia vào 1 hiệp hội như thế có phải là cách duy nhất để Việt Nam có thể công khai dữ liệu chính phủ của mình hay không?

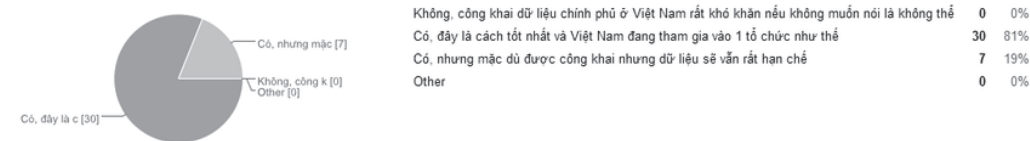


Figure 4.2. Summarise of survey respondent for availability 2

• Availability	Questions	Answers
The third question is about the willingness of those respondents in collaborating with the government to publish their data.	As an agency, individual that holds a lot of geospatial data, are you willing to cooperate with the government to publish your data or not?	- No, only sharing internally: 0% - Yes only common data: 22% - Yes all the data with the direction from government: 76% - Other: 3%

The fourth question is about the opportunity of opening government data when participate in an international organisation (such as Open Government Partnership).	According to you, participate in an international organisation about open government is a good way to Open government data?	<ul style="list-style-type: none"> - No, impossible : 0% - Yes, it's a good way, Vietnam has also participated in an organisation: 81% - Yes, however, public data will still be limited: 19% - Other: 0%
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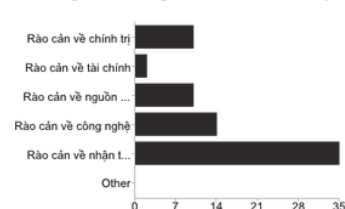
Table 4.2. Summarise of survey respondent for availability 2

Ngoài ra, ở một số nước trên thế giới, đặc biệt là ở Châu Phi, ngoài việc chính phủ ý thức được việc công khai dữ liệu và những lợi ích của nó, thì cũng có một phần không nhỏ sức ép của người dân tác động yêu cầu chính phủ công khai dữ liệu của mình. Theo ông/bà, ở Việt Nam, liệu điều này có thể thực hiện được hay không?



Không, chính phủ Việt Nam sẽ phớt lờ những sức ép đó	0	0%
Không, vì bản thân người dân cũng chưa hiểu được ý nghĩa của việc công khai dữ liệu chính phủ	0	0%
Có, chính phủ Việt Nam hiện ngày càng đổi mới và trở nên minh bạch hơn	37	100%
Other	0	0%

Thưa ông/bà, theo ông/bà thì rào cản chính hiện nay ở Việt Nam để chính phủ thực hiện công khai dữ liệu của mình là gì?



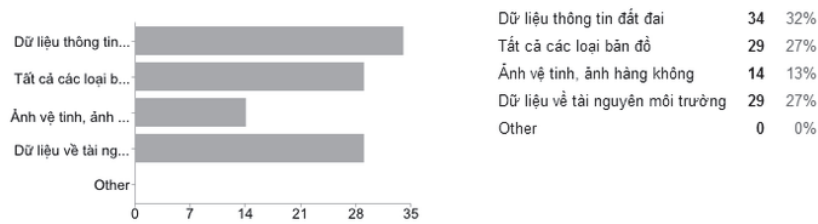
Rào cản về chính trị	10	14%
Rào cản về tài chính	2	3%
Rào cản về nguồn nhân lực chưa đáp ứng yêu cầu trong việc xây dựng và quản lý dữ liệu	10	14%
Rào cản về công nghệ	14	20%
Rào cản về nhận thức của người dân	35	49%
Other	0	0%

Figure 4.3. Summarise of survey respondent for transparency and OGD barriers

• Transparency and OGD barriers	Questions	Answers
The fifth question is about the transparency of Vietnam government.	Pressure from the people is a factor in the publishing data, according to you, this could be implemented in Vietnam or not?	<ul style="list-style-type: none"> - No, the government will ignore that pressure: 0% - Not, because the people themselves have not understood the meaning of OGD: 0% - Yes all the data with the direction from government: 100% - Other: 0%
The sixth question is about the main barriers of opening government data.	According to you, what are the main barriers for OGD?	<ul style="list-style-type: none"> - Political barrier: 14% - Financial barrier: 3% - Manpower barrier: 10% - Technical barrier: 20% - Barrier of people's perceptions: 49% - Other: 0%

Table 4.3. Summarise of survey respondent for transparency and OGD barriers

Nếu được công khai, những dữ liệu nào có thể được công khai?



Theo ông/bà, cá nhân, tổ chức nào là người nắm giữ nhiều nhất về dữ liệu địa không gian, chịu trách nhiệm quản lý và sử dụng dữ liệu?

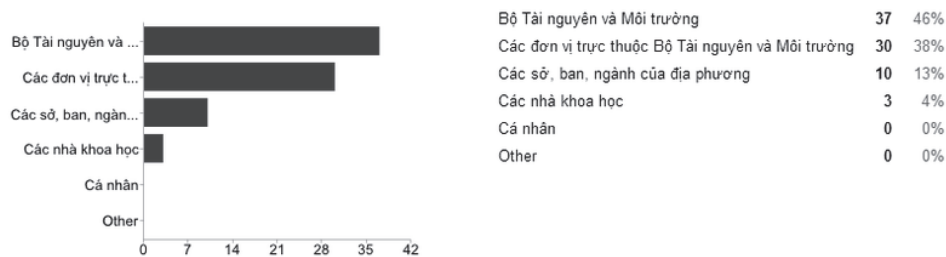
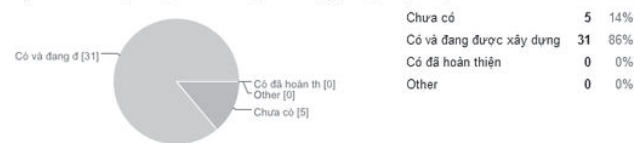


Figure 4.4. Summarise of survey respondent for complete and primary

• Complete and primary	Questions	Answers
The seventh questions is about the kind of data should be made available	What kind of data should be published?	<ul style="list-style-type: none"> - Land information: 34/37 repondents - All of the maps: 29/37 repondents - Satelite, aerial images: 14/37 repondents - Data of natural resource and environment:29/37 repondents - Other: 0
The eighth questions is about the individual, organisation that store, manage and maintance most of data	Who store, manage and maintance most of data?	<ul style="list-style-type: none"> - MoNRE: 37/37 repondents - Agencies under MoNRE: 30/37 repondents - Local departments: 10/37 repondents - Scientists: 3/37 repondents - Individual: 0 - Other: 0

Table 4.4. Summarise of survey respondent for complete and primary

Việt Nam đã có hệ thống cơ sở thông tin không gian quốc gia hay chưa?



Xét về yếu tố nguồn nhân lực, theo ông/bà, nhân lực ở Việt Nam hiện nay có thể đáp ứng yêu cầu trong việc xây dựng, quản lý và duy trì cũng như công khai dữ liệu chính phủ hay chưa?

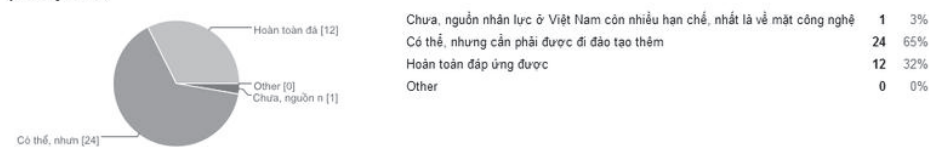
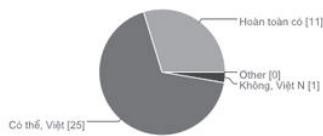


Figure 4.5. Summarise of survey respondent for NSDI and human resources

• NSDI and human resources	Questions	Answers
The ninth question is about the exist of NSDI in Vietnam	Do we have the NSDI?	- No, not yet: 14% - Yes, under constructing: 86% - Yes, completed: 0% - Other: 0%
The tenth question is about the human resources	Do the human resources match the requirement of building, managing and maintaining OGD?	- No, the human resources has many limitation, especially in technology: 3% - Possibly, but need more training: 66% - Absolutely yes: 31% - Other: 0%

Table 4.5. Summarise of survey respondent for NSDI and human resources

Theo ông/bà, nền tảng công nghệ ở Việt Nam hiện nay đã có thể ứng dụng để công khai dữ liệu chính phủ một cách hiệu quả mà vẫn đảm bảo được tính bảo mật cần thiết hay không?



Không, Việt Nam cần phải phát triển mạnh hơn nữa về mặt công nghệ cũng như ứng dụng thêm công nghệ của các nước trên thế giới	1	3%
Có thể, Việt Nam đã học hỏi và ứng dụng rất nhiều công nghệ cả trong nước và ngoài nước, tuy nhiên vẫn cần phải đầu tư thêm về công nghệ	25	68%
Hoàn toàn có thể	11	30%
Other	0	0%

Thưa ông/bà, theo ông/bà, liệu sự ảnh hưởng đến việc kinh doanh (mua bán bản đồ, ảnh vệ tinh, thông tin đất đai v.v..) là một yếu tố làm hạn chế việc công khai dữ liệu chính phủ hay không?



Có, đây chính là hạn chế của việc công khai dữ liệu chính phủ	2	6%
Không, không có ảnh hưởng nào, dữ liệu cần bán sẽ không được công khai	0	0%
Không, chỉ cần có sự đầu tư và quản lý đúng đắn từ nhà nước	34	94%
Other	0	0%

Figure 4.6. Summarise of survey respondent for technology and affect in business

• Technology and affect in business	Questions	Answers
The eleventh question is about technology	Do the technology in Vietnam match the requirement of building, managing and maintaining OGD?	- No, not yet: 3% - Possibly: 68% - Absolutely yes: 30% - Other: 0%
The twelfth effect in bussiness when opening government data	Do the effect in bussiness when opening government data is the	- Yes, this is a limitation: 6% - No, data under selling will not be published: 0%

	limitation of OGD? (such as selling maps, information etc.)	- Absolutely no: 94% - Other: 0%
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Table 4.6. Summarise of survey respondent for technology and affect in business

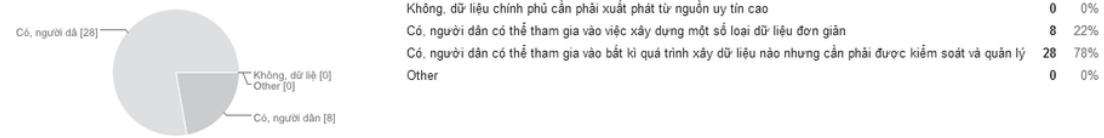


Figure 4.7. Summarise of survey respondent for non – discriminatory and non - proprietary

• Non – discriminatory and non - proprietary	Questions	Answers
The thirteenth question is about how information that is made available will be used efficient	How people can use OGD in efficient way?	- Standardize data using common and simple form such as .doc, .xls etc: 66% - Decentralize of using data: 19% - People are smart, they will learn how to use soon, don't have to do anything else: 16% - Other: 0%
The fourteenth question is about the fee of using OGD	Do people have to pay for using OGD?	- Yes, the cost of OGD is high, so people must pay: 17% - Yes, small fee: 75% - No, the data will be free: 8% - Other: 0%

Table 4.7. Summarise of survey respondent for non – discriminatory and non - proprietary

Theo ông/bà, người dân có thể tham gia vào quá trình xây dựng cơ sở dữ liệu chính phủ mở được không? (Như cách người dùng sử dụng googlemap để update thông tin của mình)



Làm thế nào để chính phủ Việt Nam có thể dự đoán trước được sự thành công của dữ liệu chính phủ mở trong 1 tương lai gần?

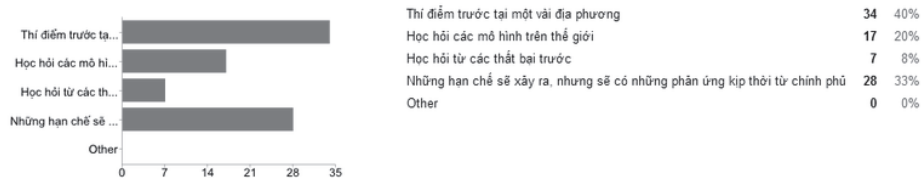


Figure 4.8. Summarise of survey respondent for participation and strategy for OGD initiatives

• Participation and strategy for OGD initiative	Questions	Answers
The fifteenth question is about the participation in building land information system	Could people participate in building and managing OGD?	- No: 0% - Yes, but with simple data: 22% - Absolutely yes, but under management of the government: 78% - Other: 0%
The sixteenth question is about the strategy for an OGD initiative	How government can foresee the success of OGD initiative?	- Piloted in a few localities: 34/37 - Yes, small fee: 34/37 - Learn from another country's model: 17/37 - Learn from the last failure: 7/37 - There are always timely response from government: 28/37

Table 4.8. Summarise of survey respondent for participation and strategy for OGD initiatives

Thời gian gần đây, các nhà lãnh đạo liên tục có những chính sách để hướng tới 1 chính phủ minh bạch hơn, liệu điều này có phải là thực tế trong 1 tương lai gần không?

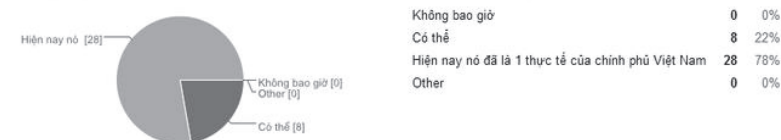


Figure 4.9. Summarise of survey respondent for transparency

• Transparency	Questions	Answers
The last question is about the transparency in governace	The government have policies in making a more transparent government,	- No: 0% - Possibly: 22% - It is a fact in Vietnam: 78%

	is this implemented in near future?	- Other: 0%
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Table 4.9. Summarise of survey respondent for transparency

4.3. Results from secondary data collection

Some documents were discovered from internet and collected from the interviewees. This section will discuss about the legal documents and some projects that may relate to the OGD initiative. The table below will show some information about legal documents and projects.

Name of document	Authority	Content
Land law No. 13/2003/QH11 in 26 th November 2003	Parliament of Social Republic of Vietnam	This law regulates the rights and responsibilities of state who is the representative in ownership of land and unify management in land, management regimes and use of land, rights and obligations of land users.
Information and communication technology law No.67/2006/QH 11 in 29 th June 2006	Parliament of Social Republic of Vietnam	This law regulates the activities in applying and developing ICT, security measures in ICT development and application, rights and obligations of agencies who engage in ICT.
Resolution No. 17/2011/QH13 in 22 nd November 2011	Parliament of Social Republic of Vietnam	Land use planning until 2020, land use schedule in 5 years (2011 – 2015) at national level.
Decision No. 179/2004/QD-TTg in 6 th October 2004	Prime Minister	Approve the strategy in application and development of ICT in natural resources and environment till 2015, orient to 2020
Decree No.102/2008/ND-CP in 15 th September 2008	Prime Minister	Content refers to the collection, management, exploitation and use of natural resources and the environment information
Decree No. 102/2009/ND-CP in 6 th November 2009	Cabinet	Content refers to the management of investment in ICT using government budget
Conclusion No 22-KL/TW in 25 th May 2012	Conference of the Party Central executive committee	Prioritize investment in constructing databases, information infrastructure towards a modern, multi-purpose serving, changing to electronic trading in the land sector. Orient to further simplification of administrative procedures, ensuring strict management requirements of the state, also is convenient for people and businesses.
Resolution No.19-NQ/TW in 31 st October 2012	Party Central executive committee	Prioritize investment in building databases, land information system and assets related to land towards modern, open, transparent, serving multiple purposes; gradually shift to electronic services in the land sector. Strive to 2020 basically finish the construction of a land information system.
Resolution No.13/NQ-TW in 16 th January 2012	Party Central executive committee	Construct a synchronous information infrastructure to make our country basically become a modern industrialized country in 2020. Assign Ministry of

		Natural Resources and Environment to construct the Vietnam NSDI
Decision No.2402/QĐ-BTNMT in 21 st December 2011	Minister of MoNRE	To approve application and development plan of natural resources and environment information technology.
Project :”Building NSDI in the period 2013 – 2015”	GDLA - MoNRE	

Table 4.10. Legal documents and projects that embrace OGD

Overall, the Vietnam government made many decisions and resolutions in building Land information system using ICT. As mentioned in the table above, resolution no.13/NQ-TW is one of the key factors for opening government data, first is to construct a synchronous land information infrastructure from national level to local level, second is facilitating organisation and people to trade and share the information.

Besides, the resolution No.19-NQ/TW, the target is also building land information systems towards open, transparency in land. The MoNRE is the government body in charge of construct, manage, maintaining national spatial data.

4.4. Conclusion

To answer the research questions, a list of factors was brought out from the results of interview, survey and documents analysis. The government has very specific policies for the construction of a public government that is more open and transparent towards building the information system for serving people. Besides, the factors were observed as below:

- Currently data has being made more public, including data on housing, land price, maps etc. The organism in charge of managing geospatial data is the MoNRE, the GDLA, DoSM, the RSC and some other agencies under MoNRE are the organisations who directly take responsibility in storage, construction and management of information. From now until 2020, the government will carry out many projects and policies, especially building the Vietnam NSDI. Government has also piloted on several provinces in construction land information such as Hanoi, Thai Binh, Hung Yen, Quang Ngai, Binh Dinh, Khanh Hoa, Tien Giang, Ben Tre and Vinh Long enhance the feasibility of building NSDI.
- People have real access to more information, not only that, they are also fully involved in the construction process, as well as maintaining geospatial information. In principle, for using data, people have to pay fee, however, there are many ways to charge fee, and people do not even know they have to pay for the data.
- There is a problem in updating data, related to the legislation of citizen, the law abiding by people is not high, for example, when a person sell his land without reporting to the agencies, so that the information that was made available will not be fully updated.
- The budget for piloting in 95 districts of 9 provinces in building, maintaining, managing spatial data are about 100 million dollar. Therefore, to apply to more than 700 districts in Vietnam, it will cost about 1 billion dollar, it is a huge number, and take a lot of time to implement it or may cause conflict.

5. CONSTRUCT DYNAMIC MODELS FOR OPENING GOVERNMENT DATA IN VIETNAM

5.1. Introduction

The chapter practise the process of open government data using system dynamics. The system dynamics use the results that interpreted in chapter 4 as factors or variables for addressing research sub objective 4. This chapter also use the SWOT analysis to analyse the possibility of implementing OGD for geospatial data in Vietnam before modelling the complex process of OGD.

There will be 5 sections in this chapter. Section 5.2 analyses the OGD implementation for geospatial data in Vietnam using SWOT; section 5.3 provides some dynamics models, also the evaluation of those models; chapter 5.4 is the conclusion

5.2. Using SWOT analysis to analyse the OGD implemetation for geospatial data in Vietnam

The SWOT analysis will use the results summarised from chapter 4 to derive the strengths, weaknesses, opportunities and threats of implementing OGD for geospatial data in Vietnam. It also provide the factors (converters and connectors) in the dynamics model.

<i>Strengths</i>	<i>Weaknesses</i>
<ul style="list-style-type: none"> - Database is still managed and updated by the specialized agencies (MoNRE). - Users can access and exploit information unlimited. - Better use the development of technology, ICT and GIS. - Easy consult and learn from experience from the other models in the world. - The spatial data is abundant and ever – improving. - Going in the right direction in building NSDI for environmental resources and land information system. - Attracting the interest and support by international organizations. - We have leaders to bear full responsibility in making decisions. - Many interest and direct at national level is limited for OGD. 	<ul style="list-style-type: none"> - No building strategy and development for OGD. - Legality of deploying OGD is missing. - Technical infrastructure is weak and uneven. - No standard for technic and services to construct OGD. - Perceptions of organizations and individuals to join hands in building OGD are limited. - Human resources for OGD are weak and lacking.

<i>Opportunities</i>	<i>Threats</i>
<ul style="list-style-type: none"> - Chance to use the supported investment from international organizations. - The interest and substantial investment from government for collecting and maintaining spatial data. - Government's administration reform, transparency and enhanced quantity and quality of online services. - The innovation of ICT, technology and GIS. - Geospatial data is managed by the Natural Resources and Environment and relevant departments is the favourable condition for the construction of OGD. - Technical staff of Vietnam has good ability in absorbing new technology. 	<ul style="list-style-type: none"> - Government and some organizations do not support the sharing and publishing geospatial data. - Geospatial data was collected but no update mechanism. - Lack of consistent policy on accessing and using geospatial data. - Missing proper attention for human resources development and the awareness rising of community. - Need a huge budget investment for OGD.

Table 5.1. SWOT analysis for implementing OGD in Vietnam

Dynamics model for Opening Vietnam geospatial Government Data

5.2.1. Introduction about Stella

STELLA is a computer simulation program which provides a framework and an easy-to-understand graphical interface for observing the quantitative interaction of variables within a system. The graphical interface can be used to describe and analyse very complex physical, chemical, biological, and social systems. Model builders and users, however, are not overburdened with complexity because all STELLA models are made up of only four building blocks, pictured in Figure 5.1:



Figure 5.1. Sample of dynamics model

Stock—a stock is a generic symbol for anything that accumulates or drains. For example, water accumulates in your bathtub. At any point in time, the amount of water in the bathtub reflects the

accumulation of what has flowed in from the faucet, minus what has flowed out down the drain. The amount of water in the bathtub is the stock of water.

Flow—a flow is the rate of change of a stock. In the bathtub example, the flows are the water coming into the bathtub through the faucet and the water leaving the bathtub through the drain.

Converter—a converter is used to take input data and manipulate or convert that input into some output signal. In the bathtub example, if you were to turn the valve that controls the water flow in your bathtub, the converter would take as an input your action on the valve and convert that signal into an output reflecting the flow of water.

Connector—a connector is an arrow that allows information to pass between converters and converters, stocks and converters, stocks and flows, and converters and flows. In Figure 5.1 above, the connector from converter 1 to converter 2 means that converter 2 is a function of converter 1; in other words, converter 1 affects converter 2.

5.2.2. Using Stella to construct dynamics modelling for opening government geospatial data in Hanoi, Vietnam

a. Construct dynamics model

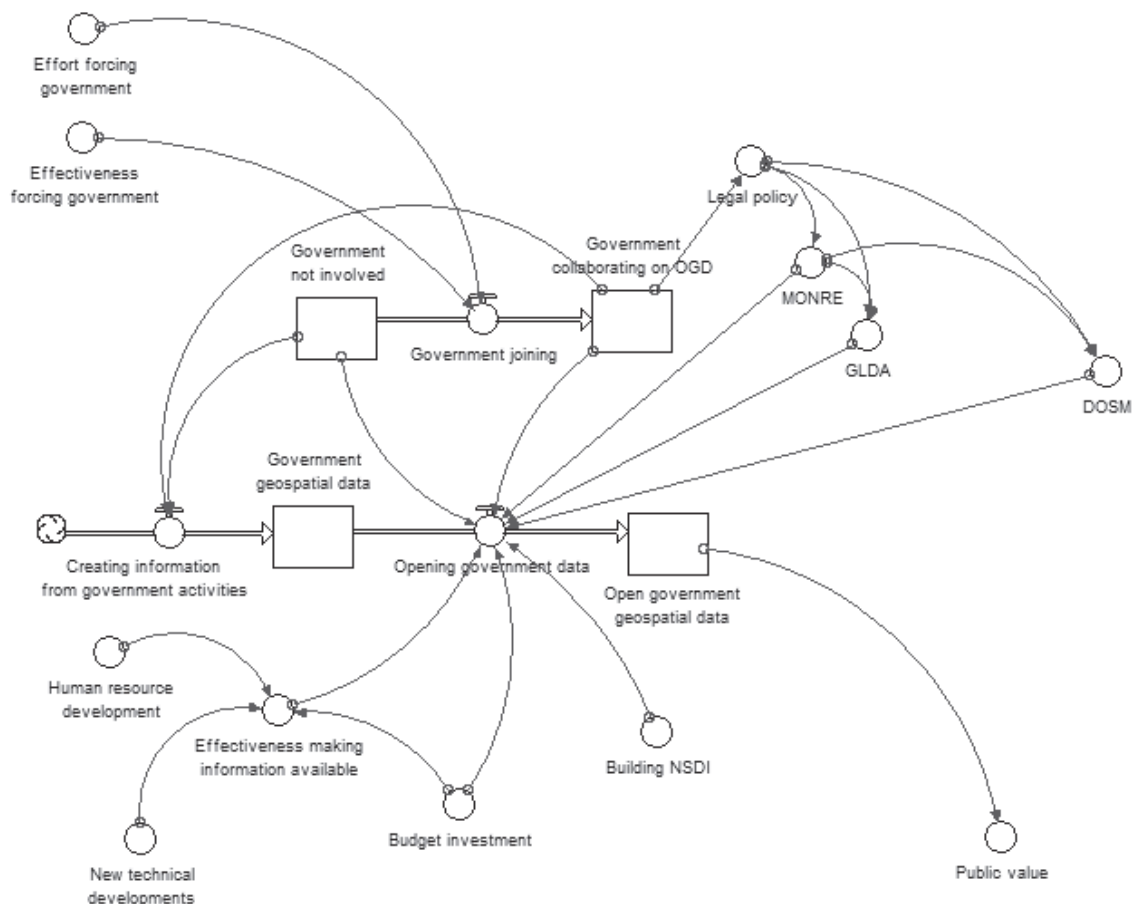


Figure 5.2. Making information available

The idea of NSDI appeared in 1993 as a feasibility study on Vietnam Land Administration system. At that time, some leaders could not persuade the government to invest in Land Administration. However, they still kept putting effort on government. Along with the development of the country, the government also focused more on building and managing in land sector. From that time, the government, the Prime Minister, the Party Central executive committee have been making many decisions and resolutions,

creating favourable conditions for NSDI and the idea of OGD. The data is under controlled and managed by MoNRE, but the GDLA, DoSM and some agencies under MoNRE are the units that directly take responsibility on the information.

For making open government information, first the government have projects in building NSDI and evaluate the efficient of NSDI. Along with the NSDI, new technique, human resources have to be developed, that will affect in the effectiveness of making information available. The government also invest for millions dollar in building NSDI, towards opening government information.

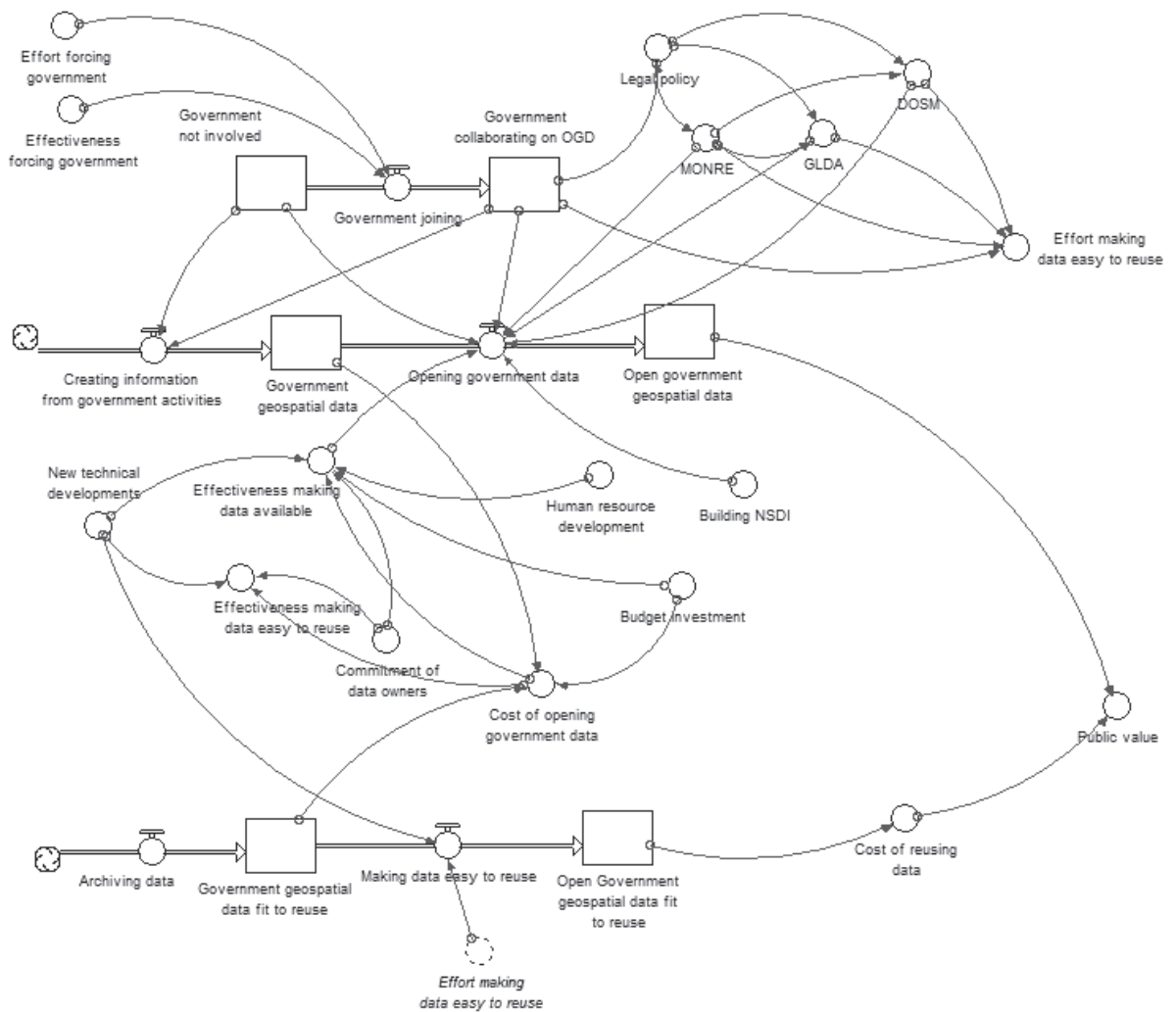


Figure 5.3. Making data easy to reuse

When data is made available, the factor that impact in the success of an OGD initiative is the effective of using data. Therefore, making data easy to reuse is necessary. The data will be standardised, and in normal and simple forms such as .doc, .xls, open form or in mobile apps. It also means, the MoNRE and other agencies have to put effort in making data easy to reuse. The users have to pay a small fee for using data, it plays an important role in maintaining data.

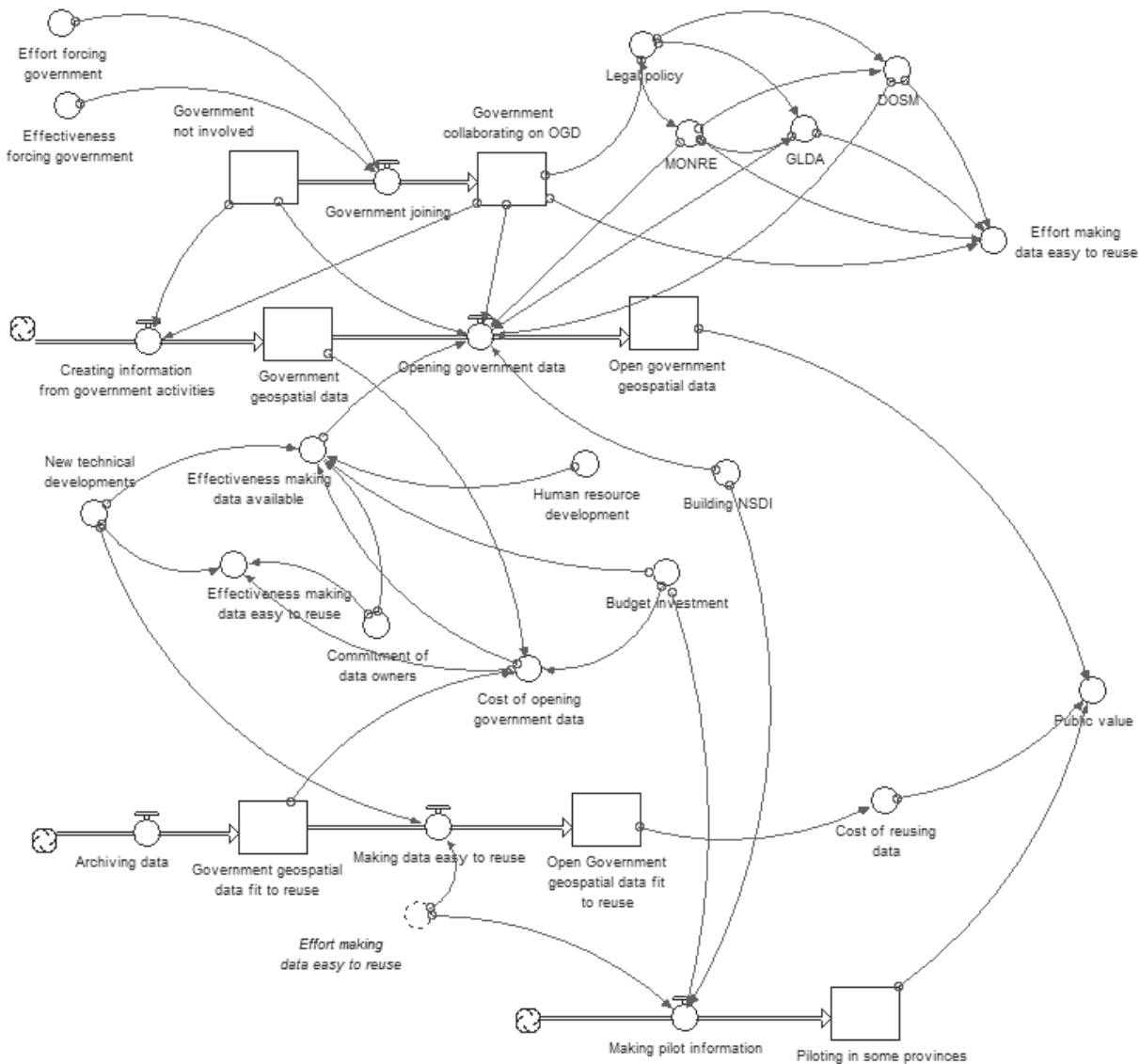


Figure 5.4. Pilot in some localities

For the most effectiveness of an OGD initiative, some provinces will be piloted in constructing, managing and using land information. At this time, 95 districts from 9 provinces are under tested towards implementing for all of the cities and provinces.

b. Evaluating model

As mentioned in chapter 4, there are two main problems that may cause conflict in the model: the awareness of people and the huge budget investment.

- **The lack of awareness from people**

In Vietnam, the law abiding by people is not high, for example, when a person sells his land without reporting to the agency, so that the information that was made available will not be fully updated. That means, it will create untrusted data. If the government were informed about the changes, they will need some cost for re - archiving data and then increase the cost of remaking data fitness for reused. If the government were not informed about changes, then the untrusted data will cause to unvalued data.

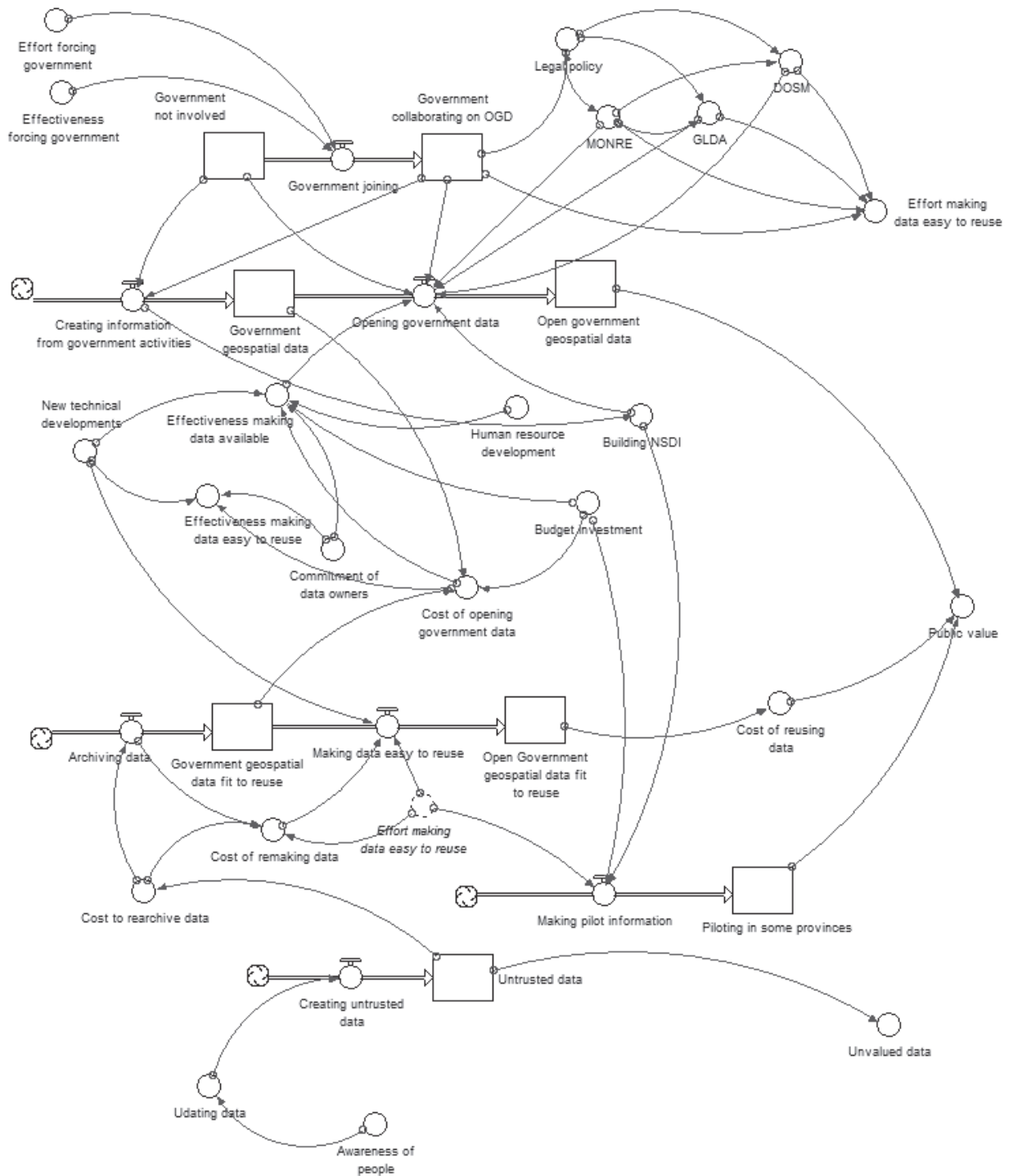


Figure 5.5. Conflict in awareness of people

The loop of creating unvalued data will stop until the government archive and create new data.

- **The problem with budget investment**

Vietnam is still a developing country, so investing hundreds of millions of dollars in projects is extremely difficult. There are many projects that were halted because of the high investment but low efficient. So that, the government should have a very clear plan for opening their data or it will fail like the project 112, the milestone of e-government in Vietnam.

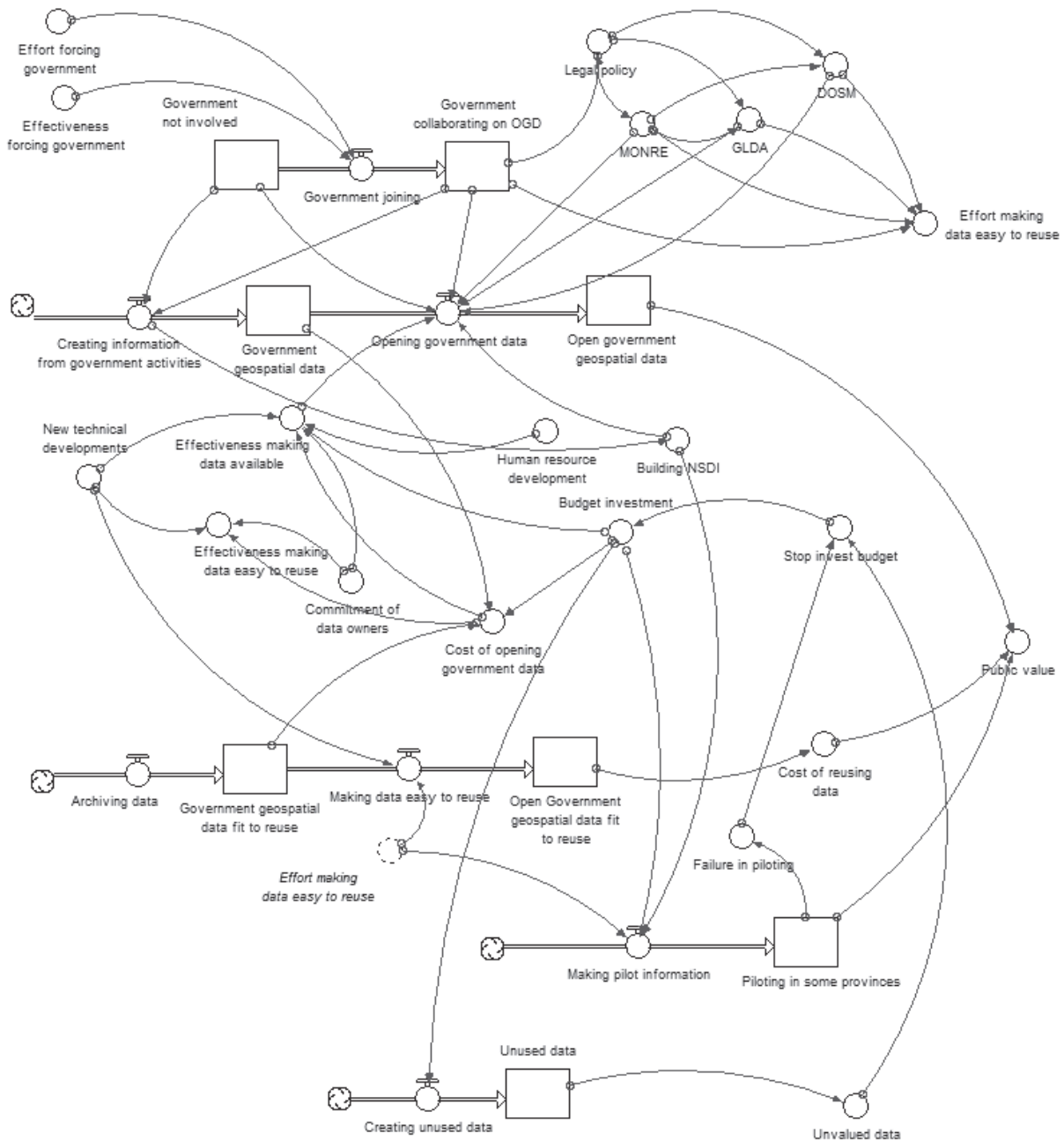


Figure 5.6. Conflict of budget investment

5.3. Conclusion

In this chapter, the author has designed the relations of factors in the dynamics of opening government data. These models will support the government leaders and decision makers in their process of OGD. There are 3 phases in an OGD initiatives have been mentioned.

- Phase 1: Making information available for everyone, ensure the complete, and primary characteristics of Open Government data.
- Phase 2: Making data easy to reuse, ensure the accessible, machine process able, non – discriminatory and non – proprietary characteristics of Open government data.

- Phase 3: Piloting with some localities, is to test for all of the characteristics of Open government and Open Government data.

There are two limitation of this model, which may cause conflict in the model as the awareness of people and the huge budget investment. The conflict also appears when a pilot is failed. When the confliction occurs, unvalued data or untrusted data will decrease the success of OGD initiative.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1. Introduction

This chapter provides the overall conclusions to all of the research objectives, which were mentioned in section 1.4. Section 6.2 will address the general conclusion while section 6.3 is some recommendations. This chapter will also bring the last justifications of this research.

6.2. Conclusions

Vietnam is a developing country, however, with no exception, Vietnam also address the interest in e-government and building national spatial information. There are several studies that have been done since the 90s of the last century on the issue of land information systems. In fact, the Vietnamese government has put many efforts in the developing a more transparent and more open government, enabling more people to participate in the government activities towards the future open government.

This study focuses on the process of publishing land data, case study in for geospatial data in Hanoi, Vietnam. Hanoi is the capital of Vietnam, is the home for all state agencies - the political centre of the country. The study focused on finding out the factors that influence the process of opening government data and the relationship between these factors, difficulties and challenges as well as benefits of open government data in Vietnam. This research has shown that these factors have tight relationships with each other, cause and effect relationship. In addition, this study also focused on building dynamics models of open government data, the way factors impact on each other in the model, the changes of data publishing process over time. The results of the model will be the basis for the leaders to make new policies, evaluate the effectiveness of opening government data in the future. Finally, the study also pointed out a number of limitations in the process of building and publishing data at the moment of the Vietnam government.

6.3. Recommendations

First, the Vietnam government should have a more specific policy directions in opening government data.. Only the existing of a clear plan, predict and inhibit adverse impacts in the future are the keys to the success of OGD initiative.

Secondary, the Vietnamese government needs to focus on international cooperation in OGD; they need to prove that the Vietnamese is in renovation date with simple procedures, transparent and open government. With that, Vietnam can attract more investment from foreign investment.

Finally, the Vietnamese government should focus on raising awareness of people through propaganda, promotion on the media, so that people can understand more about the benefits of individual as well as the country in the process of building a more transparent government , better serving people.

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