Designing e-government based land administration system (e-LAS) for improving delivery of land administration services

(Case study in Hanoi, Vietnam)

Do Thi Minh Tam

February, 2010

Designing e-government based land administration system (e-LAS) for improving delivery of land administration services

(Case study in Hanoi, Vietnam)

by

Do Thi Minh TAM

Thesis submitted to the International Institute for Geo-information Science and Earth Observation in partial fulfilment of the requirements for the degree of Master of Science in Geo-information Science and Earth Observation, Specialisation: Land Administration

Thesis Assessment Board

Chairman:	Prof.Ir. Paul van der Molen
External examiner:	Prof.Dr. Jaap .A. Zevenbergen
First Supervisor:	Dr. Diego .D. Navarra
Second supervisor:	Dr. Arbind Man Tuladhar
Member:	Mr. J.F.M. van der Steen

INTERNATIONAL INSTITUTE FOR GEO-INFORMATION SCIENCE AND EARTH OBSERVATION
ENSCHEDE, THE NETHERLANDS

Disclaimer

This document describes work undertaken as part of a programme of study the International Institute for Geo-information Science and Earth Observation. All views and opinions expressed therein remain the sole responsibility of the author, and do not necessarily represent those of the institute.

Abstract

In many countries, there is increasing need for efficient and effective delivery of land administration (LA) services, especially in land registration services to protect tenure security. As land administration is an important sector of public service delivery, the concept of e-government is equally applicable to it. In the current LA of Vietnam, citizens have to consult various organisations to get a service done. The service delivery system is not only time consuming but also expensive. As a result, services of transactions such as “transfer of land use rights” take place informally. The situation has created gaps between expectations of citizens and LA services provided by the government organisations. Such gaps in delivering services from government to citizens (G2C) are also influenced by inadequacy of interaction between government organisations (G2G). Thus, the research aims to find out the reasons of the gaps and use it as input for designing an improved system based on e-government concept which minimises or eliminates the gaps.

Case study methods and supporting literature review has been carried out to materialise this research. The case study of land registration services at district level of Vietnam is selected to study the situation of land registration in Vietnam and expectations of citizens about land registration services. Analysis of the data and information collected from the fieldwork recognised the gaps and reasons of the gap are identified. The major gaps between G2G relations are back response, data sharing practices, and access to information. The main reasons of these gaps are identified as overlapping responsibilities, lack of trust, unclear responsibilities, lack of data sharing policies, and lack of proper information system. Similarly, the identified gaps between G2C, C2G interactions are efficiency of LRS, awareness about LRS, and accessing information. The main reasons for these gaps are lacking inter-organisational cooperation, lack of proper information system, complicated LR procedure, and complex legal framework, lack of accountability, carelessness of citizen.

The reasons of the gap are used to identify requirements for development e-LAS including citizen. The research revealed the that the requirements in the e-LAS environment are to make the system citizen centric and pay special consideration in the different aspects of the system such as organisational, technical, legal and financial.

Based on the requirements, the proposed e-LAS models were developed using the unified modelling language (UML) in order to address the gaps between G2G and G2C. The models are combination of organisational model, functional model, dynamic and static model. Organisational model is shown through organisational architecture with databases at central and services are provided at local level (district level) in e-environment. Based on the organisational model, the function models including data model of services at district level regarding land registration services are developed. Among the services, the most common services “full transfer of LUR” is tested in PostGIS and UDig software environment using real datasets collected from fieldwork. The limited result reveals that e-service can operate smoothly in e-environment and feasible so it can reduce the gaps.

Key word: e-land administration, e-government, land registration, system modelling, service delivery

Acknowledgements

At the completion my MSc studies at International Institute for Geo-information Science and Earth Observation, I would like to take this opportunity to acknowledge the personalities and organizations whose support and contribution remained valuable for me to fulfil this research.

First of all, I would like to express my sincere gratitude and acknowledgment with due respect to Dr. Diego D. Navarra and Dr. Arbind Man Tuladhar for their supporting and contribution as the supervisors for the research. This research would not have been possible without their encouragement, invaluable advice, and professional comments.

Second, I would like to express my sincere appreciation is due to Prof. Jaap .A. Zevenbergen for his constructive comments during the proposal and mid-term defense.

Special word of thanks is due to Dr. Tran Quoc Binh, at Hanoi University of Science (HuS), who greatly supported the field work in Vietnam. I would also like to acknowledge the support I received from Ms. Luong from Tay Ho land registration district, Ms. Minh from Hanoi land registration office in Vietnam.

I would like to thank Mr. *Ganesh* Prasad Bhatta who helped me reading and revising the text and suggesting tips to improve the content in my MSc thesis. Special thanks go to *Nga* and *Hung*, my dear friends for their company, sharing happiness, funs and sadness in the time studying at ITC.

Last but not least, I would like to take this opportunity to express my deepest thanks and sincere gratitude to my mother *Thu* and my farther *Doi* for their supporting and blessing from home. I am thankful to my sister *Ngoc* for taking care of everything at home in my absence.

Table of contents

1. Introduction 1
   1.1. Background 1
   1.2. Research problem, Research objective, and Research questions 2
      1.2.1. Research problem 2
      1.2.2. Research objective 3
      1.2.3. Research questions 3
   1.3. Conceptual framework 4
   1.4. Research scope 5
   1.5. Research methodology 5
      1.5.1. Research methods 5
      1.5.2. Validation 5
      1.5.3. Research design 5
   1.6. Thesis structure 6
2. Conceptual framework based on literature review 8
   2.1. Introduction 8
   2.2. E-government concept 8
   2.3. E-government examples 11
   2.4. Potential benefits and risks of e-government implementation 12
      2.4.1. Potential benefits 12
      2.4.2. Potential challenges and risks of e-government implementation 13
   2.5. Land administration system 13
      2.5.1. Land administration concept 13
      2.5.2. Land administration in e-government experience 14
   2.6. Land administration in e-government framework 15
   2.7. Concluding Remarks 15
3. Framework for designing e-LAS within e-government 17
   3.1. Introduction 17
   3.2. Requirements of e-land administration 17
   3.3. Architecture of e-LAS 19
   3.4. System design and validation technique 19
      3.4.1. System design 19
      3.4.2. Choice of system development approach for designing e – LAS 22
      3.4.3. Design steps based on OOSDM approach 22
      3.4.4. Validation techniques 23
   3.5. Concluding remarks 24
4. Fieldwork Methodology for case study in Vietnam 26
   4.1. Introduction 26
   4.2. Fieldwork design 26
      4.2.1. Fieldwork objectives 26
      4.2.2. Primary data sources 27
      4.2.3. Secondary data sources 28
   4.3. Fieldwork activities 29
      4.3.1. Study areas 29

4.3.2. Data collection....29
4.4. Tools used in data management, analysis and design....31
4.5. Limitation of the fieldwork....31
4.6. Concluding remarks....31
5. Analysis of requirments for e-LAS in Vietnam....33
5.1. Introduction....33
5.2. General overview of Vietnamese Land Administration System and registration system....33
5.2.1. Land administration system....33
5.2.2. Land registration system....33
5.3. Current practices and expectations of citizen from land registration services at district level....36
5.3.1. Current practice of land registration services (G2G, G2C)....36
5.3.2. Interaction between C2G – Citizens' evaluation and expectations from land registration services....39
5.4. Analysis on the gap between government to government, government to citizens in land registration system....40
5.4.1. Gap between G2G....40
5.4.2. Gap between G and C (G2C, C2G)....41
5.5. Identification of the requirements of the proposed e-LAS....43
5.5.1. Citizen Centric System....43
5.5.2. Organisational aspect....44
5.5.3. Technical aspect....44
5.5.4. Legal aspect....44
5.5.5. Financial aspect....45
5.6. Concluding remarks....45
6. Design e-LAS model and validation for G2C services....47
6.1. Introduction....47
6.2. Scope of system design....47
6.3. Organisational model of e-LAS for improving land registration services....47
6.4. Functional/Process model for land registration services at district level....50
6.4.1. Functional model of land registration services....50
6.4.2. Full Transfer LUR of whole land parcel....52
6.5. Validation by prototyping....56
6.5.1. Software used....56
6.5.2. Data used....57
6.5.3. Prototyping for registration of the transfer of LUR of whole parcel....59
6.6. Conditions for implementation e-LAS....61
6.6.1. Organisational and institutional aspect:....62
6.6.2. Technical Aspect....62
6.6.3. Legal aspect....63
6.6.4. Financial aspect....63
6.7. Concluding remarks....64
7. Conclusion and Recommendations....65
7.1. Introduction....65
7.2. Conclusion....65
7.3. Recommendations....67

References 68
Appendices 71

List of figures

Figure 1-1: Conceptual framework 4
Figure 1-2: G-G and G-C relation in land administration at district level 5
Figure 1-3: Research design 6
Figure 2-1: E-government concept 10
Figure 3-1: System architecture 19
Figure 3-2: life cycle of SSM (Checkland, 1981) 20
Figure 3-3: life cycle of SDM (Tuladhar, 2004) 21
Figure 3-4: life cycle of OOSDM (Rutayuga, 1996) 22
Figure 3-5: e-LAS models and supporting UML diagrams 23
Figure 4-1: Data collection methods 27
Figure 4-2: Spatial association of study areas on Ha Noi administration map 29
Figure 5-1: Current procedure of land use right registration 35
Figure 5-2: The necessary of citizen participant in decision making of land registration system 38
Figure 5-3: Evaluation on quality of provided information 39
Figure 5-4: Staff attitude as perceived by citizens 39
Figure 5-5: Expectations of citizens 40
Figure 6-1: Organisational model of e-LAS 49
Figure 6-2: Service model of land registration 51
Figure 6-3: Use case diagram for registration of transfer land use right of whole parcel 53
Figure 6-4: Activity diagram for registration of transfer land use right of whole parcel 54
Figure 6-5: core data model adapted from LADM 55
Figure 6-6: Class diagram of prototyping case 57
Figure 6-7: Database structure and relationship of prototyping case 58
Figure 6-8: Information about parcel 190380039 (highlight in yellow colour) before full transferring registration 59
Figure 6-9: Information about parcel 190380039 (highlight in yellow colour) after full transferring registration 61

List of tables

Table 4-1: List of interviewees and number of conducted interview 30
Table 5-1: Total days to completed services (according to law) 36
Table 5-2: Organisations' Revisits needed of citizen 37
Table 6-1: Alternatives for system structure of e-LAS 48
Table 6-2: Definition of main classes (adapted from LADM) 56

List of appendices

Appendix 1: Questionnaire for management group 71
Appendix 2: Questionnaire for operation group.....74
Appendix 3: Questionnaire for citizens.....81
Appendix 4: List of secondary data need to be collected.....86

Abbreviations

BoT	Bureau of Tax
BoUM	Bureau of Urban Management
CPC	Commune People's Committee
DoNRE	Department of Natural Resources and Environment
DoT	Department of Tax
DPC	District People's Committee
e-LAS	e-government based land administration system
G2B	Government to Business
G2C	Government to Citizen
G2G	Government to Government
ICT	Information and Communication Technology
LA	Land Administration
LAS	Land administration system
LR	Land Registration
LRO	Land registration office
LRS	Land Registration Service
LTC	Land Tenure Certificate (Land Use Right Certificate)
MoNRE	Ministry of Natural Resources and Environment
OSS	One stop shop

1. Introduction

1.1. Background

In recent years, there has been rapid growth of research interest on the topic of electronic government (e-government). National governments all over the world are now recognizing e-government as a strategic option to fine-tune their internal and external operations in their implementing organisations (Gottschalk and Solli-Sæther, 2009). However, the concept of e-government differs among international agencies, governmental agencies (both at central or local level), researchers and scholars (Anttiroiko, 2008). Often, the term e-government refers to the use of information and communication technologies (ICT) inside and around government agencies with aim to provide better delivery of government services to citizens, improve interactions (between government-to-government (G2G), government-to-citizens (G2C) or government-to-business (G2B)), empower citizens or make agencies more efficient and democratic in general (Homburg, 2004; Navarra and Cornford, 2007; Wimmer et al., 2007; Anttiroiko, 2008; Homburg, 2008).

When one studies the functional aspects of Land Administration (LA), the concept of e-government is equally applicable to it, as it is an important sector of public service delivery to citizens. LA is concerned with the processes of determining, recording and disseminating information about the ownership, value and use of land when implementing land management policies (UNECE, 2005). These processes or functions are organised into different agencies that are committed to serving a broad range of citizens with intensive interaction between government and citizen (Kalantari et al., 2005).

LA also provides land information and related data that are fundamental in political, economic and legal decisions for the best use of land and its management (Lemmen et al., 2004). Within the context of e-government, e-land administration (e-LA) is established by using ICT / geo-ICT to provide opportunities for better service delivery, customer satisfaction and citizen participation and decision making (Steudler, 2004). In order to realise e-government concept, e-LA not only uses ICT / geo-ICT, but also considers changes in organisational and legal framework taking stakeholders' needs into account.

Reengineering LA processes with stakeholders participation and the use of IT/Geo-ICT bring new dimensions in terms of strategies, processes and skills on functioning of organisations. To implement these dimensions, re-structuring of organisation and re-skilling of the employees would be required. Along with changes in processes and skills, organisational strategies also need to be changed fitting with main purpose of e-LA in the context of e-government (Lemmen et al., 2004).

At the same time, transformation from a traditional LA to e-LA requires substantial changes in the existing laws, specifically to the acts dealing with the functioning of LA and the acts dealing with the responsible institutions/organisations (Lemmen et al., 2004; Sambura, 2004).

Moreover, the development of e-LAS cannot be done in isolation from its stakeholders, indeed citizens. Consultations and communications with stakeholders must be involved in the process of change to satisfy their needs, and to make the system more citizen oriented.

1.2. Research problem, Research objective, and Research questions

E-Government in Vietnam

Since 1999, as Vietnam is integrating comprehensively into the global economy, the Government of Vietnam (GoV) decided to build an effective e-Government that would help to facilitate its capacity to manage resources, implement sound policies and better satisfy the needs of citizens (Gottschalk and Solli-Sæther, 2009). The 112 project initiated to develop e-government in the country was supposed to do three main tasks; establishing infrastructure for information technology (IT), building websites and implementing some pilot e-government projects in government organisations (Vu and Darrell, 2006), but due to some reasons the project was terminated in 2007.

Very recently an initiation for e-government has been revived again with the issuance of Decision no.48/ND-CP to speed up ICT application in state agencies in period of 2009 – 2010.

Vietnam Land administration

LAS in Vietnam is in transition that is transforming from analogue to digital. The activities are carried out through a hierarchical structure of four administrative levels (national, provincial, district, and commune level). Each level has some mandates and responsibilities in dealing with LA functions (VNG, 2003).

In line with the development of e-government in the country and in order to provide better services to the citizens, the government websites for LA are established at central and each provincial level. However, the function of these websites still limited in disseminating some information about the services being provided from the organisations, some legal documents, forms required from some services etc. The delivery of LA services through websites has not been started yet, what currently taking place is only the digitalisation of land records and building national land information system (NLIS).

1.2.1. Research problem

For the last few years, the domestic and overseas land related organizations have been doing research studies and surveys on public opinions about LAS in Vietnam. As mentioned by (Dang, 2007), the research regarding public opinions on LA reveal two major findings a) the LA sector is one among the most corrupted public sector organisation in Vietnam, and b) the number of land disputes and complaints about administrative decisions on LA sector is 70% of total civil disputes and administrative complaints.

The main reason for this situation is the weaknesses existing with the LAS, for example the Vietnam Land Administration Project (VLAP) report produced by Stanford (Stanford et al., 2006) mentioning about the weak system of land registration. Most of LA services are still delivered traditionally. The system is not transparent. Citizens have to consult various organisations to get a service done. The service delivery system is not only time consuming but also expensive, as a result some transactions like the transfer of land use rights take place informally. Further, the VLAP report also mentions that there is lack of communication and integration among government organisation in terms of spatial data sharing, resulting into the duplication of efforts and resources.

Above mentioned situation brings us to the fact that there is a gap between the expectations of citizens from LA services and what they are provided by the LA organisations and the interaction among government organisations to deliver the LA services. The reasons of such gap have not been investigated yet, though various research studies have been performed in the LA sector. On the other hand, the potential of e-government system has not been exploited yet to improve the transparency and

efficiency of the service delivery. Therefore, this research has been proposed to design a LAS based on e-government concept and addresses the reasons of gap identified from the existing situation. I expect the newly designed system will improve the efficiency and effectiveness of the delivery of LA services.

1.2.2. Research objective

Main objective of this research is to design an e-LAS for improving delivery of LA services.
Sub objectives
Sub Objective 1: to investigate the gap between the expectations of and availability of LA services for citizens, and the interaction among government organisations to deliver the LA services (in the context of G2C, and G2G relation).
Sub Objective 2: to design and validate improved LAS based on e-government concept.

1.2.3. Research questions

RQ1: What is the existing situation of LA services delivery?
RQ2: What are the expectations of citizens with respect to the delivery of LA services and how government organisations interact among themselves to deliver the services?
RQ3: What are the reasons of gap between expectations and delivery of LA services?
RQ4: What elements should be taken into account to design improved LAS in the context of e-government?
RQ5: How is the system developed?
RQ6: How can the newly designed system be validated?

1.3. Conceptual framework

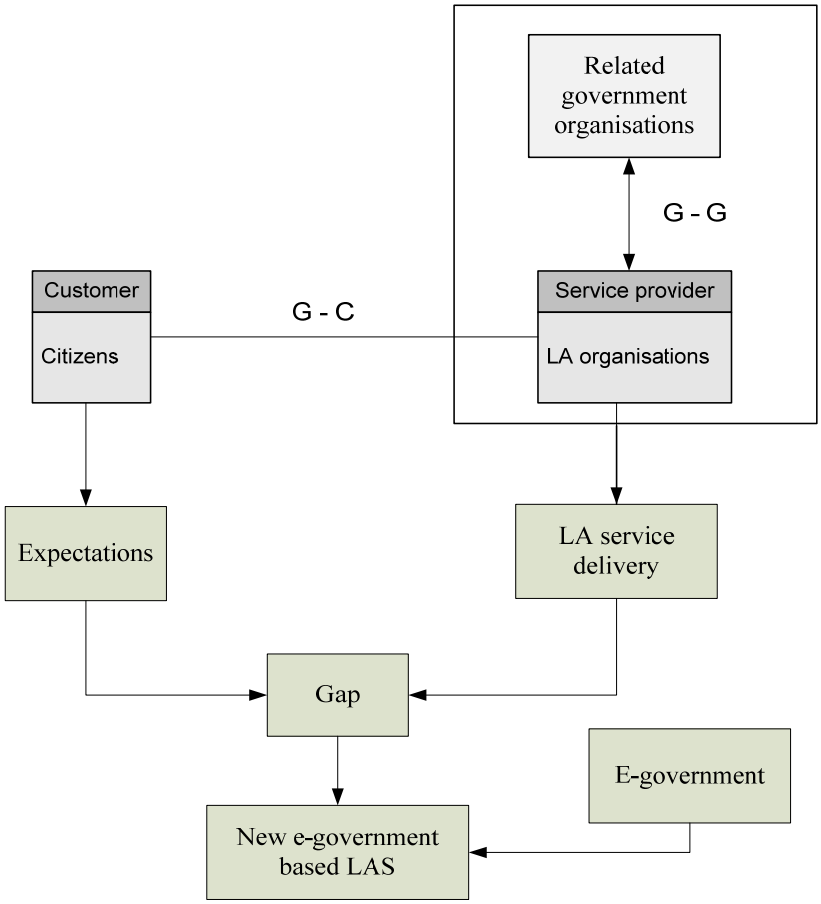


Figure 1-1: Conceptual framework

The general idea for carrying out this research has been mentioned in the conceptual framework as shown in Figure 1-1. This research first identifies the gap between the expectations of citizens on LA services, and the services being provided by the LA organisations. As the research aims to introduce the e-government concept to design improved LAS, it is important to assess the gap in terms of the relations between different entities of the system. For this research, the inter-organisational interaction (G2G) and the interaction between the LA organisation and citizen (G2C) are assessed to identify the gap. Inter-organisational interaction means, here, is the interaction between the government organisations to deliver particular services on LA, for example, Bureau of Natural Resources and Environment (BoNRE), a district level LA organisation, has to interact with Bureau of Tax (BoT) and Bureau of Construction (BoC) to deliver a land and house certificate to the citizen. In this case, BoNRE has G2G relation with BoT and BoC whereas G2C relation with the citizen who seeks the service for land and house certificate.

The identification of gap in terms of services and interaction lead to identify the reasons behind the gap. Then, the reasons of gap further lead to identify the elements to be improved in existing LAS. Some practices of e-LAS around the world are also be referenced through literature review to identify necessary elements for the LAS to be designed.

1.4. Research scope

This research deal with land use registration services, one of the important LA services, at district level in Vietnam case study.
The relation G2G and G2C in the service are described in figure 1-2 as follow:

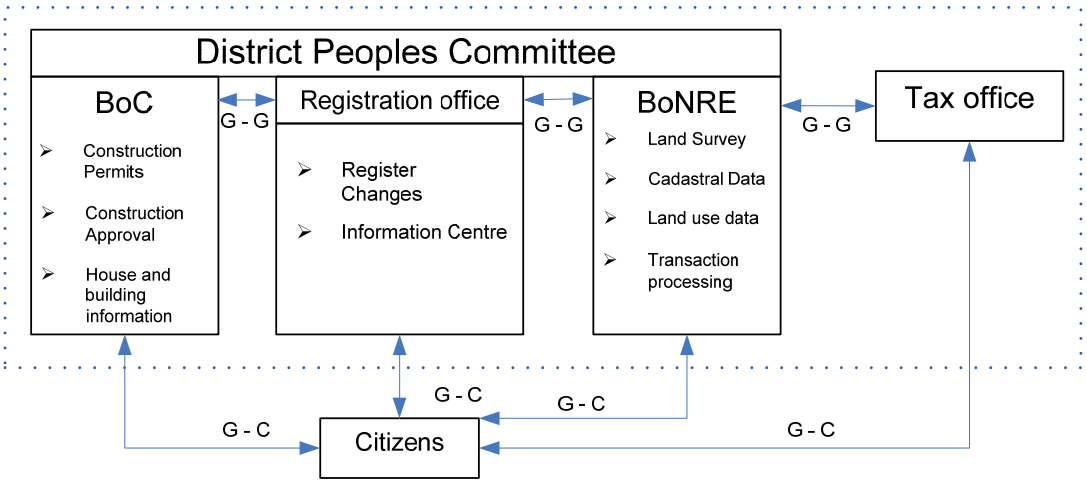


Figure 1-2: G-G and G-C relation in land administration at district level

1.5. Research methodology

1.5.1. Research methods

Case study approach has been adopted for this research. The case study for this research is carried out in Hanoi city, Vietnam. Due to the time constraints, among many LA services only the delivery of land use registration at district level was studied. Based on this study, the gap as mentioned in the conceptual framework is identified. The entire approach of case study, including data collection is mentioned in following section.

1.5.2. Validation

The e-LAS designed from the two research methods as mentioned above need to be validated. This validation has been performed on the basis of scientific knowledge acquired from literature reviews, and by developing a system prototype. The empirical data collected from the field work was used to simulate the prototype.

1.5.3. Research design

A research design is the logic that links the data to be collected (and the conclusion to be drawn) to the initial questions of research (Yin, 2003).
This research has been designed with four main phases as follows:

✓ Phase 1: Research proposal and preparation phase

This phase starts with literature review. The main activities of this phase are formulation of research proposal, and preparation for data collection. The research proposal includes research problem, objective and research questions and methodology. The activity of preparation for data collection includes preparation of questionnaire for interviewing, correspondence with the organisations and staff of BoNRE, BoC, BoT, Department of Natural Resources and Environment (DoNRE), an LA

organisation at provincial level, Ministry of Natural resources and environment (MoNRE), an LA organisation at national level, where the case study took place, and arrangement of necessary logistics.

✓ Phase 2: Data collection phase

A field visit was taken place in this phase. To collect the primary data, interviewing was performed. Potential interviewees were citizens come for service, the staff of BoNRE, the staff of DoNRE, and some other high level staff from national level (MoNRE). The staff here means information technology (IT) staff, and executive level staff who relates to the service. The staffs from other related government organisations such as BoC, BoT at district level were also interviewed. Observation staff and citizen's activities at the district office also were taken to fully investigate the situation of land use rights registration services.

As the secondary data, relevant reports, policy documents and legal documents were collected. Cadastral data and land use data at district level were also collected.

✓ Phase 3: Analysis and Design phase

This phase begins with the management of data collected from the field. Then analysis is done to identify the gap as mentioned in the conceptual framework. Statistical Package for Social Science (SPSS) software is used for quantitative analysis of the data. The results of the analysis are guide to design a new system of LA. Literature review will be required to support the design phase.

✓ Phase 4: Validation and Discussion Phase

The system designed at this stage is validated through developing a prototype. Finally, conclusion is drawn and some recommendations are made.

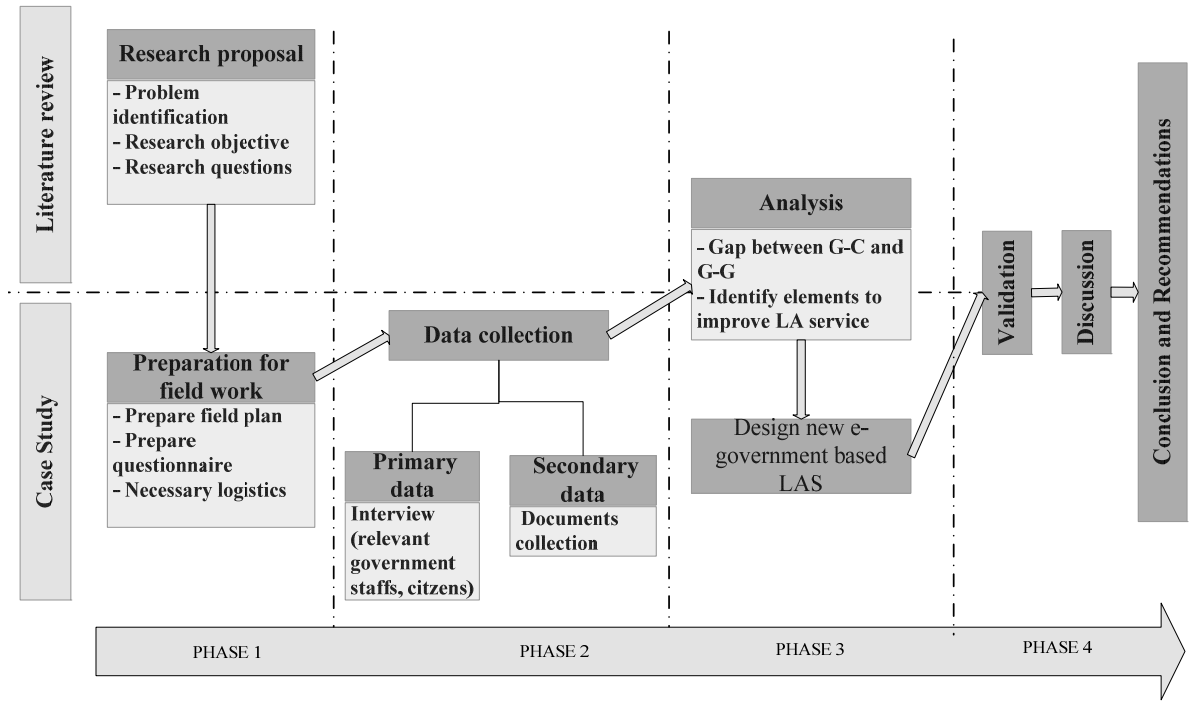


Figure 1-3: Research design

1.6. Thesis structure

This thesis is organized into seven chapters as follows:

Chapter 1 – Introduction: This chapter first provides background information about e-government and e-land administration. It then presents the research problem, research objectives and questions, research scope, and methodology of research. Finally, the outlines of thesis structures are given.

Chapter 2 - A conceptual framework based on literature review: In alignment with objective of research, a set of structured concepts for developing e-LAS is identified in this chapter. E-government concepts and implementation, land administration system concept and implementation which are crucial concepts, are discussed and presented in this chapter.

Chapter 3- Framework for designing e-LAS: based on the concepts obtained in chapter 2, system design theory approach, system development approach and choice of system development approach are presented in this chapter. Object-oriented system development methodology is adopted for designing e-LAS and object-oriented modelling concepts is discussed. And a number of static and dynamic models for modelling by using the unified modelling language (UML) are discussed.

Chapter 4- Field methodology for case study in Vietnam: This chapter describes fieldwork methodology including fieldwork design, fieldwork activities, and preliminary results. Then, limitations of the fieldwork are given.

Chapter 5 - Analysis of requirements for e-LAS in Vietnam: The purpose of this chapter is to identify the current situation of land administration in Vietnam and find out reason of the gap between G2G and G2C by analysing the fieldwork data. Then the analysis results are used to identify the requirements for improving land registration system and designing e-LAS.

Chapter 6 - Design e-LAS model and validation for G2C services
This chapter includes the designing of e-LAS based on requirements identified from Chapter 5. Different system models are developed and validated in this chapter.

Chapter 7 - Conclusion and Recommendations
This chapter presents the summary and draws the conclusion. Some recommendations for further research in this field are also presented.

2. Conceptual framework based on literature review

2.1. Introduction

In alignment with objective of the research, a set of structured concepts for developing e-LAS is identified in this chapter. E-government concepts and examples, and potential benefits and risks of e-government implementation are discussed and presented in this section 2.2, 2.3 and 2.4. Then, land administration concepts and implementation of land administration are presented in the next section. Both e-government and land administration are structured to develop the conceptual framework for this research.

2.2. E-government concept

There are different definitions of e-government concept among international agencies, governmental agencies (both at central or local level), researchers and scholars (Anttiroiko, 2008). In order to cover varieties of user requirements, several definitions are presented below. The essential elements of all these definitions are used to define main characteristics of e-government framework.

Electronic government (e-government) is a system of government in which internet or other digital means are used for the delivery of public sector information and services (Azad and Faraj, 2009). It is based on the principle of enabling users access to government information and services, when and how they want (i.e. ideally 24 hours a day, seven days a week) (Homburg, 2008).

E-government combines various information and communication technologies (ICTs) to connect government agencies and institutions, promotes reorganization of governments internal and external information flows, activities and functions in order to provide effective service delivering, and offer a new improved interaction of citizens, business community with governments (Ciborra and Navarra, 2005; Navarra and Cornford, 2009).

E-government is the government owned or operated systems of ICTs that transform relations with citizens, the private sector and/or other government agencies so as to promote citizens' empowerment, improve service delivery. Strengthen accountability, increase transparency, or improve government effectiveness and efficiency (World Bank, 2004).

E-government also refers to strategic use of ICT, in and around public administration, for the purpose of a 'wired' or a digital government (Homburg, 2008), or with aim to provide better delivery of government services to citizens, monitor government performance, improve interactions (between government-to-government (G2G), government-to-citizens (G2C) or government-to-business (G2B)), empower citizens or make agencies more efficient and democratic in general (Navarra and Cornford, 2003; Homburg, 2004; Navarra and Cornford, 2007; Wimmer *et al.*, 2007; Anttiroiko, 2008; Homburg, 2008).

E-government is one of those concepts that mean a lot of different things to a lot of different groups (Grant and Chau, 2005). There is also a debate that some see e-government as a goal, some see it as a tool to achieving other, broader public sector reform goals (Yildiz, 2007). Therefore, many definitions of e-government are rather loose and gloss over the multiple meanings e-government might have

depending on the specific context, regulatory environment, and dominance of a group of actors in a given situation, different priorities in government strategies (Torres et al., 2005).

Though e-government is variously defined, it essentially embraced the use of ICTs in public sectors with aim to transform its internal and external way of doing things and its interrelationship with citizens and business community. Internal is referred to the use of ICT to improve the efficiency and effectiveness of internal functions and processed of government. External is referred to the use of ICTs to make governments to be more transparent to citizens and businesses, giving access to greater range of information provided by government. Interrelationship is referred to the changes in the relationship between the citizens and governments with implication to empower citizens or make governments more efficient and democratic. This is adapted as e-government concept which is used in this research. This concept is generally presented in the figure 2-1.

In this connection, three main distinct blocks can be identified as government -to-government, government-to-business, and government-to-citizens(OECD, 2003; Seifert, 2003). However, this thesis does not deal with all three blocks but only G2G and G2C.

- Government-to-Government involves interactions and processes within and between government organisations (governments, public agencies) at national level as well as between national, provincial and local level. In many respects, G2G is considered as the backbone of e-government implementation (Seifert, 2003). Many e-government initiatives in G2G with aim to improve the efficiency of delivery when transacting information, sharing data within itself or with other governments.
- Government-to-Business involves interactions of business entities with government (Seifert, 2003). Example includes e-procurement, an online government-supplier exchange for the purchase of goods and services provided by government, with potential for reducing cost through improved procurement practices and increased competition.
- Government-to-Citizens involves interaction of citizens with government. Many public administration reforms and e-government initiatives have been focused upon strengthening the relationship with citizens (Homburg, 2008). These initiatives try to make transactions between citizens and government less time consuming and easier to carry out. One of the main goals for implementing these initiatives is to create a “one-stop-shop” service where citizens can carry out different tasks. The essence of one-stop-shop service is service integration which not only includes the integration of service content, but also the integration of service process (Zhu, 2009).

The “government” as indicated in the above blocks can be considered as a necessary component of any e-government interaction. This government could be either at the national, state or municipal level. Governments in general are formally constituted and therefore legitimized. They have the responsibility to strategically manage the country among in order to provide social infrastructure, such as public health, transportation planning, social service, etc. They formulate policies and are involved in planning and decision making processes to implement these policies. However, the term “government” has been used in a broad manner and therefore, its nature and structure would depend on the type of political system that exist in the country (Sharma, 2007).

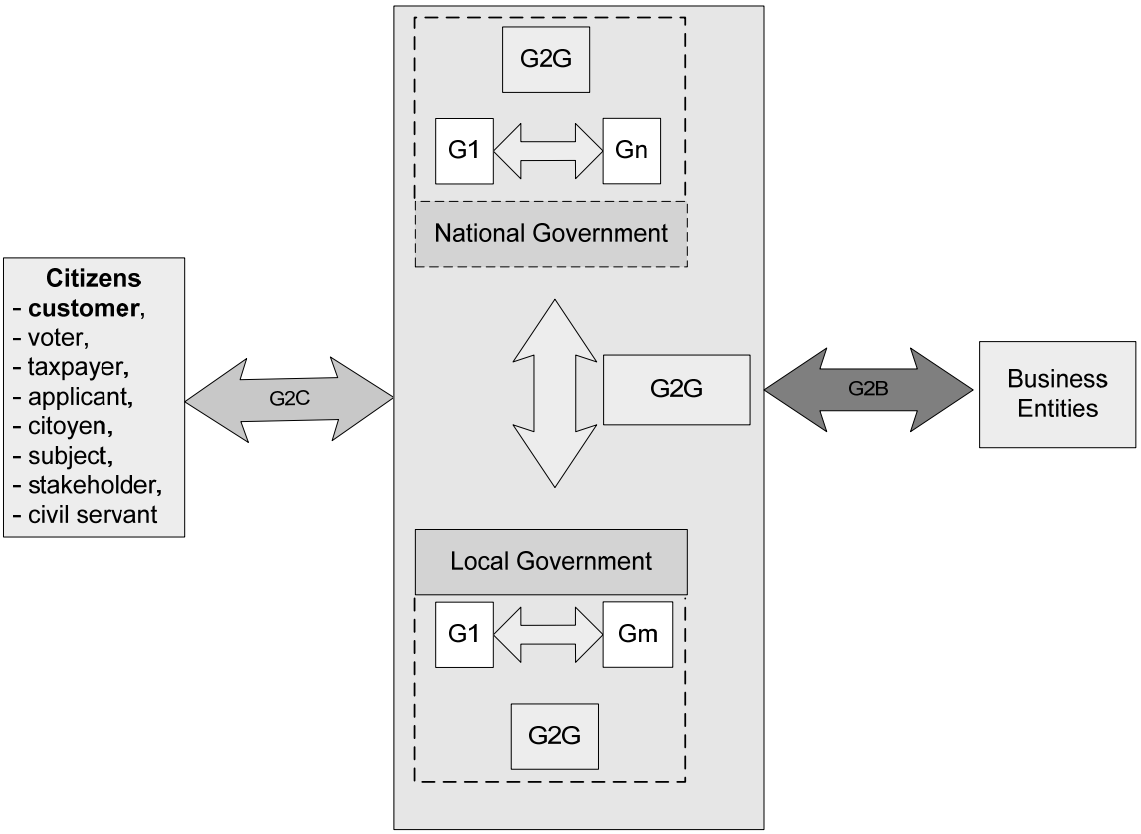


Figure 2-1: E-government concept

In the context of public administration, the concept of citizen is multidimensional one. Many roles of citizen in its relationship with government: customer, voter, taxpayer, applicant, citoyen, stakeholder, civil servant (employee) were distinguished by (Ringeling, 2001 in Homburg, 2008). In these relationship, voter, taxpayer, applicant, stakeholder itself presents the meaning of it. In the relationship between citizens and the democratic constitutional state, an important role of citizens is their position as citoyens. A citoyen is an individual who participates in policy processes, political parties and social movements (Homburg, 2008).

This study concentrates on solving gaps between citizens land administration. In this relationship, citizen is limited to the roles of customer of public services who looking for services provided by land administration organisation and using that services mandatorily. Moreover, there are number of striking differences from a customer as market perspective (Homburg, 2008).

- Many customers of public services are involuntary customer in relation to specific obligation such as prison service, tax payments.
- They do not have authority to negotiate the price or quality of services when applying for services because generally the law forbids.
- When the right to a certain public service is recognized, public sectors have an absolute right to delivery though it is different at each country. This is because government organisations have a legal duty to ensure the delivery of the particular service. These government organisations can seldom refuse delivery of the services and goods they have to offer in individual or special cases.

2.3. E-government examples

In the recent trend around the world, governments are fully awarded of the benefit of employing ICTs for improving public sector management practices seeking to harness this potential in service delivery, efficiency and transparency. According to UN survey 2008, recent evidence shows that many developed countries mostly Organisation for Economic Co-operation and Development (OECD) countries, where most services are already online or in digital form, they are in the process of integrating e-government policies and strategies with transformation policies and strategies. For example, under new e-government strategy, Switzerland is establishing a common body to co-ordinate policies, including data sharing policy. The Dutch government is implementing common public sector e-government building blocks for providing a seamless service to the public in order to reducing administrative burden (United Nations Department of Economic and Social Affairs, 2008).

E-government development in many developed countries is concentrate on creating back-office coherence and efficiencies to enable the delivery of e-services. In the mean time, an important objective for some of the developing countries is the integration of government back office process and re-engineering. For example, The department of public health in Rajshahi city corporation, in Bangladesh, was successful in integrating births and immunization schedules for children in the online birth registration system which improved significantly the dropout rates of immunization as well as better service delivery (United Nations Department of Economic and Social Affairs, 2008).

In order to see how the e-government is implemented and successful, two examples of good practices were identified which received the e-government Awards 2009. The two examples are Denmark with Genvej, which is the winner of “e-government empowering citizens” category, and Portugal with Licensing of hunters via the Multibancao ATM network, which is the winner of “e-government enabling administrative efficiency and effectiveness” category (European e-government award 2009).

Genvej is an online service developed by Gentofte Kommune – a municipality of Denmark to give citizens direct access 24 hours per day to self service solutions and personal information that the municipality and other public possesses such as tax authorities and healthcare sector. An OCES digital signature – a personal log-on key all Danish citizens is required to access this system. The services are exposed through open and reusable web services (SOAP) interfaces. Citizens can see and do the following things in Genvej (European e-government award 2009):

- See the personal and family information
- Use real estate series
- Give and read information to/from day care institutions
- Enrol their children to a school
- Use library services
- Oder a passport
- Order a Danish Health security card and change their house doctor.

“Licensing of hunters via the Multibanco ATM network”, is an electronic cross-bank network of automatic teller machines (ATM) with a geographical distribution throughout Portugal. This is Portugal’s respond to the target of European Union which is 25% reduction in administrative burdens. In order to implement this project, a joint effort between two national organisations was needed to integrate the information on hunting license. This network brought qualitative benefits such as greater convenience and faster service delivery to citizens, improve of information exchange, raise the level of security with which these type of licenses are issued, etc (European e-government award 2009).

2.4. Potential benefits and risks of e-government implementation

2.4.1. Potential benefits

Introduction of e-government concept can be found in the realization of new public management-type of public reforms, which make public administration more citizen-oriented, efficient, accountable, transparent, and responsive to the needs of public. In addition, an important motivation for e-government is to bridge the gap between administration and citizens (Homburg, 2004; Navarra and Cornford, 2007; Homburg, 2008). According to OECD study, E-government can improve efficiency, improve service, increase citizen involvement and help achieve reform in public administration (OECD, 2003). However, these benefits can actually be realized only in the certain conditions. Some main potential benefits of e-government are given below:

Increasing efficiency: The most prominent benefit of e-government is the reduction of costs related to services provided to citizens, businesses. Another benefit is reducing layers of organisational processes by re-engineering and streamlining operating procedures. Governments can decrease number of staff if appropriate or redeploy staff in more productive tasks. Internet-based application can generate savings on data collection and transmission, provision of information and communication with customers. Significant future efficiencies are likely through greater sharing of data within and between governments (OECD, 2003; Seifert, 2003; Sharma, 2007; Bhatnagar, 2009).

Improve service delivery: Another potential benefit of e-government is improving the quality, range and accessibility of services provided by governments to citizens and businesses. E-government can benefit customer by reducing delays, consolidating multiple services under one roof, eliminating the need for frequent visits to government offices, standing in queues, and enhancing geographic coverage to reach larger segment of population. The use of ICT enables quicker transactions and up-to-date information and data (OECD, 2003; Seifert, 2003; Sharma, 2007; Bhatnagar, 2009).

Increasing transparency, accountability: E-government systems can lead to greater transparency. If the right procedures are in place, e-government can make financial or administrative transactions traceable and open to challenges by citizens. Those responsible for particular decisions or task can be readily indentified. By providing enhanced accounting, monitoring system, e-government applications can ensure that public finances are fully open to senior managerial and external inspection. In addition, publishing rules and procedures online can increase transparency. Citizens can access and understand government rules and procedures to obtain a service by having better documentation for follow-up action (OECD, 2003; Seifert, 2003; Sharma, 2007; Bhatnagar, 2009).

Empower citizen or increase citizen participation: E-government provides citizens channels for feedback and consultation. In a longer time frame, e-government can subtly shift the balance of power between the service providers and customer by providing services according to customers' needs and not according to government department structure. E-government enables greater participation of citizens leading to their empowerment (Seifert, 2003; Bhatnagar, 2009). For example, strengthen feedback on services, and collections of statistics on performance in service delivery are become easy. These data can also be made public.

Reducing corruptions: E-government has been used by a number of public agencies as an enabling tool that can help achieve broader goals of improving governance (OECD, 2003; Ciborra and Navarra, 2005; Bhatnagar, 2009). E-government cannot be considered a significant impact on reducing corruptions but can be a meaningful impact. Recent studies on the impact of e-government projects in India have reported a reduction in bribery in some projects, not all. One of typical example is Bhoomi

project in India which involves the digitalisation of land record, and the provision of access to these record via information kiosk and fingerprint authentication systems. Results of this project shows that still having the possibility for corrupting but a large number of corruption and losing land is reduced (Thomas, 2009). There results seem to suggest that e-government can potentially impact administration corruption. As the possibility of exposure of wrong doing gets enhanced by e-government, the fear of consequent embarrassment can be prevention to corrupt practices.

In addition to these benefits, e-government results in a number of socio-economic gains such as enhancing competitiveness leading to higher economic growth of country, more efficient and user-friendly public sector, enhancing political capital for the government (Sharma, 2007).

2.4.2. Potential challenges and risks of e-government implementation

On the other hand, despite the potential benefits of e-government initiatives, there are a number of challenges such as digital divide (the lack of equal access to internet, computers whether due to a lack of financial resources or necessary skills); privacy; pre-existing conditions that are connected to larger issues; legacy systems and old mindset (Seifert, 2003; Ciborra and Navarra, 2005).

In order to design appropriate e-government systems, it is important to learn from studies of field experiences. Many studies confirm that there are many obstacles to successful e-government implementation including financial, planning, political objectives and lack of citizen acceptance and/or interest. An UN study divides there obstacles into the following factors: institutional weakness, human resources, funding arrangements, local environment, and technology issues (Evans and Yen, 2006).

Evidence of failed e-government projects has drawn attention to the level of risk in implementation. A failure rate of more than 50 percent based on the opinions of 15 experts and student submissions is widely cited (Heeks, 2003). In the context of developing countries, many projects launched have not led to any significant improvement in the delivery of government services. Major factors that could lead to failure of e-government implementation in a country include resource crunch, lack of political will, together with corrupt practices, cultural and contextual challenges, depending on foreign technique knowledge (Seifert, 2003; Ciborra and Navarra, 2005).

2.5. Land administration system

2.5.1. Land administration concept

“Land administration” as a term has been defined in many publications and in several glossaries and different from country to country. For the purpose of the research, a definition of land administration of UN-ECE (1996) (2005) was adopted. Land administration is defined as “the process of determining, recording and disseminating information about the tenure, value, and use of land when implementing land management policies. It is considered to include land registration, cadastral surveying and mapping, fiscal, legal and multi-purpose cadastres and land information systems”.

It is not easy to present a definition of a land administration system. D. Steudler notices “…that a land administration system very much reflects the social and cultural context in which it is being operated” and he further continues: “As the land administration systems are operated within distinct social and cultural contexts, they depend on many factors from within and from the outside of the system” (Steudler, 2004). Un-ECE (1996) also mentioned that land administration systems are concerned with the social, legal, economic and technical framework within which land managers and administrators must operate.

Land administration systems, and particularly their core cadastral components, are an important infrastructure which facilitates the implementation of land policies, land management strategies (Enemark and van de Molen, 2006). Land administration system are also considered as continuum comprising deed recording systems, title registration systems, negative and positive systems (van de Molen, 2001) or an integrated system of land registration system and cadastre system (Zevenbergen, 2004).

Land registration is a process of official recording of rights in land through deeds or title (on properties). It means that there is an official record (the land register) of rights on land or of deeds concerning changes in the legal situation of defined units of land. It gives an answer to the question "who" and "how" (Zevenbergen, 2004). Land registration also can be described by the definition as "the process of recording legally recognized interests (ownership and/or use) in land" (Dale and Nichol, 1989).

The system of land registration, being a so-called open system, can be seen as a 'black box' represented by an input - throughput - output model. The input into the land registration system is the real land tenure situation and the output is the legal security since the focus is on increasing the legal security of people holding land with the system of land registration (Zevenbergen, 2002).

There are quite few classifications of land registration system can be found in the literature. Two main popular type of land registration system are title registration and deed registration. Other land registration system are negative systems, positive systems, system adjudication, sporadic adjudication etc (Zevenbergen, 2002).

2.5.2. Land administration in e-government experience

Besides the trend of sustainable development, good governance, civic participation, cadastre 2014 vision statements which influence land administration system, e-government is newly emerging and important trends (Steudler, 2004). A Dutch Kadaster case is presented as following in order to see how the implementation of successful e-LAS.

The Dutch Kadaster is the cadastre and land registry agency of the Netherlands. It compiles data about registered properties and makes it available to business, clients and citizens through public registers and cadastral maps. The agency got the European E-government award 2005 in theme three which is businesses and citizens service use – transformation and innovation in external facing services, putting citizens and businesses at the centre, driving use and participation. The organisation has been redesigned as a front office (marketing and customer services department) with a back office operating (production team) to support the front office requirements. Some of the good characteristics of the Netherlands system are (Tuan, 2006):

- The system guarantees quality of data and products by ISO standards and by implementing national triangulation network and ensuring authentic registration procedure.
- The system adopts a computerized registration procedures and simplifiers the retrieval and process of data access, thus it can provide up to date information and timely available data to customers.
- The system has a sound product distribution strategy based on the one-stop-shop strategy providing ease and access to customers.
- Kadaster implements a coordination strategy and ensures good relationship with council of users maintains linkages with municipalities and maintains a Kadaster network.

- The Kadaster also institutes a program for capacity building and warrants that staffs have open and flexible attitude.
- The system is protected and legally upheld by the Kadaster Organizational act, Kadaster act and the Land Development act.
- Compulsory registration of real estate transaction that guarantees the system is complete and reliable.
- Updates are based on notarial deeds and land surveys.

2.6. Land administration in e-government framework

When one studies the functional aspects of Land Administration, the concept of e-government is equally applicable to it, as it is an important sector of public service delivery to the citizen. The processes or functions of LA are organised into different agencies that are committed to serving a broad range of citizens with intensive interaction between government and citizen (Kalantari et al., 2005).

LA also provides land information and related data that are fundamental in political, economic and legal decisions for the best use of land and its management (Lemmen et al., 2004). Within the context of e-government, e-land administration (e-LA) is established by using ICT / geo-ICT to provide opportunities for better service delivery, customer satisfaction and citizen participation and decision making (Steudler, 2004). In order to realise e-government concept, e-LA not only uses ICT / geo-ICT, but also considers changes in organisational/institutional and legal framework taking stakeholders' needs which mostly is citizen's need into account.

Reengineering LA processes with citizen participation and the use of IT/Geo-ICT bring new dimensions in terms of strategies, processes and skills on functioning of organisations. To implement these dimensions, re-structuring of organisation and re-skilling of the employees would be required. Along with changes in processes and skills, organisational strategies also need to be changed fitting with main purpose of e-LA in the context of e-government (Lemmen et al., 2004).

At the same time, transformation from a traditional LA to e-LA requires substantial changes in the existing laws, specifically to the acts dealing with the functioning of LA and the acts dealing with the responsible institutions/organisations (Lemmen et al., 2004; Sambura, 2004).

Moreover, the development of e-LAS cannot be done in isolation from its stakeholders, indeed citizens. Consultations and communications with stakeholders must be involved in the process of change to satisfy their needs, and to make the system more citizen oriented.

2.7. Concluding Remarks

A set of structured concepts including e-government concept and land administration system for developing e-LAS is identified and discussed in this chapter. Though e-government concept is variously defined, it essentially embraces the use of ICTs in public sectors to improve internal functions and process of government, to make governments more transparent to citizens and businesses, increasing access to information provided by government, and empower citizens. Two examples of "e-government empowering citizens" of Denmark and "e-government enabling administrative efficiency and effectiveness" of Portugal were introduced to see the practices of e-government.

Introducing of e-government not only brings potential benefits but also brings some challenges and risks. Increasing efficiency, improving service delivery, increasing transparency, accountability, empowering citizen, and reducing corruptions are the potential benefits of e-government which can be realised in certain conditions. In contrast, there are many obstacles including institutional weakness, human resources, funding, local environment, policy will, and technical issues in implementation e-government.

When one studies the functional aspects of Land Administration, the concept of e-government is equally applicable to it, as it is an important sector of public service delivery to the citizens. Moreover, e-government is emerging and important trend which influence land administration system. A Dutch Kadaster is the good practices of implementation e-government in land administration system.

When transformation from traditional LAS to e-land administration, not only using ICT/geo-ICT to provide better service delivery, citizen participation, all the changes in organisational structure and cooperation, institutional environment, and legal framework need to take into consideration.

3. Framework for designing e-LAS within e-government

3.1. Introduction

The purpose of this chapter is to develop a framework for designing e-government based LAS. A general discussion about e-LAS is already presented in the previous chapter. This chapter begins with the identification of requirements from e-LAS (Section 3.2) in order to develop the framework. Based on the requirements, general system architecture of e-LAS is provided in section 3.3. Then, system design theory, system development approach and validation techniques are presented in section 3.4. Since there are three main system development approaches such as soft system, structured system, and object-oriented, a brief description of each approach along with the choice of approach is also explained in this section. The subsequent sub-section provides the design steps as a guideline to the system design to be followed in the upcoming chapters. Then, validation techniques used for the research is presented in the sub-section 3.4.4. . Finally, concluding remarks are drawn in the section 3.5.

3.2. Requirements of e-land administration

As given in chapter 2, e-government framework might be different at each country because it depends on the specific context, regulatory environment, main actors, and different priorities in each government. Thus, transformation of traditional land administration system to e-land administration system in the framework of e-government also might be different for each country. However, it is essential to identify the requirements on fundamental aspects including citizen focus, legal, organisational/institutional, technical and financial aspects in order to realize e-LAS.

a) Citizen focus

The main goal of e-land administration is to improve the delivery of services to citizens. Thus, to be a citizen-focused system is one of the basic requirements in developing e-land administration system. In order to achieve this goal, a system should fulfil following requirements:

- It is essential to understand citizens' needs for a system to be customer oriented. Citizen satisfaction and need surveys should be performed regularly by the government organisations to assess the quality of services being provided and citizens need from the new system.
- Before developing new e-services, government organisation should know which service citizens prefer to use.
- A way to create citizen-focused services in e-environment is the development of a website easy to use. The website provided by land administration should be as simple as possible, so citizens have no problem in finding what they are looking for.

b) Organisational/Institutional aspect

This aspect affects the implementation of e-LAS in reality. Use of geo-ICT and reengineering land administration functions with stakeholder participation bring new dimensions to organisations and institutions. E-land administration within e-government framework means bringing improvement on interactions between land administration organisations and citizens and within and among related organisations. Thus, following requirements concerning organisational and institutional aspects are need to meet in order develop e-LAS:

- It requires re-structuring within organisation and among concerning organisation.
- Re-skilling and optimization of staff would be required.
- It leads to change in organisational strategies and mandate. Moreover, the changes only at an organisation are not sufficient for improving overall system therefore a suitable institutional arrangement among related organisation is required.

c) Technical aspect

One aspect of e-LAS is to ensure efficient access of citizens as well as government organisations to the required information. Further, the information needs to be comprehensive, complete and interoperable so that it can be integrated and shared among different interest groups and stakeholders. In order to achieve this, following technical requirements should be met while developing e-LAS:

- **Standards**: Non-standards data and information cannot respond efficiently to required e-LAS. Data and information need to transparent and reliable by following certain standards. The standards have to consider several aspects, such as data content (cadastral content, land registration content), technical specifications, a defined process for input, update, sharing and maintenance.
- **Data and its quality**: The data output expected from e-LAS are comprehensive and completed cadastral and land registration data. The system efficiency and effectiveness depend on the accuracy, completeness and quality of the data. With the support of ICT/geo-ICT tool, the expectation about data and its quality can be met.
- **Security and control**: Without proper mechanism of security and control e-LAS may also face some risks as other e-government systems face. Therefore, proper mechanism of security and control is a must for an e-LAS. The purpose of security and control is to recognise risks and provide solutions to eliminate or reduce maximally its consequences. If the system is weak and unsecured, it can create significant problems such as informal transaction, tenure insecurity for organisations and stakeholder who use it.

d) Legal aspect

Legal aspect affects deeply on the implementation of e-LAS. In order to implement e-LAS, existing legal framework may require tremendous changes, and specifically on concerning acts and regulations and issuing permissions not only dealing with function of cadastre and land registration system, but also dealing with institutions responsible for land administration and related fields. However, changes in legal framework cannot be done in a short period of time. Therefore, it is necessary to have a clear strategy, short term and long term for making necessary changes. Nonetheless even the best law for e-land administration are established it does not guarantee the practical successes during its implementation.

e) Finance aspect

The implementation of e-LAS will require large budget for designing, piloting and implementation of the system. Main areas of investment are procurement of hardware, software, communication network, user and operator’s training activities, system operation, and maintenance. Main requirement to be fulfilled for the financial aspect is the arrangement of financial resources, as government funding will not be sufficient to implement the system. External resources such as financial institutions, donor agencies, the collaboration with related government organisations can be the options for additional arrangement of financial resources.

3.3. Architecture of e-LAS

System architecture is an important system component during the design phase. The role of system architecture is similar to the role that n architecture plays in building construction. Correspondingly, system architecture is important part to know how the information requirements are satisfied. Moreover, system architecture is created in order to align business and geo-ICT strategies.

System architecture includes diagrams showing the internal interfaces among the system's components or subsystems, and the interface between the system and its external environment, especially the user of system. In this research, e-LAS architecture provide broad picture of technical and infrastructure specifications. The general idea about e-LAS architecture is showed in figure 3-2.

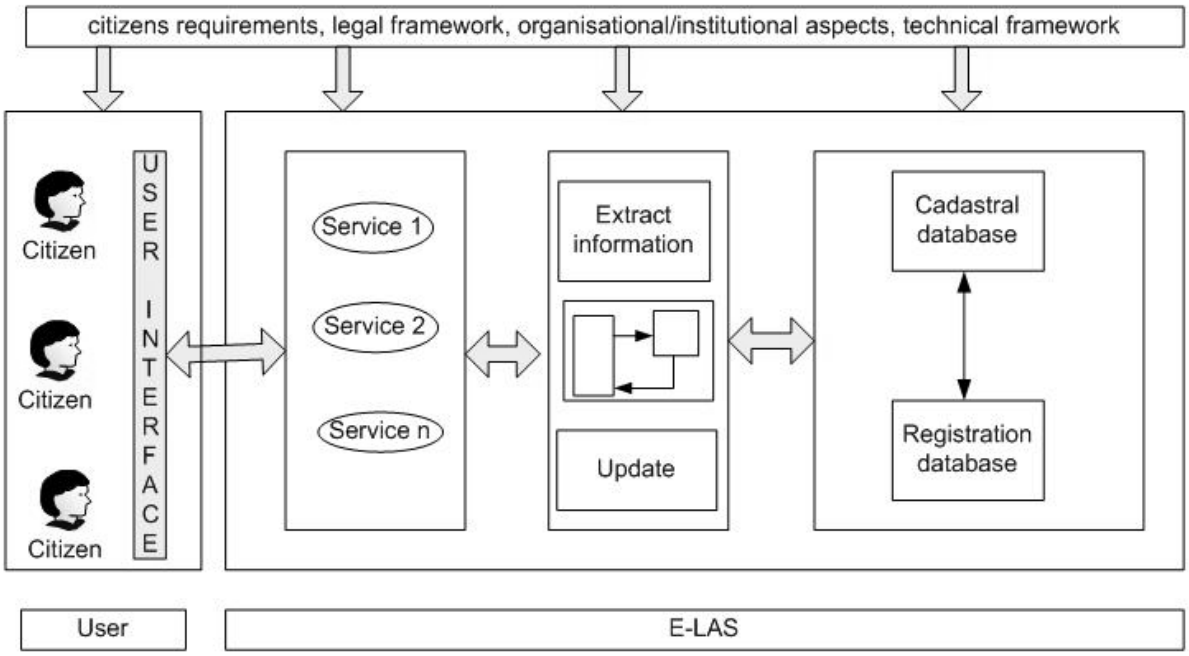


Figure 3-1: System architecture

3.4. System design and validation technique

3.4.1. System design

With the aim to develop a framework for designing e-LAS, system design theory and development approach in Information System (IS) are briefly presented here.

3.4.1.1. Information System (IS) design theories approach

In general, IS design theory is a term that can refer to general system theory and the relationship between developers, clients, and users (Churchman, 1968). That term also used in a very specific way to refer to solutions for specialized classed of IS design problems (Walls *et al*., 1992). Walls et al define IS design theory as a package of three interrelated elements including a set of user requirements, a set of system features, and a set of principles guiding the process of development. By identifying all these elements, an IS design theory can be considered as a general guidance for designers(Markus *et al.*, 2002). IS design theories are normative theories which are prescriptive and evaluative rather than solely descriptive, explanatory, or predictive. Thus, IS design theories must not pass scientific tests, they also need pass the tests of practice (Markus *et al*., 2002).

However, main concentration of this study is designing e-land administration system through case study of land registration system in Vietnam. It aims at creating solutions to specific classes of relevant problems.

3.4.1.2. System development approach

In order to develop a guideline for designing e-LAS, a brief introduction of system development methodologies are given and the choice of suitable methodology can be made accordingly.
System development consists of a collection or model of the information system, procedures, techniques, tools and documentation aids that guides us in implementing a new system. It provides further knowledge on system behaviour and why certain systems do not function as required by the users. It consists of several phases, and these help the designers in planning, managing, controlling and evaluating information system projects. Thus the system development methodology represents a systematic way of developing an information system by telling "what" steps to take and how to perform those steps and explain why those steps should be taken in that particular way (Avison and Fitzgerald, 1995; Reeve and Petch, 1999). The sequence of those systematic steps is identified as system development life cycle.

There are already system design approaches available, such as soft system, structural system and object-oriented system (Tuladhar, 2004). A brief description of each approach and its life cycle is presented in order to explain which approach is suitable for design e-LAS as follow.

a) The soft systems methodology (SSM): is based on the general systems theory with aim to understand the nature of systems in their entirety. It concentrates on the actors understanding problem situations rather than on developing a solution. Therefore, SSM is considered as bottom-up approach. The basic life cycle of SSM is a seven-stage model developed by Checkland which is shown in figure 3-2. Although Checkland assurances that SSM is time-independent, it is in fact time consuming (Lehaney and Paul, 1996). These steps and processes may have to be repeated many times before a reasonable agreement can be reached.

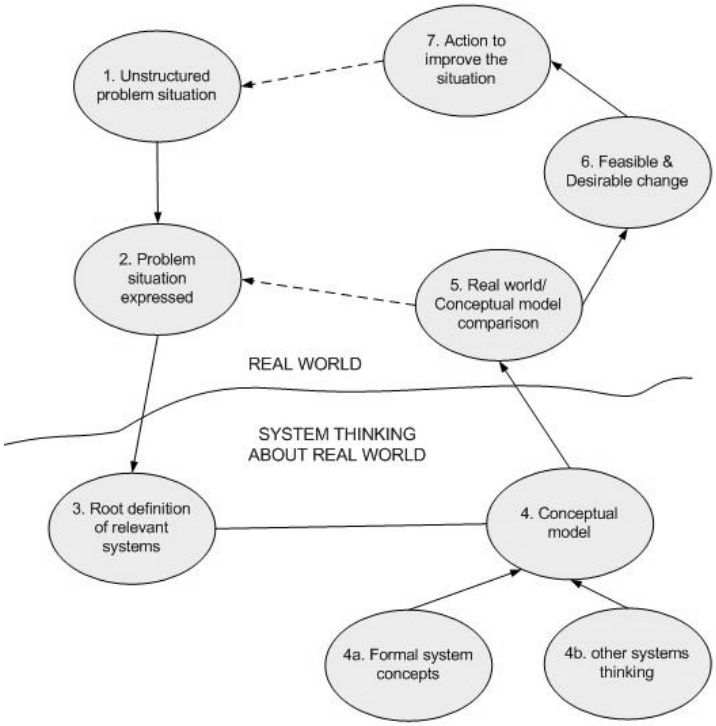


Figure 3-2: life cycle of SSM (Checkland, 1981)

b) The structured system development methodologies (SDM): are based on functional decomposition that breaks down complicated problems into smaller units in more manageable way. SDM life cycle, as presented in figure 3-3, is commonly known as waterfall model and top-down model because in this approach all phases are executed sequentially where the activities in each successive phase start with the completion of the activities in the former phase. Moreover, SDM are function-oriented from the standpoint of the functions it employ rather than the data on which it performs these function. Consequently, consideration is given only to those data immediately needed by the function. Then, a system is developed that has short-term value because system functions can change very fast (Hawryszkiewycz, 1998).

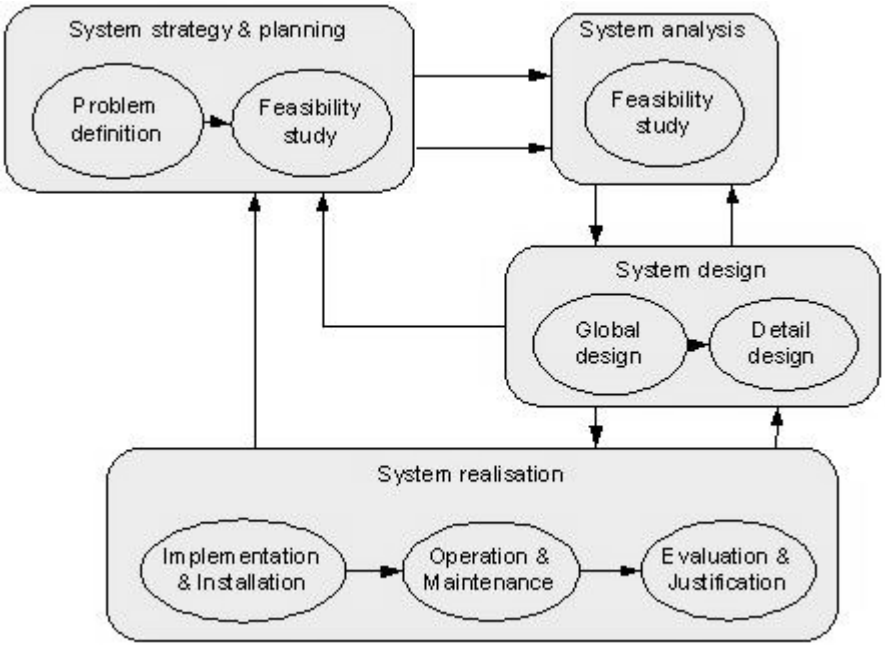


Figure 3-3: life cycle of SDM (Tuladhar, 2004)

c) The object-oriented system development methodology (OOSDM) uses the concepts of objects as the development perspective of systems. The objective of OOSDM is to bring solution the division between process analysis and data analysis. OOSDM combine both semantic data modelling and process modelling and avoids the gaps between them, remedy the disadvantage of the classical waterfall model used in the SDM. Figure 3-4 demonstrates a typical example of OOSDM life cycle. From that life cycle, during system development a little analysis, a little design, and a little coding and testing are needed to be done (Tuladhar, 2004).

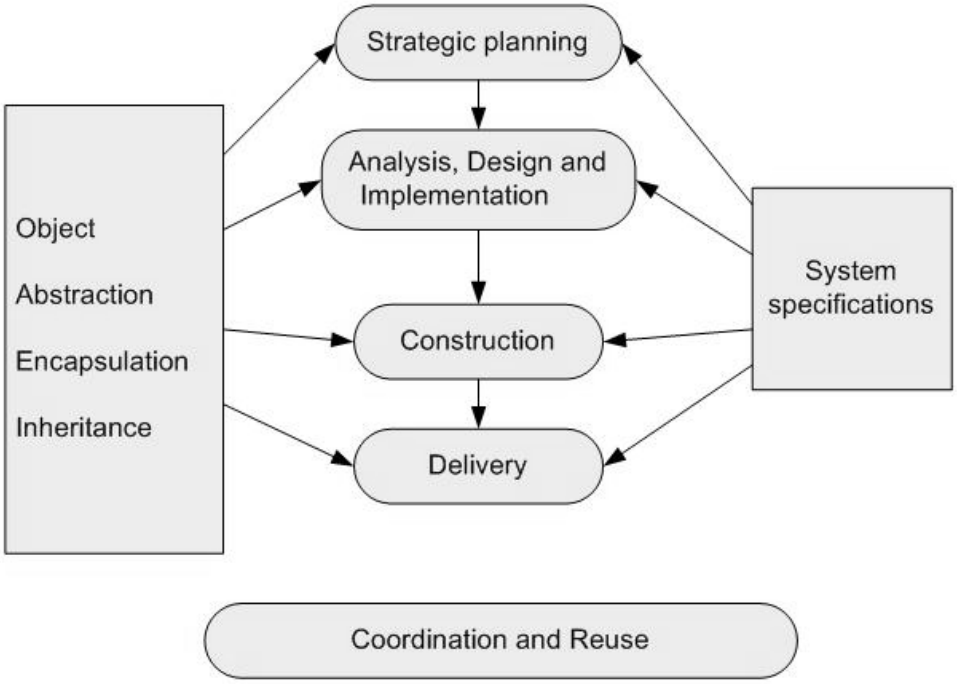


Figure 3-4: life cycle of OOSDM (Rutayuga, 1996)

3.4.2. Choice of system development approach for designing e – LAS

Among these above approaches , the OODSM approach takes advantage of both top-down analysis and bottom-up design simultaneously (Henderson-Sellers and Edwards, 1990) which means take advantages of both SSM and SDM. Moreover, there are additional advantages to this approach such as:

- Extendibility, which presents object types and methods with easy modifications.
- Behavioural constraints, which allow the behaviours of each object to be predetermined with a fixed set of methods and modelling power that is realised through various relational types.
- Inheritance of attributes and methods.

With the above characteristics, the OOSDM is a well-known methodology for use in system development, and it plays crucial roles in the development or reengineering of systems (Tuladhar, 2004). Particularly, a system such as LAS which is a complex relationship of the technical and legal, organisational, institutional domains, OOSDM is reasonable choice. Another reason is that objective of new designed e-LAS is to solve the gaps between G2G and G2C in land administration system and meet requirements of citizens.

3.4.3. Design steps based on OOSDM approach

Models are seen as “guiding templates” for developing or reengineering existing systems, and are built to enable better understanding of a system being developed. Thus, the larger and more complex the system is, the more important that modelling becomes (Tuladhar, 2004).

For system modelling in this study, modelling is divided in to 4 models for e-LAS. The activities are related to the functional, process, static and dynamic aspects of e-LAS. These models are not separated but created a combined set of system models (see figure 3-5).

The unified modelling language (UML) based on Object-oriented concepts is accepted worldwide as standard modelling language. UML models can be used to describe and implement various

components and their links with cadastre and land registration systems, and also to compatible and integrate with other databases (Tuladhar, 2002).

a) Organisational model

Overall vision of system organisation is visualised by organisational model. Organisational model is developed and described through organisation architecture. In this model, the relation between the units which can improve the coordination and cooperation among line organisations is the important part.

b) Functional model

The functional model focuses on how the system is supposed to function, for satisfying the users (citizens and staff) (Tuladhar, 2004). The functional model is described using use case diagram because use case diagram is applied for capturing external environment (user requirements and behaviour)

c) Dynamic model

Dynamic model describes the behaviour of the system containing each important resource and interacts between several different resources. Because e-LAS include dynamic aspects such as process of transfer and subdivision which can be changed and revised to meet certain requirements, dynamic model is chosen to develop the dynamic part of e-LAS. Use case diagram to capture external environment and activity diagram to demonstrate internal environment are suitable choice for developing this type of model.

d) Static model

Static model concerns the structuring of databases for all kinds of information used in the system and information about objects participating in the process. Data model is usually static. In UML, the class diagram is used to describe the data model because the classes can represent and structure information, products, documents or organizations. It provides a way of visualising who interacts with whom and who is responsible for what (Tuladhar, 2004).

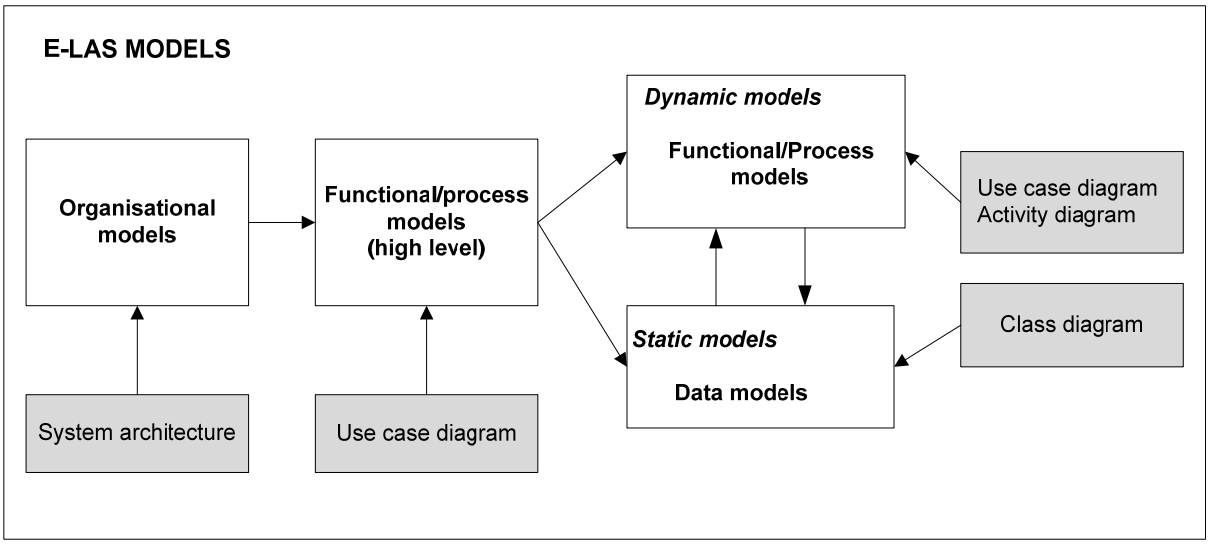


Figure 3-5: e-LAS models and supporting UML diagrams

3.4.4. Validation techniques

In this study, prototyping is adopted as methods for validating the designed e-LAS. Prototype is a construction of a working model provided to help potential users to determine their requirements.

Technical prototyping is a type of design prototype concerned with testing the functionality and performance of software (Reeve and Petch, 1999).

In this research, the aim of this prototyping is to test the functionality of e-LAS to see whether it can meet requirements of system. In functionality prototyping, there are four activities of registration which are: transferring and subdivision, information query, citizen participant should be test. Detail description about which software and hardware used for prototyping, how to prototype the registration process are developed in chapter 6.

3.5. Concluding remarks

The object of this chapter is to develop framework for designing e-LAS by using object-oriented system development methodology. In order to achieve this, this chapter looked briefly at requirement of e-LAS, system architecture of e-LAS, system design theory, existing system development methodologies and a choice of OOSDM is given. The model is emphasised in the methodology as important part for designing system. Four models such as data model, function model and dynamic and static model are introduced. Finally, technical prototyping is introduced as technique for validation the designed e-LAS.

4. Fieldwork Methodology for case study in Vietnam

4.1. Introduction

This chapter explain about the case study methodology applied in this research. In this research, land registration system of Vietnam is considered as a case study. The current situation of Vietnam land registration system and land administration system are identified through fieldwork. Based on the data collected from the fieldwork, gap and the reason of gap mentioning at chapter 1 are recognized.

The fieldwork methodology is described in the following sections in detail. Section 4.2 describes fieldwork design including fieldwork objectives and data collection methods. Fieldwork activities are presented in section 4.3. Section 4.4 presents preliminary results. Finally, limitations of the fieldwork are given.

4.2. Fieldwork design

4.2.1. Fieldwork objectives

One of several ways of doing social science research is case study. In general, case study is preferred when “how” and “why” questions are being posed (Yin, 2003). In this research, in order to answer research questions from 1 to 3, besides literature reviewing, a case study was carried out through fieldwork at Hanoi city, Vietnam.

The fieldwork was conducted with three main objectives:
Objective 1: To obtain the understanding about the land use rights registration services at district level.
Objective 2: To investigate the main reasons of the gap between the expectations of citizens on land use rights registration services, and the services being provided by the LA organisations (G2C); and how land administration organisations and related organisations interact among themselves to provide that services.
Objective 3: To collect data and information related to the research topic.

In order to achieve the above mentioned objectives, both primary and secondary data are collected in this research. The primary data helps to understand the real practice of land registration and the opinion of the respondents about it. The data collected from the secondary sources provide deeply understanding and verify the accuracy of collected data from primary source. The figure 4-1 shows the methods of data collection which is explained in the following part:

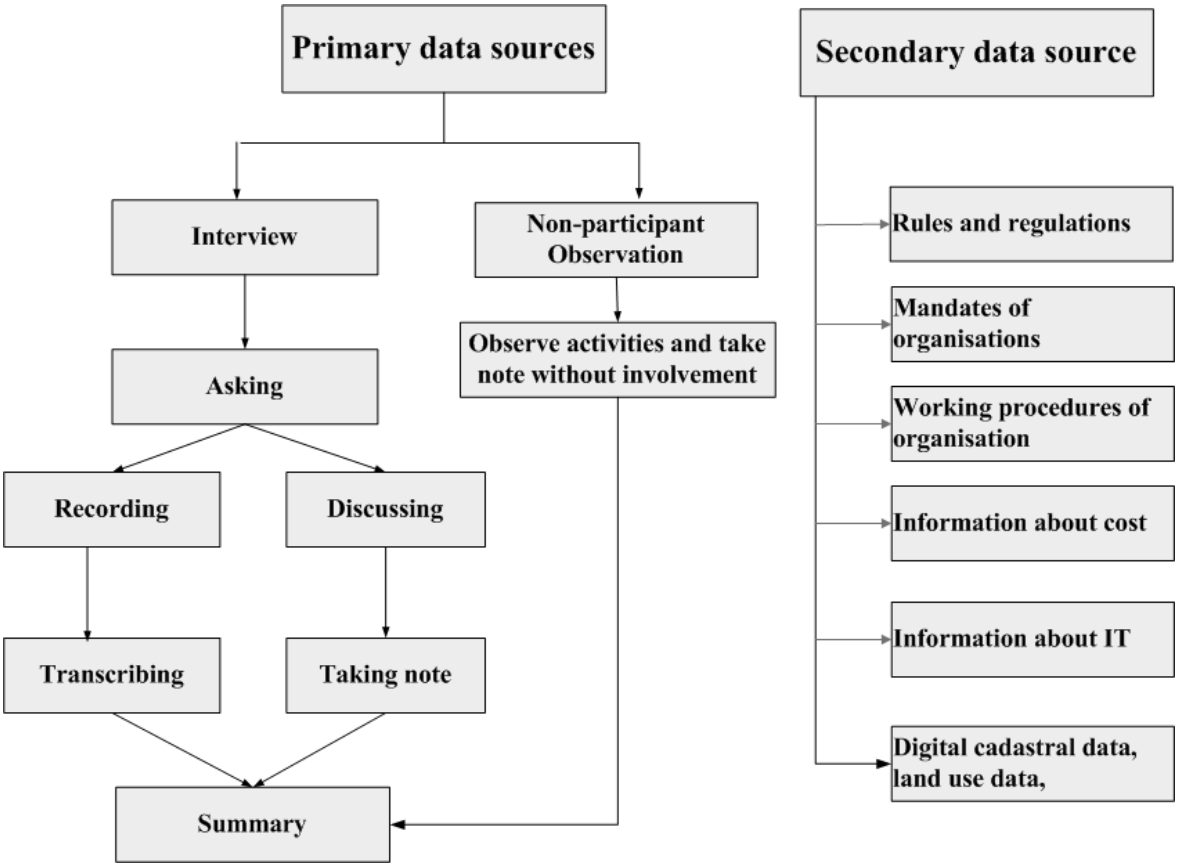


Figure 4-1: Data collection methods

4.2.2. Primary data sources

4.2.2.1. Data collection methods

The methods used for primary data collection were interview and non-participant observation. These two methods are described in detail as following.

a) Interview

Interview is the main sources of primary data collection in this research. Data collected from interview is used to answer research question 1, 2 and input to answer research question 3. Fieldwork plan were prepared and approved by the supervisors before going to the field.

Interview method is undertaken for three groups to study from three different viewpoints including high level of management, operational level and citizens. Scope of this study is to deal with land use registration services at district level in Vietnam. Thus, the interviews mainly concentrate on operational level (district level) and citizens. The interviews with high level of management is to study the consistent and connection among this levels and operational level and citizens.

b) Non-participant observation

Non-participant observation is another method of data collection applied in this research. The non-participant observation was used during the three week field trip in Vietnam. The purpose of using this technique was to observe activities and attitude of staff working at land registration office at district level, location of offices, workload, and citizens who come for land use rights registration services from land administration organisation at district level. In order to applying observation methods, a fieldwork support letter from ITC was given to the Land administration organisations at the beginning. Information and findings from the observation were noted in the interview diary.

4.2.2.2. Questionnaire designing

Before designing the questionnaire for interview, the main purpose of interview was identified. High level of management, operation staff and citizens were selected as three main groups of respondents. Three different sets of questionnaire for interview, as given in appendices 1, 2 and 3, were designed based on purposes of the interview and objectives of fieldwork.

Questionnaire for operation group was divided into 4 main themes as follows:

- General information about land use right registration services
- Interaction among related organisations
- Interaction of land administration organisation with citizen and discussion about the gaps
- Understanding the existing land registration system and opinions of staff about using digital system

Questionnaire for citizen was divided into 3 main themes as follows:

- Interaction of citizen with land administration organisations and discussion about the gaps
- Understanding awareness of citizens about land administration services
- Understanding opinions of citizens about using digital system

Questionnaire for high level of management was divided into 2 main themes as follows:

- Discussion about gap between land administrations organisation and citizens
- Discussion about land registration system and land administration system

All three sets of questionnaire were designed based on these following indicators in order to be taken as input for answering research question 1,2, and 3 and supporting for design e-LAS.

- Efficiency and effectiveness of services
- Functions/processes of services
- Back office/Front office
- Interrelation
- Participation of citizens
- Accountability
- Legislation
- Cost/Fee

Three sets of questionnaire were tested before conducting interview to check whether the questions are understandable or not. For this reason, small pilot interview was done before conduction real interview. One to two persons belong to each target groups were chosen to interview. Based on these pilot interviews, the questionnaires were revised to make it understandable and reasonable before real one.

4.2.3. Secondary data sources

In order to cross check, and understand deeply and guarantee accurate of data collection, secondary data is also collect for this research. As the secondary data, relevant reports, policy documents and legal documents of related and land administration organisations are collected. Cadastral data and land use data at district level also are collected. A check list of documents need to be collected, as given in appendix 4, was prepared in detail before the fieldwork and was approved by supervisors.

4.3. Fieldwork activities

4.3.1. Study areas

Fieldwork was conducted in Hanoi capital, one of the biggest urban in Vietnam. Administrative boundaries of Hanoi capital were adjusted to combine with Ha Tay province, one district of Vinh Phuc province, and four communes of Hoa Binh province on 29 May, 2008 and implemented effectively on 1st August, 2008. Hanoi Capital has 9 inner districts such as Hoan Kiem, Dong Da, Ba Dinh, Hai Ba Trung, Tay Ho, Cau Giay, Hoang Mai, Long Bien and Thanh Xuan; 20 external districts as Dong Anh, Tu Liem, Soc Son, Gia Lam, Thanh Tri, Ba Vi, Chuong My, Dan Phuong, Hoai Duc, My Duc, Phu Xuyen, Phuc Tho, Quoc Oai, Thach That, Thanh Oai, Thuong Tin, Ung Hoa, Me Linh, Ha Dong and Son Tay; and 4 outer communes as Dong Xuan, Tien Xuan, Yen Binh and Yen Trung (Vietnam National Assembly, 2008). Three out of 29 districts; Tay Ho district, Cau Giay and Ha Dong were selected based on the volume of the land registration services to be delivered from the organisations from high to low respectively.

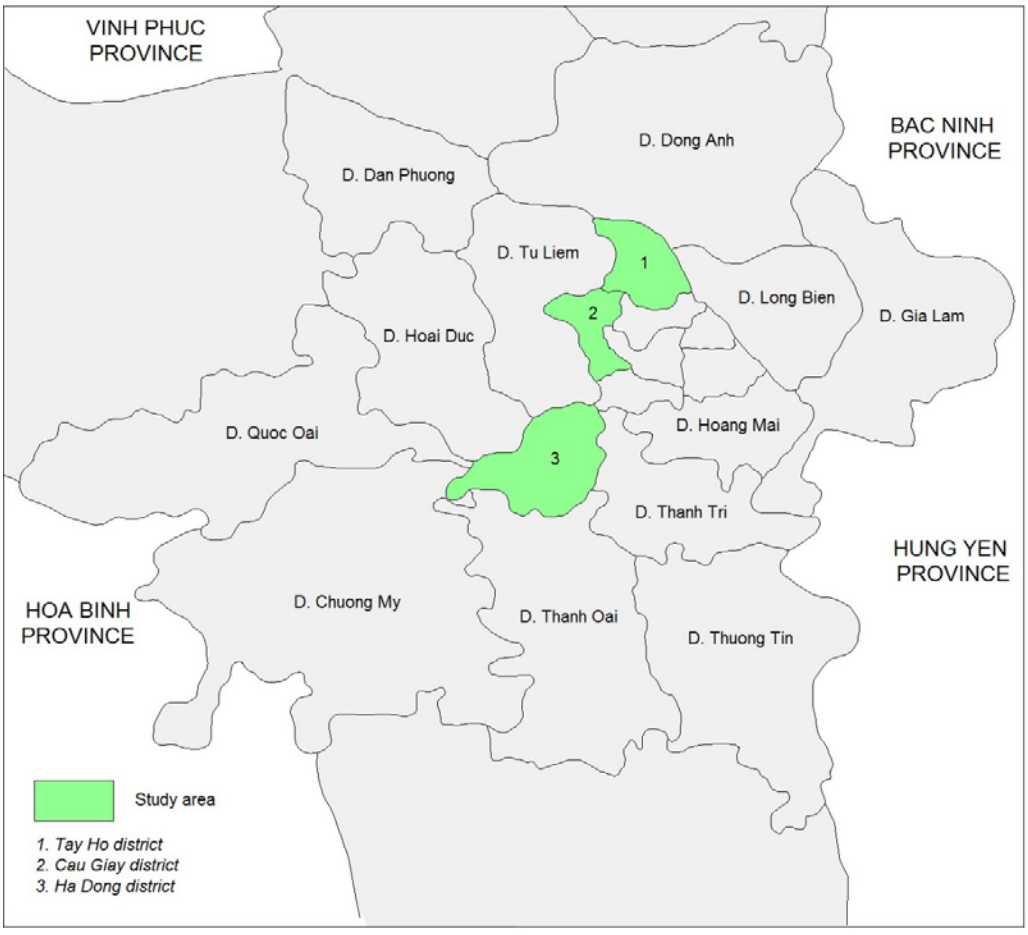


Figure 4-2: Spatial association of study areas on Hanoi administration map

4.3.2. Data collection

The main activities done in the fieldwork period are:

- **Arranging and conducting in-depth interviews with management, operation groups and citizen. Also, observation at each district office was done.**

Group 1: Management group (4 interviews)

Ministry of Natural Resource and Environment (MoNRE) – National level
Department of Natural Resource and Environment (DoNRE) – Provincial level

Group 2: Operation group – district level (12 interviews)
Bureau of Natural Resources and Environment (BoNRE)
Land registration office
Bureau of urban management
Bureau of tax

Group 3: Citizens (38 interviews)
Who are applying for land administration services
Who has used land administration services

Before starting the interview, all of the respondents were informed about the purpose of the research and were asked whether they allow the recording of the interview. Some of the respondents denied recording. Main points of discussion were noted in the interview diary and print-out questionnaire. Information collected from the observation also were noted in the interview diary.
The list of detailed interviewees is presented in table 4- 1 below:

Table 4-1: List of interviewees and number of conducted interview

	Level	**Name of organisations**	**No of proposed interviewees**	**No of conducted interviewees**
Land administration staff				
Group 1	National level - MONRE	General department of Land administration	1	1
		CiREN	1	1
	Provincial level - Hanoi DoNRE	Bureau of land statistics and registration and surveying	1	0
		Bureau of land administration	1	0
		Bureau of land and house registration	1	2
Total			5	4
Group 2	District level	-Bureau of Natural Resources and Environment (BoNRE) -Land registration office -Bureau of urban management -Bureau of tax	Tay Ho district	
			5	4
			Ha Dong district	
			5	4
			Cau Giay district	
			5	4
Total			15	12
Group 3	Citizens	-who are applying for land administration services -who has used land administration services	Tay Ho district	
			16	16
			Ha Dong district	
			16	10
			Cau Giay district	
			16	12
Total			48	38

- **Collecting other related data, information and reports from the interviewed organizations**

From Land administration organisation at district level:

1. Mandate of the Bureau of natural resources and environment of 3 districts (Tay Ho, Ha Dong, Cau Giay)
2. Relevant legal document which guiding implementation land administration services

(Circular 38, Decree 81, Land Law…)

3. Documents guiding land registration processes at 3 districts (Tay Ho, Ha Dong, Cau Giay); and at Hanoi city
4. Information about cost (service charter) of land registration services at 3 districts (Tay Ho, Ha Dong, Cau Giay)
5. Number of transactions of last 3 months (only Tay Ho district and Cau Giay district)
6. Cadastral map and records (to be investigated)

4.4. Tools used in data management, analysis and design

A large amount of descriptive data was collected from the interviews and non-participant observation. Most of the interviews were transcribed after returning from the field. Findings from the observations were also transcribed from the field note. In order to proper use of that data, tools for management and analysis of these data is described below:

The statistical software SPSS – version 16 was used to create the database for management and analysis two sets of questionnaires: for citizens and for operations staffs. The questionnaires are designed and edited in words and thereafter, was coded and design by SPSS. The responses were entered one by one after finishing transcribe into English. SPSS also is used for data analysis and is discussed in the next chapter.

The data acquired from non-participant observation and open-ended questions, collected documents and interview for high level of management was managed manually. The reason to choose manual method is that the data acquired from these approaches is not so much but diversity in supporting main data collected from the interview with citizens and operation staff. In the process of data management and analysis, these data are categorised into 4 main aspects including citizen, institutional, organisational, legal, and technical aspect.

Based on the chapter 3, UML is chosen to develop e-LAS model.

4.5. Limitation of the fieldwork

During the data collection, some problems were encountered

- Fixing date and time for interview at high level of management and operational level were difficult.
- In many case, interviewees did not agree to tape recording the interview. In case of open questions, it was difficult to note down in detail all the information provided by respondents.

Gap issues between land administration organisation and citizens have been discussed in recent years. That also is considered as environment for corruption in the field of land administration, and it becomes a sensitive issue. Thus, the open questions related to the issues have some limitations.

4.6. Concluding remarks

In this research, a case study of land registration at district level in Vietnam was carried out in order to find out the existing situation of land registration and gaps between land administration organisation

and citizens, gaps among related organisations. Both primary and secondary have been collected in this case study. High level of management, operational staff and citizens were interviewed and the activities of staff and citizens at land registration offices were observed without participating. The document and data related with the case study were also collected.

5. Analysis of requirments for e-LAS in Vietnam

5.1. Introduction

The collected data and used techniques were presented in the previous chapter. In this chapter, the results of the data and its analysis have been presented. The analysis is focused on finding the reasons of the gap between G2G and G2C, as per one of the objectives of this research, so that appropriate system requirements could identified for designing a new system of land registration. Before presenting the results of the field data, a general overview of Vietnamese land administration system and registration system has been described in the section 5.2. The next section 5.3 describes current practice of land registration system including interaction between G2C and G2G and the citizens' expectations from land registration services provided by the land administration organisations which is shown the interaction between C2G. Based on the results, the gap and the reason of gap are discussed in the next section 5.4. Then, system requirements to fill the gap are identified in the section 5.5. Eventually, the chapter ends with concluding remarks.

5.2. General overview of Vietnamese Land Administration System and registration system

5.2.1. Land administration system

According to Land law 2003, Vietnamese Land administration system shall be uniformly established from central to local levels. It is carried out through a hierarchical structure of four administrative management levels including central, provincial, district, and commune level. Each level has mandate and responsibility in dealing with land management functions.

- At the central level, the Ministry of Natural Resources and Environment (MoNRE) is responsible for State management of land resources.
- At the provincial level, the Department of Natural Resources and Environment (DoNRE), which is under the supervision of the MoNRE, is the organization that supports the Provincial People's Committee to exercise State administration on land use, survey, and mapping in provincial area. The DoNRE has responsible for land allocation and land registration of land-user as organisations.
- At the district level: the Bureau of Natural Resources and Environment (BoNRE) is the organization that supports the District People's Committee to employ State administration on land use, survey, and mapping in the district area. The BoNRE has responsible for land allocation and land registration of land-user as individuals, or households at rural area.
- At the commune level: there is only the Cadastral officer in charge of land administration. His function is to support the Commune People's Committee to employ the State administration on land.

5.2.2. Land registration system

Vietnam uses the term of land use rights registration (LURR) instead of land registration. Pursuant to the Land Law 2003, article 4, Registration of land use rights means the recognition of the legitimate land use rights in the cadastral records with respect to a definite land parcel in order to establish the rights and obligations of land users.

Vietnam LURR includes two steps of registration: 1) Primary Registration; and 2) Secondary Registration. Decree No. 181/2004/ND-CP contains regulations on procedures to affect Primary Registration and Secondary Registration.

In Vietnam, land belongs to the people and the State is the representative owner (article 1, Land Law 2003). Therefore, the first process of LURR or called Primary Registration is land allocation. It is the process to grant or allocate land from the entire people for organisations, individuals and households use. Legal entities allocated land use rights or leased State land after registration of an application for Primary Registration of land will be issued a Land use rights certificate or land tenure certificate (LTC).

Secondary Registration or Land use rights changes registration shall be applicable to land users who exercise their rights under the Land Law changes in the original LTC and in the cadastral records:

- Applications for registration of contracts in relation to transfer, assign, lease, sub-lease, inherit, donate land use rights; mortgage, guarantee, making capital contribution with land use rights;
- Applications for registration of contracts in relation to the removal of interest in land use rights (for example application for removal of mortgage or lease or sub-lease);
- Applications for registration of changes by State agencies where land use rights are withdrawn or recovered or the land use purpose classification is changed pursuant to the Land Law.

The current workflow of land registration services is shown by activity diagram in figure 5-1. Land Registration Offices needs to interact with three other organisations at district level for delivering land registration services such as Tax Department, State Treasury, and, Bureau of Natural Resources and Environment. Besides these organisations, citizens responded that they need go to Commune people's committee (CPC), Notary, Bank to prepare some required documents for submitting at land registration office.

Step 1: Citizen submit forms and required documents to front-office
Step 2: Staff of front-office check and bring application to LRO or BoNRE
Step 3: Staff of front-office invests applications and related documents and prepare cadastral information or land use information
Step 4: Staff of BoT receives cadastral and land use information and identify financial obligation
Step 5: Director of BoT signs on document of identifying financial obligation
Step 6: Staff of LRO takes document from BoT and transfer to front-office
Step 7: Citizen receive document of financial obligation from front-office of LRO
Step 8: Citizen go to State treasury to fulfil financial obligation and take invoice
Step 9: Citizen submit invoice at front-office
Step 10: Staff of LRO update land use and cadastral information and prepare updated LTC
Step 11: Director of LRO sign on updated LTC and return it to front-office
Step 12: Citizen receive results at front-office

Conditions may be applied a number of time in step 1, 2 until citizens submit correct required documents. The process may be stopped at step 3 if the applications is not enough legal conditions or fall in the case of dispute or complain.

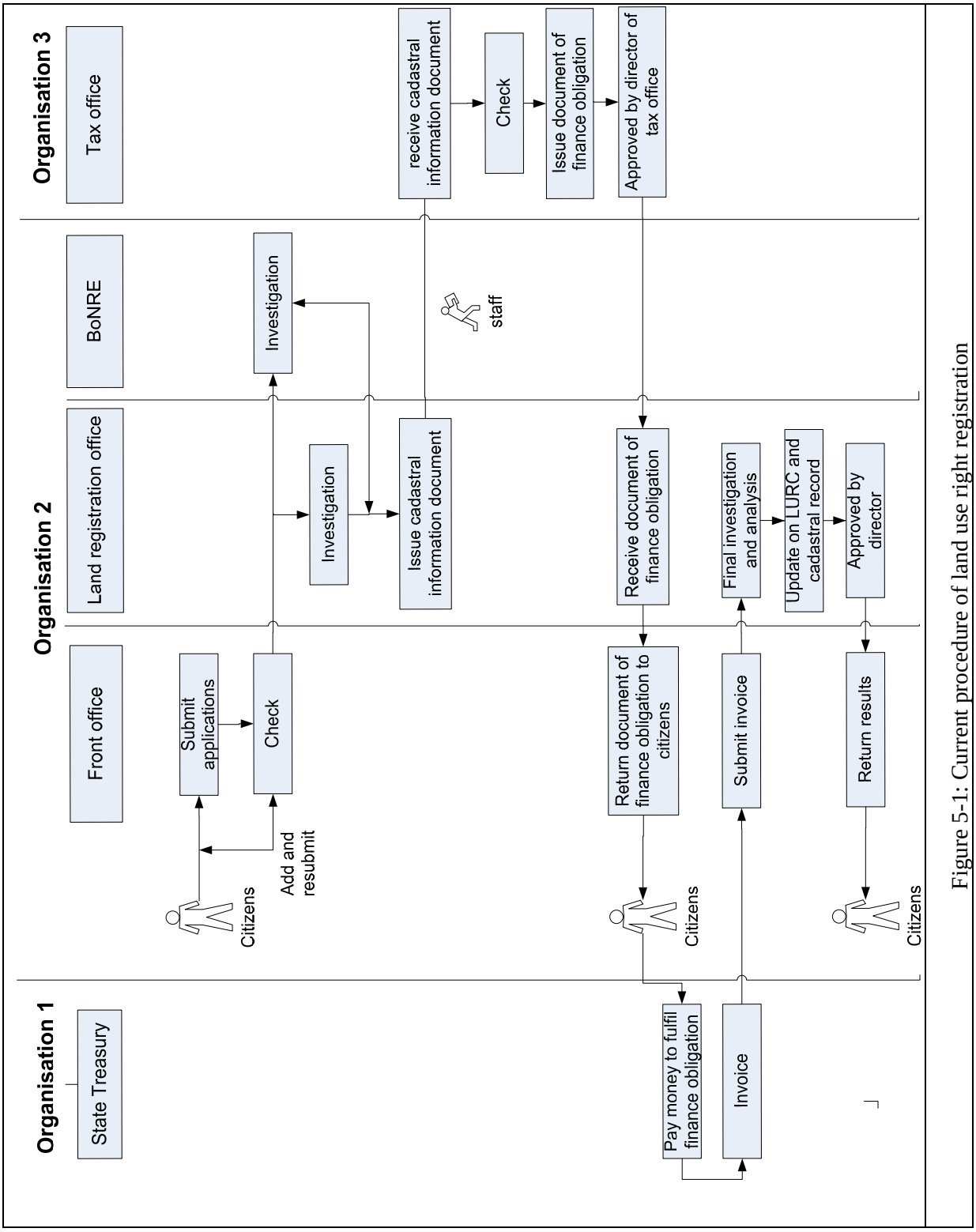


Figure 5-1: Current procedure of land use right registration

5.3. Current practices and expectations of citizen from land registration services at district level

5.3.1. Current practice of land registration services (G2G, G2C)

Current situation of land registration services is presented through the main indicators which were used for data collection. The indicators have been seen from both citizen as well as officials point of views.

a) Efficiency and effectiveness

Seven types of land use rights registration can be performed at the district level. Among them, only four types of registration services such as issuing land tenure certificate; transfer land use rights; registration of inheritance; and registration and de-registration of mortgage are performed frequently. According to the responses of operational level staff, the number of days (only total time when citizens work with land registration office are counted) required to complete these types of registration services is shown in table 5-1. From this table it can be clearly seen that while number of days to complete registration at Tay Ho and Cau Giay are quite equivalent, the number of Ha Dong district is less than a half. On asking the reasons, it was found that Ha Dong district has a different structure of organisation than the rest two. A land registration office at district level has to interact with State treasury office and Tax Department among others to provide land registration services, which delays the performance. In case of Ha Dong district, two staff from the State Treasury office and Tax Department are deputed at the Land Registration office. Therefore, the time required for interacting with these two offices is reduced and hence overall time required for the completion of the registration services is reduced to almost half than the rest of the two districts.

Table 5-1: Total days to completed services (according to law)

Land use rights registration types	Completed services (total days)		
	Tay Ho	Ha Dong	Cau Giay
Issuing land tenure certificate	55	25	40 - 55
Transfer land use rights	27	11	20
Registration of inheritance, donation of land use rights	19-55	25	55
Registration, de-registration of mortgage, guarantee of land use rights	5	1	5

The response from citizen about days to complete services is 90 % same as time provided by staff. The total time is whether more than or less than 1 to 2 days. In this total days to complete service, the days when citizen work with tax office, state treasury, notary or bank, is not counted.

From two of the respondents, it was found that one of them was waiting for a year and the other was waiting for 3 months to get their services done from the district level office but they did not know the reasons of delay. From this situation, it can be revealed that there is a lack of flow of backward information or there is lack of accountability in the staff involved with registration services.

b) Front office

All three land registration organisation at district level have front office. That front office in the legal context should be the one-stop-shop. However, according to response by operation staff, 100% respondent said that front office only has functions of receiving application, returning results, guiding citizen in the process of land registration at land registration office. Then, citizens still have to go to another office such as state treasury, notary, and bank.

c) Interaction between G2G

In principle, Land Registration Office needs to interact with five other organisations at district level for delivering land registration services such as Bureau of Urban management, Notary, Tax Department, State Treasury, and Commune Peoples Committee. From the field survey, it was found that the interaction between land registration office and BoUM is lacking. The interaction is important because BoUM has the updated record of the status of buildings. The interaction would prevent illegal transaction or check unauthorised construction of buildings. Currently, the staff at Registration office only rely the construction certificate and building drawing submitted by citizen and do not cross-check with BoUM.

The interaction with Tax Department is also not satisfactory. The department delays the response requested by LRO. This situation exists in all the three districts. Normally, it takes 10 to 15 days to get response back, which is supposed to get back in 5 days. About 42% of the respondent staff viewed that they face problems with the interaction with Tax Department due to delay in the return of documents and feedback. From the field investigation, it was found that there is overlapping responsibilities regarding the checking of cadastre documents. The documents verified from LRO are again verified at Tax Department, which delays the return of the documents to LRO. According to the responding staff, the consequences of the problems are divided to 2 main opinions including the delaying of work and pressure by increasing complaints from citizen. This situation is not happening at Ha Dong district as a staff from Tax Department works at LRO.

For the other organisations, there is no any time limitations legally bound to get back the response, as the citizens themselves have to visit the organisations to get their requirements done. The efficiency of other organisations affects the efficiency of LRO in this case.

d) Interaction between G2C

From the response of both operational staff and citizen, there are 5 locations which citizen need to visit to complete the requirements for registration, such as commune people's committee, district land registration office, tax department, state treasury and notary. In the case of mortgage registration, one more location has to be visited that is financial organisation related to mortgage. According to the respondents, the citizens not only have to visit many locations for getting their services done but also revisit the locations number of times as shown in the table:

Table 5-2: Organisations' Revisits needed of citizen

Organisation	**Re-visits needed (in average)**
Commune People's committee	2
District land registration office	5
State Treasury	1
Tax Department	1
Notary	2
Bank (mortgage registration)	2

About 53% of the citizen respondents informed that they faced problem when using land registration services. According to them, the main problems are classified into 4 main aspects as:

- A number of visits to LA organisations
- Information about tax is confusing

- Some forms are difficult to fill in, and need support from LA staffs
- Complication due to require of many documents

e) Information System

All the data or document which need transfer or provide among land administration organisation and line organisations such as tax department, notary, bank, state treasury are paper-based and are transferred manually. Similarity, all data and document which are transferred between LA organisation and citizens are paper based and done manually.

f) Participation of citizens

According to the respondents, both citizens and officials, there is no any participation of citizens in the process of land registration. The respondents were asked if they had been asked about the complexity of the process or additional interests to be incorporated. Regarding their opinion about the need of citizens participation, only 39% responded positively and majority of the respondents (58%) did not know or don't care about the importance of participation (Figure 5-2).

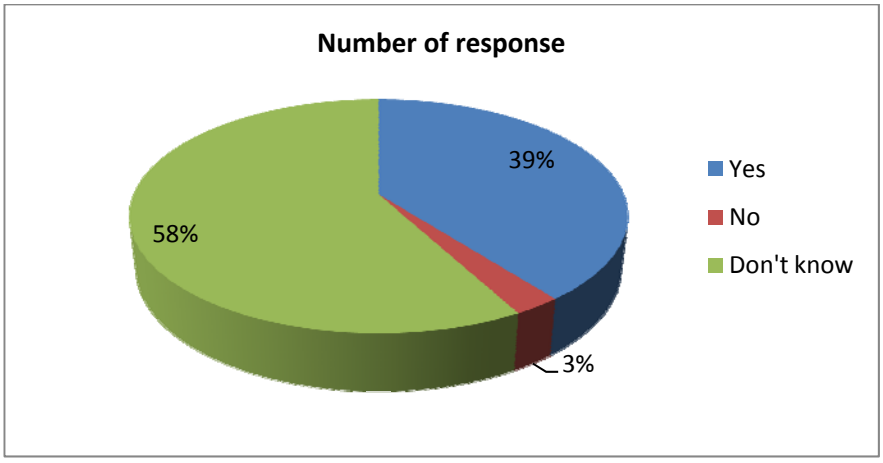


Figure 5-2: The necessary of citizen participant in decision making of land registration system

g) Accountability

The accountability of land registration service is reflected by the feedback system. All three district offices have feedback mechanism to citizen which mostly through mail box, hot line, phone call, office book. However, from the responses of citizen, 50 % of them responded that they were not aware of the feedback system.

Though there are some provisions of disseminating information about the requirements and offices to be visited by the citizens through citizens charter published on paper based and screen based media. But the citizens are not aware or do not know how to use the information mentioned in it.

h) Rule of law

There are varying responses regarding the clarity of legal provisions. About 75% of interviewed staff said the legal documents and framework are clear, but only 42% of interviewed citizens were found to have positive response in this regard. .

5.3.2. Interaction between C2G – Citizens' evaluation and expectations from land registration services

Three indicators were used to assess the interaction between C2G during the field survey; the perception of the citizens on the quality of the information, the attitude of the staff, and their expectations from the LRO regarding LRS.

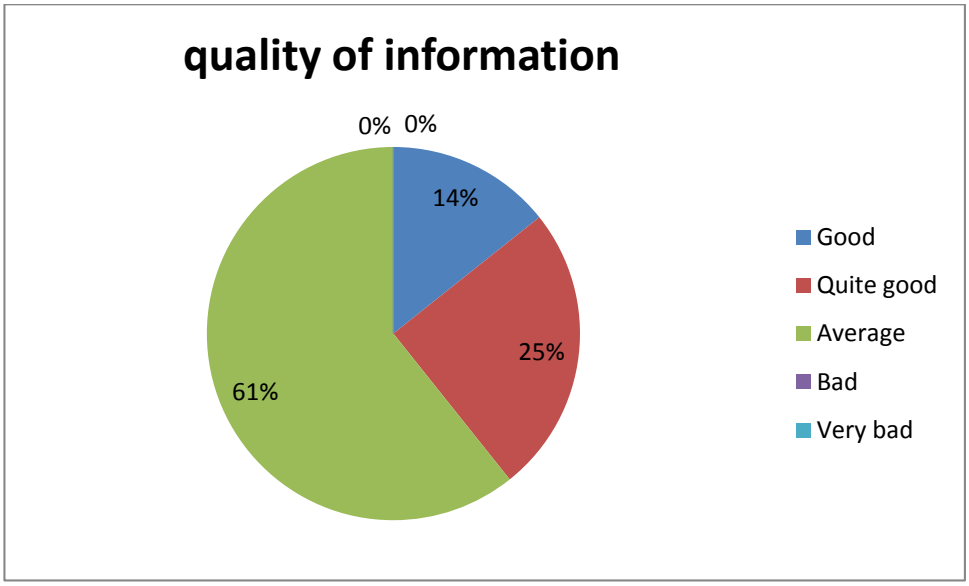


Figure 5-3: Evaluation on quality of provided information

Regarding the quality of information provided by the LRO, majority of the respondents (about 61%) found it average. The reasons they mentioned are the lack of updated information and longer time needed to get the required information.

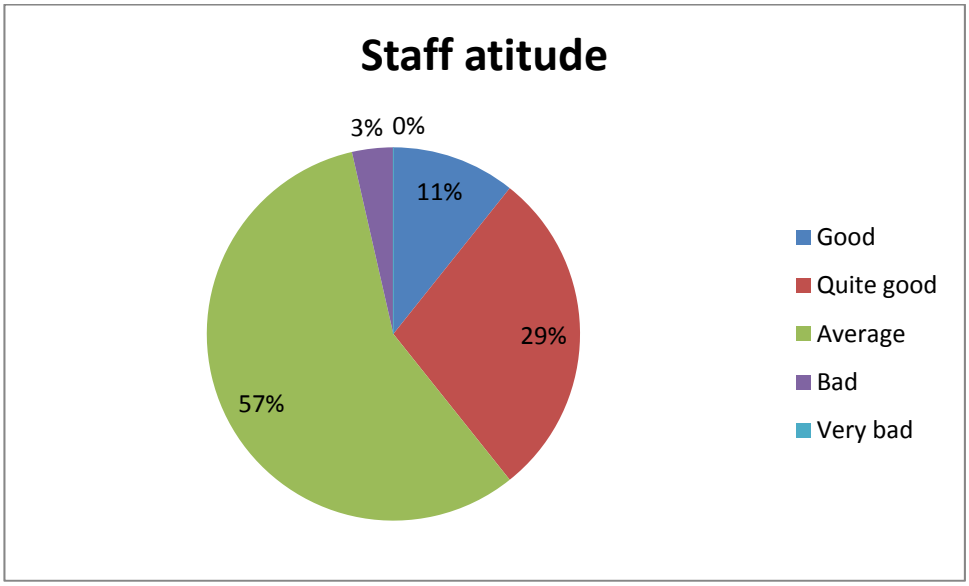


Figure 5-4: Staff attitude as perceived by citizens

Attitude of the staff greatly influences the impression of the citizens regarding the quality of services delivered. The citizens, who visited LRO to acquire LRS are not quite happy with the attitude of the staff. Majority of them (57%) found that the staff attitude is average. From the respondents of citizens, it is because of the way how the staff behaves with the citizens and do not explain the requirements in

a simple way. Consequently, the situation has reduced the citizen's trust with the organisation and the staff. It is also observed that the citizens having close relation with the staff get special treatment and even they can get services faster than an ordinary citizens gets it.

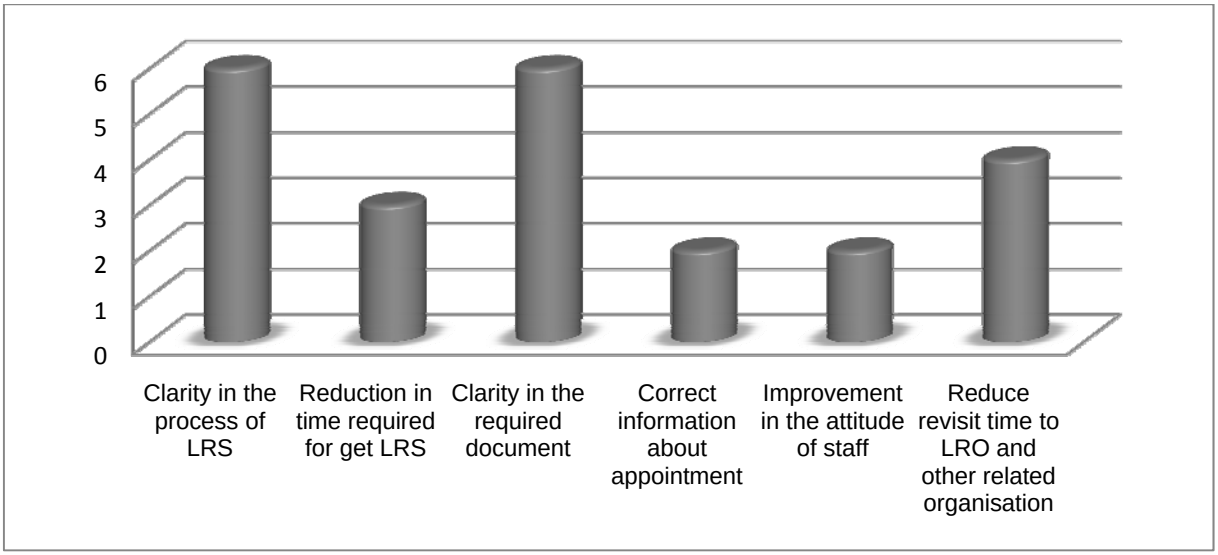


Figure 5-5: Expectations of citizens

The expectation of citizens about land registration system is categorised into 6 groups as shown in figure 5-5. The respondents viewed that they did not have good awareness about the system how it works and how services can be received efficiently. Therefore, they expect better instruction about their obligations and responsibilities, simplified working procedures which is clarity in the process of LRS. According to the respondents, many citizen face difficulties in understanding legal documents and information about registration, and they expect clarity in information and document required for registration. A number of revisits and delays in acquiring services is frustrating experiences of the citizens. They expect reduction in service time and revisit times to LA organisation and correct information about appointment. There is one more expectation from the citizens is improvement in staff's attitude. Some of citizens responded that they didn't receive friendly attitude of staff.

During the field survey, it was realised that citizens do not want to complain against the government organisations. From the observation, I found that they were not satisfied with the services from LRO but only talked with each other and did not do the formal complain.

5.4. Analysis on the gap between government to government, government to citizens in land registration system

5.4.1. Gap between G2G

From the field investigation, following gaps between G2G and corresponding reasons have been found:

a) Gap in back response time

As mentioned in the previous section 5.3.1c, the LRO staff expect timely respond from Tax Department. Due to delay in their responses, in one hand the service delivery from LRO has been delayed and on the other hand there is increasing pressure from the citizens for quicker delivery of services. Similarly, there is no legally bound deadline for other organisations to respond LRO in relation to their obligations related to land registration activities. The staff expect, the time of back

response should be clearly mentioned. This situation reveals that there is a gap in the back response time between G2G to offer timely services. Following reasons are found to cause this gap:

1) **Overlapping responsibilities**: Verification of cadastre information of tax purpose can be regarded as an example of overlapping responsibilities. LRO prepares a file after verification of cadastre information for determining tax on the real property and sends to BoT for their approval. The BoT again carries out the verification of the information itself. This means, same activity is performed twice. It would have been done once to reduce the time of service delivery.
2) **Lack of Trust**: The example given just before can also be regarded as an example of lack of trust between the government organisations, as the verification done by LRO is repeated by TD.
3) **Unclear Responsibilities**: The duplication of work at LRO and TD as mentioned above is also an example of lacking clear responsibilities.

b) Gap in data sharing and access to information

From the field observations, it was found that the organisations do not have proper data sharing mechanism. The LRO does not have updated building information, which is important for registration of use rights. BoUM is the responsible organisation for issuing construction certificate for buildings and updating building information and this information is not accessible to LRO. This situation reveals that there is gap in data sharing practices and proper mechanism of access to information between G2G. Following reasons have been found to cause the gap in data sharing and access to information

1) **Lack of Data Sharing Policy**: There is no data sharing policy available as a result of which the LRO does not have updated building information prepared by UMB.
2) **Lack of integrated working mechanism:** If there would be an integrated working mechanism between LRO and its line agencies the performance of service delivery would be efficient and the information could be accessible to each organisation.
3) **Lack of proper information system**: The transfer of data and information is paper based. This situation could also a reason of delayed back response and lack of access to information. At the same time, the organisations have to deal with lots of transaction every day and it is not possible to update their information at the very moment in the manual system, which also could be a reason of delayed response.

5.4.2. Gap between G and C (G2C, C2G)

From the field investigation, following gaps between G2C and corresponding reasons have been investigated:

a) Gap in efficiency of LRS

According to the respondents, they have to pay a number of revisits to the LRO for acquiring land registration services and it takes quite a long time to get the services done, which is, according to them, frustrating experiences. The respondents would expect reduction in service time and revisit times to LA organisation and correct information about appointment. This situation can be termed as gap in the efficiency of LRS. Following reasons are found to cause this gap:

1) **Lacking inter-organisational cooperation**: As it is discussed before, LRO has to interact with five other organisations to deliver land registration services. The efficiency of LRO is

somehow affected by the efficiency of its line agencies. It has been seen that LRO does not get response back from these organisations in time, and according to official respondents, LRO staff have to face pressure from the citizens. Therefore, lack of inter-organisational cooperation is one of the reasons of the gaps, especially for efficiency of the LRS.

2) **Complicated LR procedure**: The LR procedures are complicated, as it has been already mentioned in the section 5.2.2. For example, citizens have to contact many organisations other than LRO, and have to visit many times for the same purpose. It has affected the efficiency of the system in one hand, and the delays in the responses from different organisations. Therefore, complicated LR procedures are the reasons of the gap with G2C.

3) **Complex legal framework of LR**: Due to the complex legal framework, many organisations have to be contacted for services and to pass through complicated procedures. This situation has mainly impacted the delays in response time and returns results and also reduced the efficiency of the system. On the other hand, the complex legal framework including laws, decrees and circulars issued by different government organisation at both central and provincial levels, create confusion to the citizen which and how to use.

b) Gap in awareness about LRS

As discussed in the section 5.3.2, the respondents viewed that they did not have good awareness about the system how it works and how services can be received efficiently. They would expect better instruction about their obligations and responsibilities, simplified working procedures which is clarity in the process of LRS. This situation can be considered as gap in awareness about LRS. Following reasons have been investigated for this gap:

1) **Lack of accountability**: From the responses of citizen respondents and field observation, it has been found that there is a lack of accountability in the current system of land registration. In principle, the system should let the citizens know the procedures to be followed to get desired services, but the state of awareness with citizens is very low. Lack of awareness, on the other hand, is diminishing the citizens' access to information.
2) **Carelessness of the citizen**: The LRO has published its citizens' charter in paper as well as in screen format. However, as responded by the citizens they do not use these facilities rather expect staff should explain them all the procedures and obligations they have to follow. They would have used these facilities to get clarified about the requirements and obligations to save their time and future consequences.

c) Gap in accessing information:

According to the respondents, if they need information about their land parcel it takes long time to get it. At the same time, many citizens face difficulties in understanding legal documents. This situation has affected the citizens to get timely and accurate information not only related to land parcel but also the procedure they have to follow. Therefore it can be regarded as gap in accessing information. Following reasons have been investigated from the field work:

1) **Lack of proper information system**: Since there is no computer based information system available, the staffs have to rely on paper based files to provide the required information. At the same time, the change in the status of a parcel is not timely updated. That is why it takes longer time to get the information required.

2) **Complicated legal documents:** The legal documents including laws, regulations, decrees and circulars are issued by different level of organisations and the statements are not understandable to the general citizen. The documents issued at the different level of the government makes the citizens confuse which one applies in which case. At the same time due to the complicated statements, general citizens cannot understand what really the statements mean.

5.5. Identification of the requirements of the proposed e-LAS

The reasons of the gaps between G2G and G2C, C2G justified from the discussion above are considered as input for designing proposed Land registration system in e-LAS. In order to transform the existing land registration system to proposed system which can overcomes the gaps, the requirements including citizen centric system and its organisational/institutional, technical, legal and financial aspects.

5.5.1. Citizen Centric System

In practice, citizens (land users in Vietnam case) do not have the right to actively take part in the registration process. They are considered as involuntary land users in the legal framework. This situation has made the system of land registration less effective since it is developed only from the government's perspective. Moreover, citizens do not see the accountability of land registration and the benefits of land registration. Thus, in the proposed system, citizens are regarded as partners with government for the decision-making process rather than subjects or involuntary customer as of now. With citizen participation as the element of the proposed system, the accountability and transparent of land registration will be improved.

It is required clear regulation to identify role of citizen and how they can participate in land registration process. Besides, land registration process will need to reengineer to make citizens' participation possible. The following arrangement in the system would enhance the participation of citizens in the process of land registration:

Web Service:
Dissemination of information about land registration services through the web would help improve the awareness of the citizens, who have access to internet, about land registration services, which is lacking with the current system. Availability of information about the procedure to be followed, documents to be submitted, and the time and cost required, in the web would ease the citizens to be well prepared before applying for certain services. Additionally, if the progress in the processing of land registration services is provided through web, it would reduce the revisit time for the citizens and they would know the position of their application without visiting the offices.

Establishing Feedback System:
The establishment of a feedback system, where the citizens have room for making complaints and suggestions regarding the quality and approach of service delivery, will improve citizens' participation in the process of land registration. On the other hand, such mechanism will oblige the system to be more accountable and responsible to the citizens.

Establishment of Help Desk:
From the discussions above, it has been realised that many of the citizens are facing problems with the system due to their unawareness about the procedures to be followed and liabilities to be borne by

them. Establishment of help desk would provide the citizens to get rid of such problems, where they can have opportunities for getting clarified with their doubts and receive clear information about the procedure they have to follow.

5.5.2. Organisational aspect

Organisational restructuring

The first and foremost need of organisational restructuring is to establish one-stop shop facilities for the citizens. Since the citizens have to visit many organisations for a registration service, even different officials within an organisation, they have to spend a lot of time and resources. Citizens expect, LRO should establish such a mechanism in which a citizen contacts a single official to acquire the registration service of interest. At the same time, it has also been considered as one of the strategies of land administrative reform.

Currently, land registration services are delivered from two levels of organisations; individual registration at district level and organisational registration at provincial level. The process of registration is similar for both cases. District level organisations can be delegated the responsibility of organisational registration as well. Nevertheless, additional resources but not much will be required for newer arrangement.

Coordination among line organisation and LA organisation

The other important aspect is to improve the environment of coordination and cooperation among line organisations. In Ha Dong district, two staff from BoT and State treasury are deputed at the LRO, as a result of which, the efficiency has been improved by almost 50%, which reflects that two organisations can work jointly for delivering services. Such opportunities should be explored and implemented in the newer organisation. Similarly, it is found that there is lack of proper data sharing policy and practices among different government organisations such as tax department, notary, bank, state treasury. Proper coordination and also change in the attitude of the staff from different organisations have to be made to tackle such problem.

Capacity Development for e-Land Registration Services

The newer organisational set up should be capable enough to implement e-land registration services. Delivery of services through e-LRS will certainly improve the efficiency and effectiveness of the registration services. Additionally, it will make the land transaction more transparent and no place for corruption.

5.5.3. Technical aspect

Without digitalisation or computerisation of existing cadastre data, land use records and cadastral maps, e-LRS cannot be implemented. For this purpose, first of all, necessary infrastructure, such as hardware/software and other accessories should be managed. The next is to develop the standard for data and information, which will support to make the data or information reliable, and easier to integrate and share with other organisations.

The other important element of the technical aspect is to adopt necessary measures such as control system area, power back up, data backup, and virus protection, for ensuring security to protect from the possible risks of fraud, data loss and system infection.

5.5.4. Legal aspect

Proposed e-LAS when bring into implementation would serve as an efficient and effective citizen-centric system of land administration. To establish such kind of system, requirements of supporting

legal framework is demanded. Therefore, existing regulations and laws need to be revised to make them supportive to the implementation of e-LAS. The revised legal framework should include the clear tasks and responsibility of LA organization and line organizations, and proper data sharing policy among these organisations. Moreover, the participation of citizens should also need to be incorporated in the revised legal framework.

5.5.5. Financial aspect

Financial aspect is the most important aspect for materialising the implementation of e-LRS. Transformation of registration system from manual to digital will require huge investment. The main sector of investment are digitalisation of land use records and cadastral map, capacity development of the staff, procuring necessary hardware and software, establishing communication network, and operationalisation and maintenance of the system. Management of financial resources from government budget for these huge tasks may not be sufficient. Therefore, assistance from donor agencies, and financial organisations can be required.

5.6. Concluding remarks

LAS in Vietnam is implemented through four administrative levels of government; central, provincial, district and commune. Until now, the system is paper based. Land registration service is one part of land administration services. Land registration services are provided from provincial and district level. The provincial level looks after the registration of the organisational cases, whereas the district level is responsible for the individual registration. The regular registration process needs at least 12 steps to be followed and the process is quite complex.

Current practice of land registration services have been assessed based on primary data collected from the field work. The indicators used for the assessment are efficiency and effectiveness, interaction between G2G, interaction between G2C, information system, participation of citizens, accountability, and rule of law. The results revealed that the system is not efficient as it requires many days to get a registration services done. The citizens have to visit many organisations repeatedly. The interaction between G2G is not satisfactory, manly LRO does not receive back the responses from its line organisations related to land registration services. About six organisations interact in the course of delivering land registration services. There is lack of data sharing and proper coordination. Citizens are not happy with the efficiency of the system. The participation of citizens is almost null. The state of rule of law is above average. The accountability of the system is poor. Citizens are not aware of the procedures they have to follow for acquiring services from LRO. Regarding interaction between C2G, the citizens expectations from LRO are such as clarity in the process of LRS, reduction in time required for services, clarity in required information, improvement in staff's attitude and reduction in revisit time to LRO and other organisations for a service.

Back response, data sharing practices, and access to information are the main gaps between G2G relations. The reasons for the gaps are identified as overlapping responsibilities, lack of trust, unclear responsibilities, lack of data sharing policies, and lack of proper information system. Similarly, the identified gaps between G2C, C2G interactions are efficiency of LRS, awareness about LRS, accessing information. The main reasons for these gaps are lacking inter-organisational cooperation, lack of proper information system, complicated LR procedure, and complex legal framework, lack of accountability, carelessness of citizen.

To deal with the problems with existing LRS, requirements for the proposed e-LAS have been identified, based on the citizens requirements and the gaps identified. The new system should be

citizen centric with the availability of web services, facilities of feedback system, and help desk. The other aspects to be considered in the new system are organisational, technical, legal and financial. Under the organisational aspect, main concern should be given for proper restructuring of the organisation, establishment of one-stop shop, and coordination among line organisations. The digitalisation of cadastre data and information, and establishment of proper infrastructure are the main issues to be taken care under technical aspect. The legal aspect should consider the timely amendment of the legal framework to support the new system. Finally, financial aspect has important role to play in materialising the implementation of e-LAS. The transformation of the system will require huge amount of investment, for which, government budget may not be sufficient and hence assistance from donor agencies and financial organisations should be looked at.

6. Design e-LAS model and validation for G2C services

6.1. Introduction

Chapter 3 described the methodology and modelling techniques for developing a system and general requirements for design e-LAS. In the chapter 5, the reasons of the gap between G2G, G2C, C2G are analysed and used as input for identify requirements of proposed e-LAS. In this chapter 6, the gap is minimised by developing e-LAS models. First, scope of design of 3-LAS models are presented in section 6.2. Organisational model of e-LAS which visualises the overall vision of system is described and discussed in section 6.3. Additionally, explanation about how that system model can bring solution to reduce gap G2G and G2C is given. Then a functional model, dynamic and static model for LR service in e-LAS at district level is developed and disscussed in section 6.4.

In order to validate the designed models, in section 6.5 one part of system model is validated by prototype to prove that system can be executed. Discussion about how system can be implemented in term of organisational, technical, legal and financial aspects are presented in section 6.6.

6.2. Scope of system design

The scope of e-LAS, designed on the basis of the steps of system design as mentioned in chapter 3, section 3.4.3, is as follows:

- Organisational model: The overall vision of the system organisation in relation to provide land registration services to the citizen.
- Functional/ Process Model: The land registration services provided by the LRO at district level. There are different kinds of services provided at district level such as accessing to information, transfer of LUR, parcel sub-division, mortgage, lease, etc. Out of these services, the full transfer of LUR has been chosen to develop the static and dynamic model in detail.

The details of the design are described in the following sections.

6.3. Organisational model of e-LAS for improving land registration services

As mentioned in chapter 5, one of the purposes of developing e-LAS is to provide one-stop-shop services to the citizens. For this purpose, reengineering of land administration organisations is required. The reengineering should not only take care of establishing one-stop shop but also proper means of coordination and cooperation among line organisations. For this purpose, there is a need of improvement in existing legal framework and responsibilities of the organisations involving in the land registration services should be redefined clearly. In this section, it is assumed that existing legal system and responsibilities have been improved as required. These requirements are discussed in the section 6.6.

Vietnamese land administration system, currently, is performed through a hierarchical structure of four administrative levels; centre, province, district and commune. The responsibilities of these organisations have been briefly introduced in the section 5.2 of chapter 5. The current land administration system is manual.

Land information required for performing land administration services is available, in analogue format, at different level of organisations. To perform the land administration services, the central level manages generalised information, whereas the provincial and district level organisations manage the specialised information up to parcel level. The management of tax system and building system are also managed with the same hierarchical way.

The basic requirement for designing the e-LAS is to convert existing manual system to the digital system. The system has to deal with the organising and sharing of databases. There can be four different alternatives of system implementation as follows:

Table 6-1: Alternatives for system structure of e-LAS

Level	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Central	- Database at central - Use information for decision making	- Copy of province database (selected information) - Use information for decision making	-Access to provincial database through internet/intranet - Use information for decision making	- Database at central - Update and maintenance database - Use information for decision making
Provincial	-Use the copy data from central database - Processing level - Provide services	Original Database and updating, maintenance level	Original Database and updating, maintenance level	- Access to central database - administrative level, use information for decision making
District	-Use the copy data from central database - Processing level - Provide services	Database at district level (copy of provincial database) - Processing level - provide services	Database at district level (copy of provincial database) - Processing level - provide services	- Database at district level (copy of central database) - Processing level - provide services

From the characteristics of these alternatives, the fourth alternative is suitable for the purpose of this research, as mentioned below:

The alternative 2 and 3 is not suitable because of some reasons as follow:

- There are 63 provinces. Database at each province will require 63 organisations or professional office responsible for maintenance.
- In alternative 3, central level can access provincial databases to get information. It will require a lot interaction and remarkable processing to get information from many provinces.

The alternative 1 is not suitable because

- Provincial level use of data and information mostly for decision-making
- District level is the one dealing with services everyday not provincial level.

Alternative 4 (as illustrated in figure 6-1) is a suitable solution:

- Up-to-data data and information are managed at central level. Legal information is protected and controlled at this level.
- District level will keep relevant data for providing services and copy of central database in order to provide all land registration services.

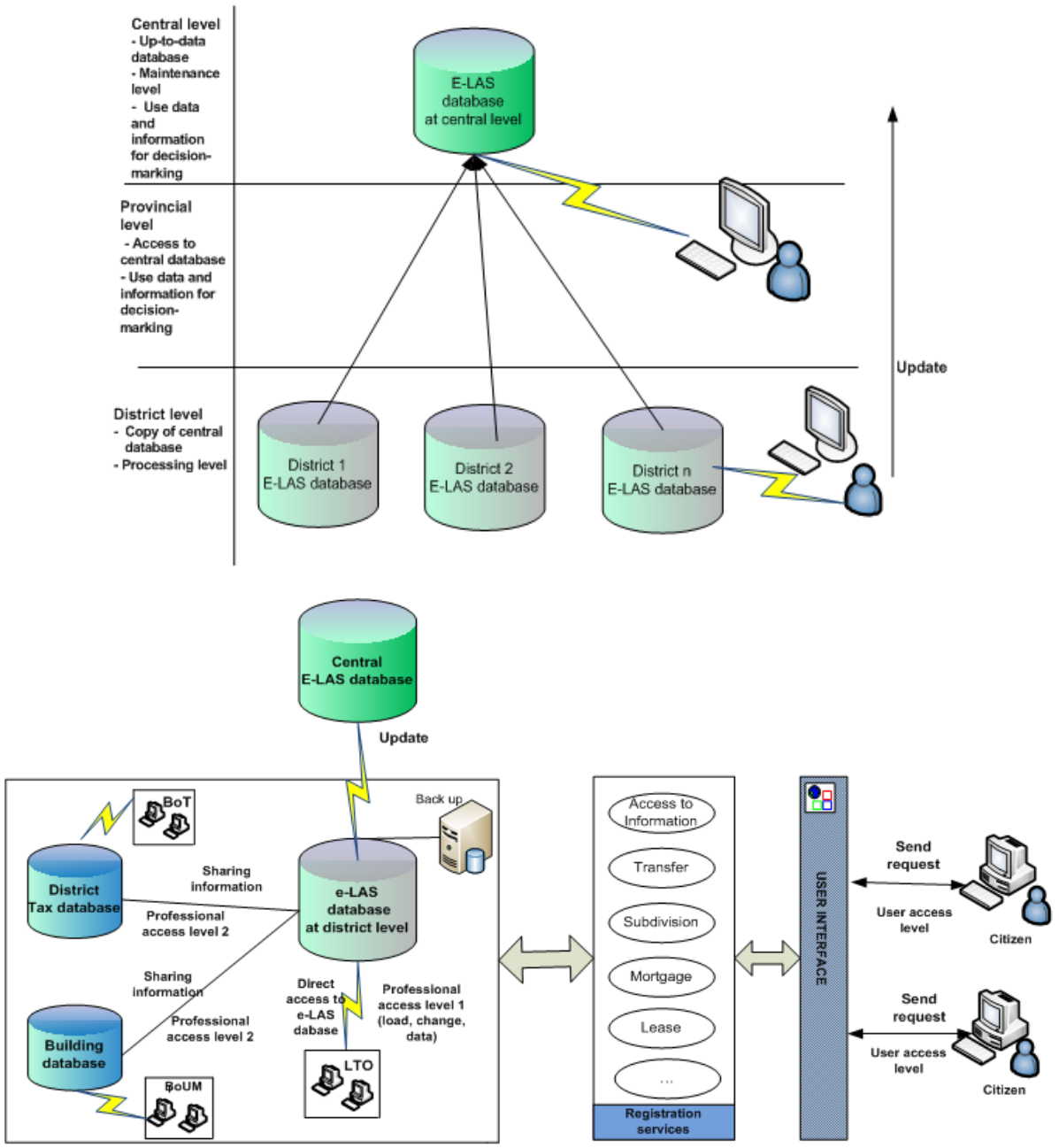


Figure 6-1: Organisational model of e-LAS

Figure 6-1 shows the organisational model of e-LAS. According to this model, the database will be centralised and organised at the central level, copy of which will be available at district level. According to this model, among land administration services, all the land registration services will be provided through district level office, therefore the daily changes in land information will be sent to the central level for up-dating. The type of land registration services provided at LRO are:

- Access to information (information and legal status of parcel)
- Full transfer of land use right (transfer LUR of whole parcel, inheritance, donation)
- Parcel subdivision
- Mortgage
- Lease.

The system is developed in such a way that one-stop-shop facility is established at LRO to provide all these kind of land registration services. BoT and BoUM are the other organisations involving with land registration services. In order to provide one-stop-shop facility to the citizens, inter-organisational cooperation between LRO and these line organisations is required. The cooperation is mainly required for sharing the data and information. Therefore, at the district level (processing level), the tax database and building database are connected with e-LAS database in such a way that they can share and transfer data and information. Since LRO is the main organisation for delivering land registration services, it will have direct access of professional level 1 to e-LAS to implement land registration services and will be authorised to search, load all cadastral and land registration information, and change necessary data and information as per requirement.

BoT and BoUM will have the access of professional level 2 to the e-LAS, with which, they can search, share or load their data and information to the database, and access the data and information available in e-LAS, but will not be allowed to change or update e-LAS data.

Citizens can access to e-LAS services by sending request and retrieve results through web services. Their access level is user access level which allows searching and sending request for data and information, which can be retrieved through web.

The organisation model of e-LAS to address the gaps

This organisational model is expected to address the gaps indentified in the existing system as follows:

1) Data sharing mechanism between LRO and its line organisations will improve the gap of data sharing and access to information, provided that adequate data sharing policy is developed. The new system will emerge with modern information system accessible via network, which will allow each organisation to work in an integrated way, since each organisation can have access to the data of other organisation.
2) With the digital system the response time will be faster and the gap caused due to improper information system will be reduced, ultimately to improve the response time.
3) The establishment of one-stop-shop facility will improve the efficiency of the organisations. The flow of information via network will avoid requirement to visit the other organisations in existing system. Since the system will allow the citizens to access the information via web, it will reduce their visit times to the organisation.
4) The new system will oblige the organisations to include relevant information for the citizens in the web, which will improve the awareness of about the requirements needed to acquire services.
5) Since the new system will allow citizens to access and request the information via web, it will be easier for them to acquire information in time. The system will require the data to be incorporated in simplified format, which will make the information understandable to the citizens.

6.4. Functional/Process model for land registration services at district level

6.4.1. Functional model of land registration services

The organisation model, as developed in the section 6.2, established one-stop-shop facilities for all kind of services provided by the LRO in cooperation with its line organisations. Based on the organisation model, the function model has been designed in this section. The functional model for

land registration service delivery from LRO is as shown in the figure 6-2. This model includes all kind land registration services provided from LRO.

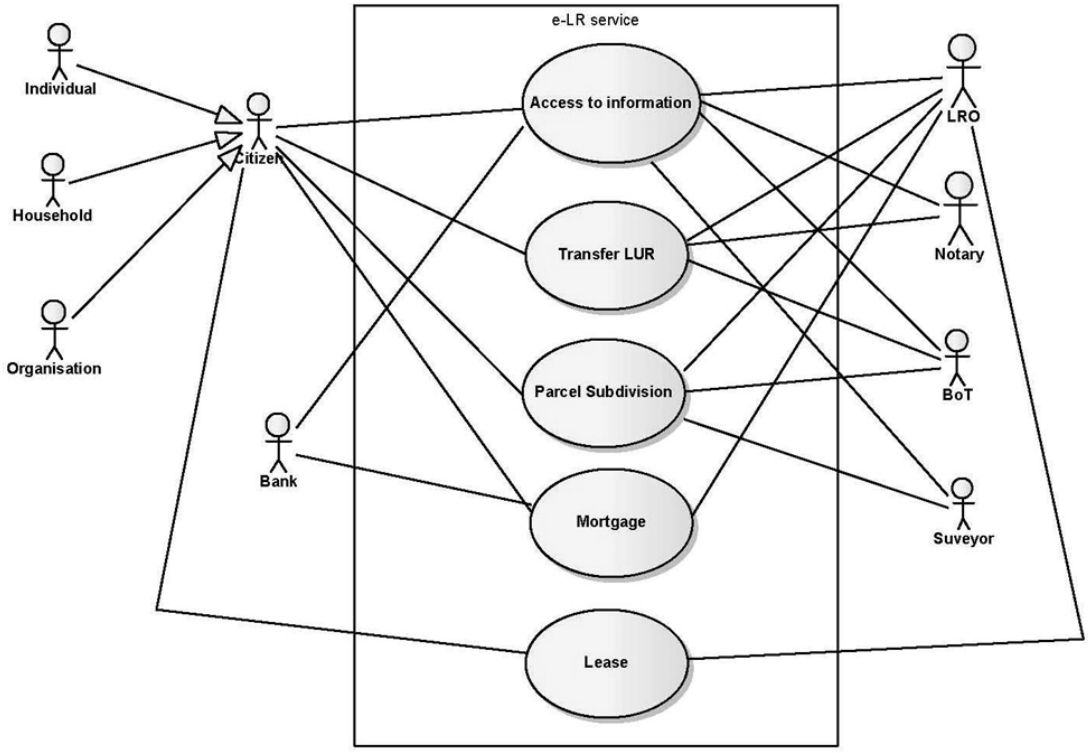


Figure 6-2: Service model of land registration

The internal and external actors of this model are as follows:
*Internal actor***:** LRO, surveyor, notary, and BoT who directly involve in the LR service.
External actor:

- Citizens: natural person which is individuals and household; non-natural persons which are organisations.
- Bank or Financial Institution: which are related to mortgage registration process. They are also as customer who needs information from LA organisation.

Land registration system at district level will provide 5 main services as follow:
Access to information: one of the issues of proposed e-LAS is make information available and accessible to the citizen and from single location. This will improve the transparent of system as well as reduce time of revisits to organisations and save time, cost for citizens. On the other hand, government staff and related organisations in LR services need to access to information to make the right decision or employ the registration.

Transfer of LUR: This is the one of the most common services in land administration. This services including transfer LUR of the whole parcel, registration of inheritance, donation and other.
The improvement of this service in compare with existing service is providing one location for citizen to apply services. Citizens can apply for this service through the internet and can check the status of their application as well as check the final results. The more detail and explanation of this service will be addressed in the next part.

Parcel subdivision: this is another common service in land administration when partial land use right is transferred. The original parcel is divided into two or more new parcels. The seller will receive the original LTC with update information about parcel. The buyer will receive new LTC. In this process, citizens are invited to come to the field to check and support surveyor in identifying boundary of new parcels. Same as transfer of LUR, citizen can apply this service and check final results through the internet.

Mortgage: this is a type of land registration service to support tenure security for both citizens and financial institutions such as bank that provide mortgages with land parcels as collateral.

Lease: land use right lease and sub-lease are required to be registered at district level.

As mentioned before, there are different kinds of land registration services provided by the LRO. Among them full transfer of LUR has been chosen for designing static and dynamic model in detail.

6.4.2. Full Transfer LUR of whole land parcel

Among 5 main services mentioned in previous section, full transfer of LUR has been chosen for detailed designating of static and dynamic model. The reason is it is one of the most common services in land registration and the model designed for this service can be helpful to design for the rest as well. In the following section, dynamic models for full transfer of LUR include model in user's environment (citizens' environment) and model in internal system environment are discussed with focus on describing and understanding the registration process for full transfer of LUR. The static models for full transfer of LUR, is described how all information and resources need for this services is structured.

6.4.2.1. Dynamic models for full transfer LUR of whole parcel

a) Model in External environment (users' environment)

The model explains what systems must do to provide services by use case functions and who uses systems by actor. Figure 6-2 is the process model for full transfer LUR of whole parcel. There are 5 actors in this process including citizens, notary, LRO, BoT, Information department. From this figure, it can be seen that citizens request services for registration of full transfer LUR of whole parcel through internet or front-office of LRO. As mentioned in the organisational model, close cooperation from BoT, BoUM, Notaries are needed to facilitate the OSS at LRO. That is the improvement of new system in comparing with existing system. Citizen only need to access to services of LUR by web or front office and no need to go to all related organisations in order to services done. It means reducing the revisit times and the LR procedure become simple than before. Thus, the gap in efficiency of services and gap in accessing to information will be minimised with the implementation of this model.

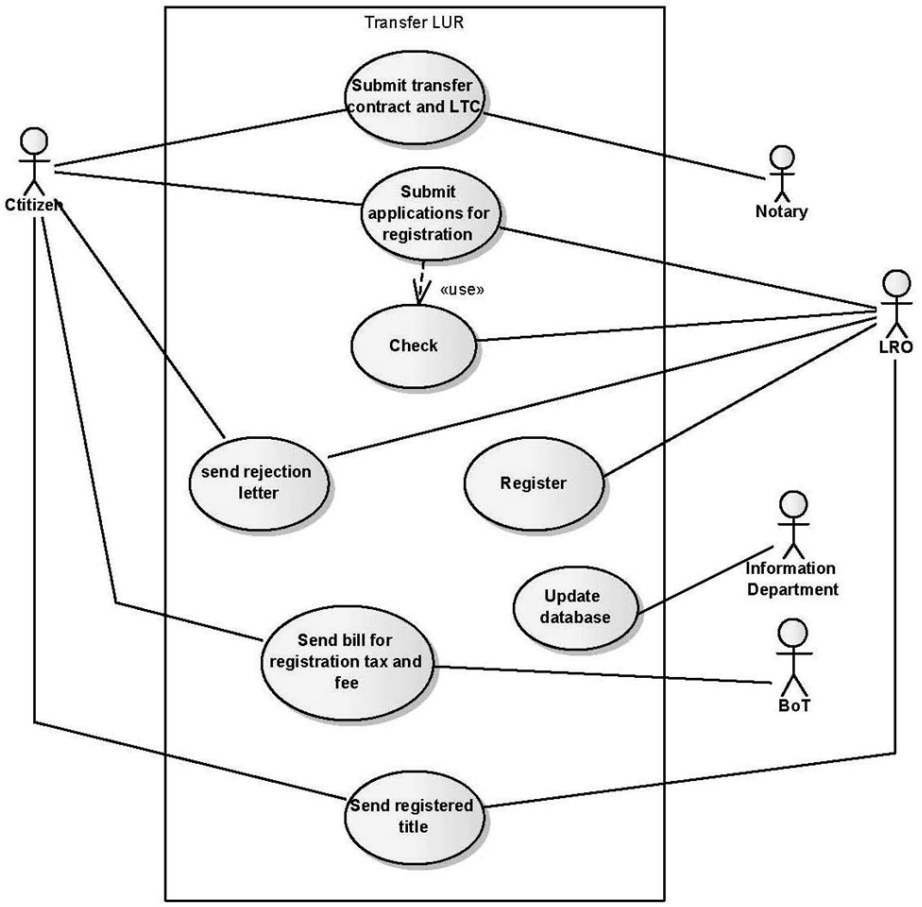


Figure 6-3: Use case diagram for registration of transfer land use right of whole parcel

b) Model in Internal system environment

The model show the basic flows of registration process for full transfer LUR of whole parcel by activity diagram as shown in figure 6-4

Step 1: Citizen prepare transfer contract and LTC (land tenure certificate) to send to notary

Step 2: Notary office notarize that document and send back to citizen

Step 3: Citizen submit application to Registration department

Step 4: LRO receive applications and retrieve digital data from database to check

Step 5: LRO archive LTC and related documents. At the same time, LRO send request of updating data to information department.

Step 6: LRO prepare updated LTC

Step 7: LRO receive financial obligation identification from BoT

Step 8: LRO send bill and results to citizen

Conditions are applied a number of times in this activity model. The process will terminate at step 4 if the application does not meet requirements. Besides that, step 4 may also repeat several times until the data is retrieved fully from the database. From the figure 6-4 and described steps above, it can be seen that the registration process is becoming simple and less steps than the existing one. Thus, it will contribute in reducing the processing time and increasing efficiency of LRS. However, change in legal framework will be required for these steps to be implementable, as discussed in section 6.6.

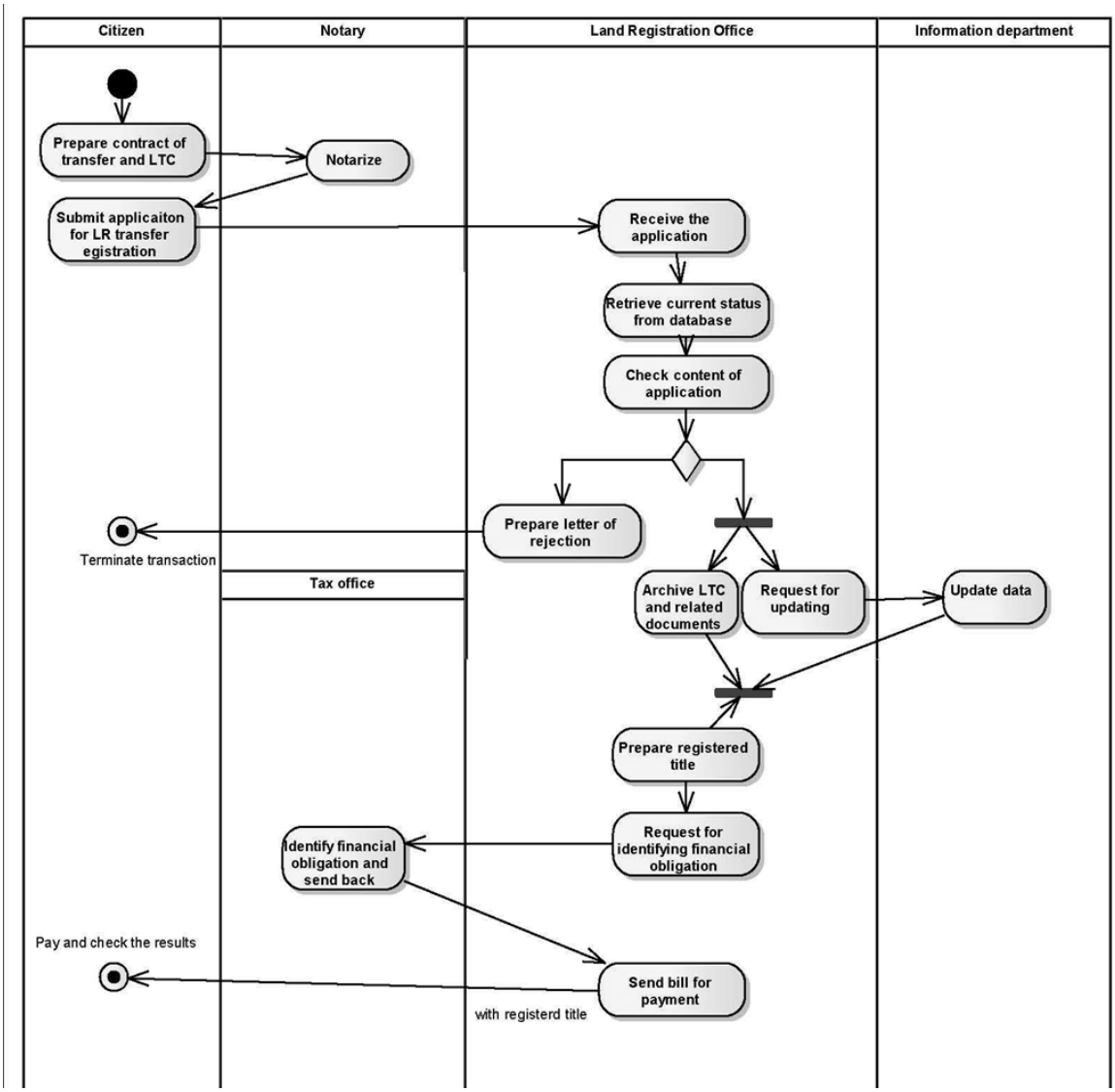


Figure 6-4: Activity diagram for registration of transfer land use right of whole parcel

6.4.2.2. Static Model for full transfer LUR of whole parcel

Static models concerns the structuring of databases for all kind of information and resources used in full transfer LUR of whole parcel services and contains all information of objects participating in the services.

The core objects of any cadastre and land registration around the world that are needed for tenure security are (land) objects, RRR (right, restriction, responsibility), and subject (Tuladhar, 2004). The core objects need to suit the Rules, Policies and requirements of individual countries.

The data model for full transfer LUR of whole parcel is adapted from land administration domain model (Lemmen *et al.*, 2009) and based on Vietnam situation. The model start from the three core classed of model (LA_RRR: RightRestrictionResponsibility; LA_RecordedObject and LA_SpatialUnit; and LA_Party). Three core classes are three core objects as mentioned above. The definition of the main classes are shown in table 6-2.

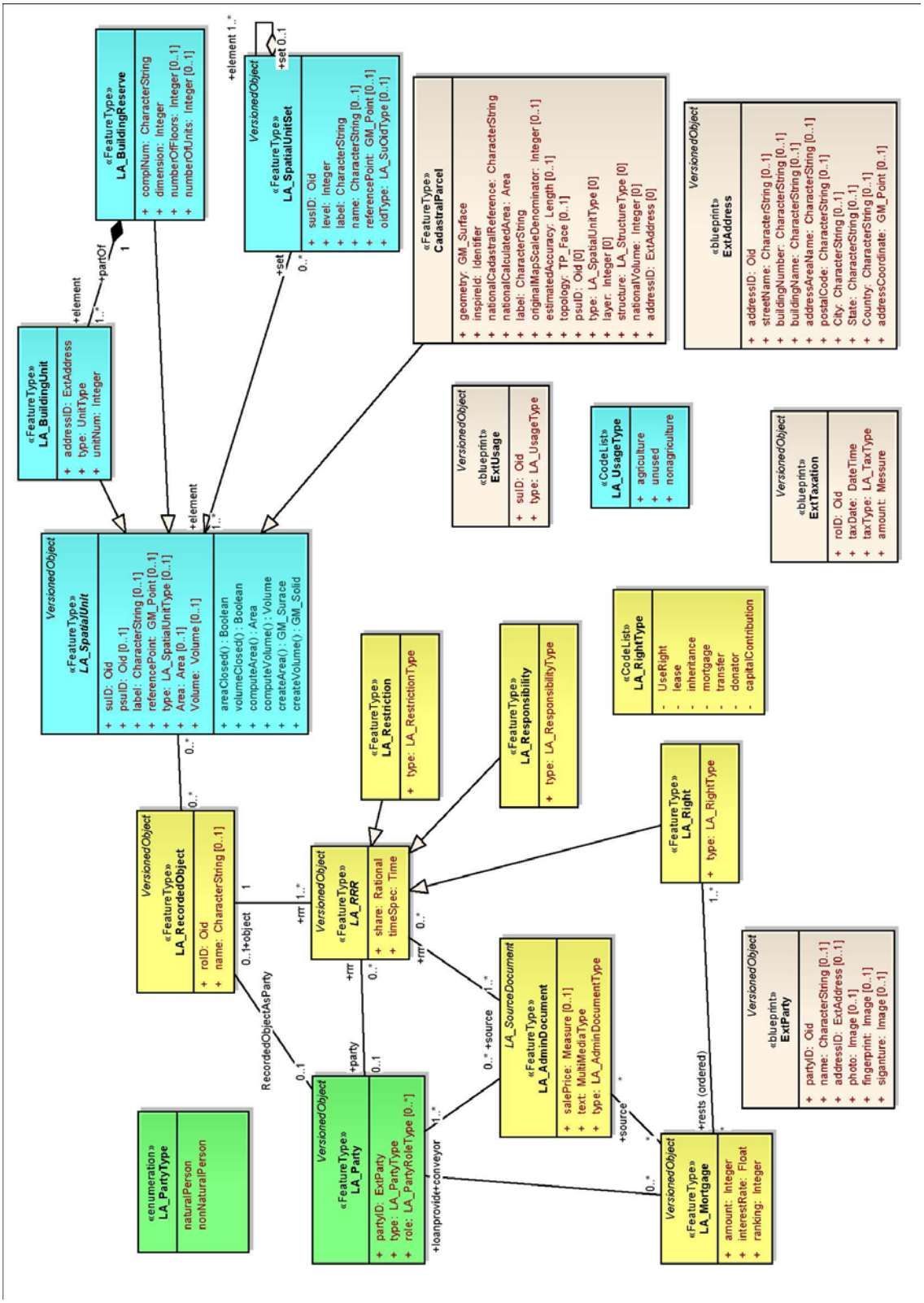


Figure 6-5: core data model adapted from LADM –WD3- ISO2008

Table 6-2: Definition of main classes (adapted from LADM)

Class	Definition
LA_Party	A person, or group of persons that compose an identifiable single entity. In Vietnam case, LA_Party type include natural (individual, household) and non-nature person (organisation)
LA_RRR	Where RRR stands for Right, Restriction and responsibility LA_RRR include 3 sub-class as follow LA_Right (lease, transfer, mortgage,...) LA_Responsibility (maintain a waterway, protect forest,..) LA_Restriction (a monument, time of using)
LA_RecordedObject	Administrative information concerning spatial units
LA_SpatialUnit	Is associate with LA_recordedObject and include information about a single area of land or a volume of space, under a unique right (land use right)
LA_SourceDocument	Document providing fact

In this data model, the LA_Party classes are shown in green colour, LA_RRR classes in yellow and LA_RecordedObject and LA_SpatialUnit in sky blue colour. The LA_RRR class is the generalisation of three classes LA_right, LA_responsibility and LA_Restriction and associated with LA_Party, LA_RecordedObject.
Similarly, LA_SpatialUniti is the generalisation of classes LA_BuildingUnit, LA_CadastralParcel.
Blueprint of extension classes ExtParty, ExtAddress, ExtTaxation and ExtUsage with attributes based on Vietnam, is also presented in this diagram. Unique personal identity numbers and parcel identifiers are used in this model.

All the above classes are need for registration of full transfer of LUR. In order to process the registration of full transfer of LUR, e-LAS system will need to interact with number of classes as follow:

LA_RRR: provide information about rights relate to transferred parcel
LA_RecordObject: provide administrative information regarding spatial unit
LA_SpatialUnit: provide information about land object (parcel and building)
LA_Party: provide information about subject who has rights on that land objects
Besides the above basic information, information about tax are provided from ExtTaxation

6.5. Validation by prototyping

The aim of prototyping here is to test the functionality of e-LAS models which are designed in the previous section. In this section, full transfer LUR of whole parcel which developed in detail is chosen to prototype.
The rest registration services can based on this to validate in similar way.

6.5.1. Software used

Two GIS software are chosen for prototyping:

- For database management: PostGIS was chosen for prototyping because it adds support for geographic object, create spatially enables the PostgreSQL server. Additionally, it is open sources and follows the OpenGIS " Simple Features Specification for SQL", enable information to be organised, visualised and analysed. Since e-LAS deals with both spatial and non-spatial data and aim to provide better accessing information to citizens, PostGIS can be a suitable choice.

- For visualisation of the registration information via internet, the software is uDig (User-friendly Desktop Internet GIS) is chosen. It is open sources and aim to provide a complete Java solution for desktop GIS data access, editing, and viewing. It meets the requirements of creating user-friendly environment for citizen and other stakeholders.

6.5.2. Data used

Data was collected from district 6, Hochiminh city in Vietnam. The reason to choose this data is because they have digital land use and cadastral data while other districts of Hanoi still are paper based data. However, e-LAS is not developed in Vietnam, so the structure of database has to revised as following the proposed design. The database is revised following the data model was developed in 6.4.2.2.

The prototyping case has 7 classes, which are LA_RRR, LA_Party, LA_ReObj (LA_RecordedObject), SpUnit (LA_SpatialUnit), LA_SD (LA_SourceDocument), Taxation, Address
Because the digital data of building and tax are not available, so only basic information about building is included in class of SpUnit, and only taxid was generated autimaticlly in class of Taxation.

Figure 6-7 illustrate the data classes for prototyping case by using enterprise architecture
Figure 6-8 illustrate the data structure by using Arcgis access
All data of prototyping case are managed by Arcgis software, and afterthat data are loaded to PostGIS for management. Udig is used for visualisation data and information. (figure 6-8).

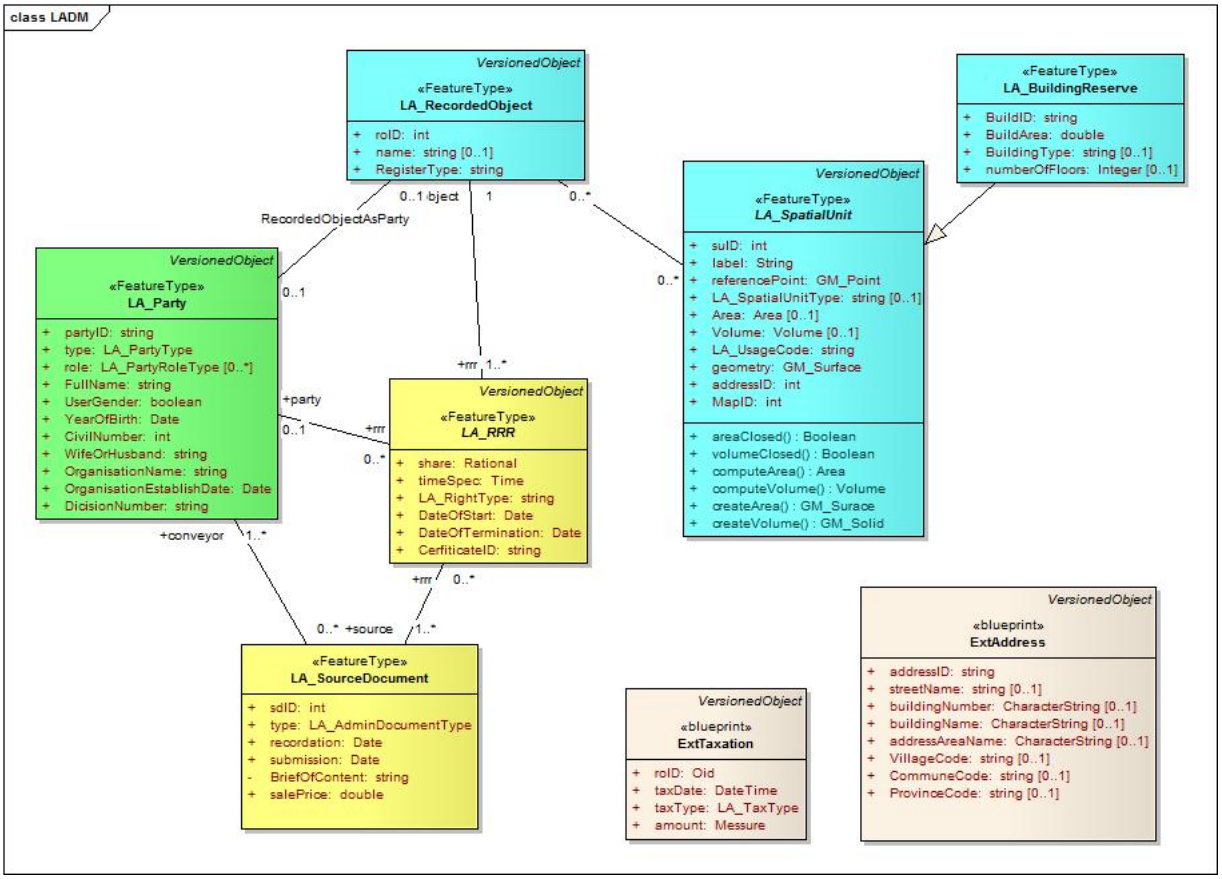


Figure 6-6: Class diagram of prototyping case

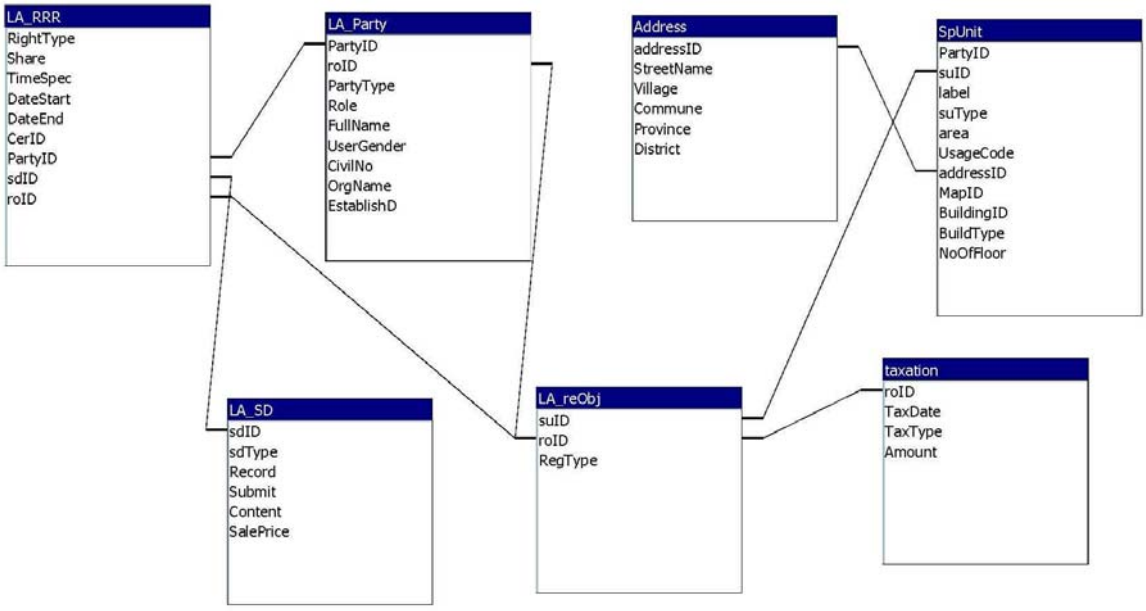
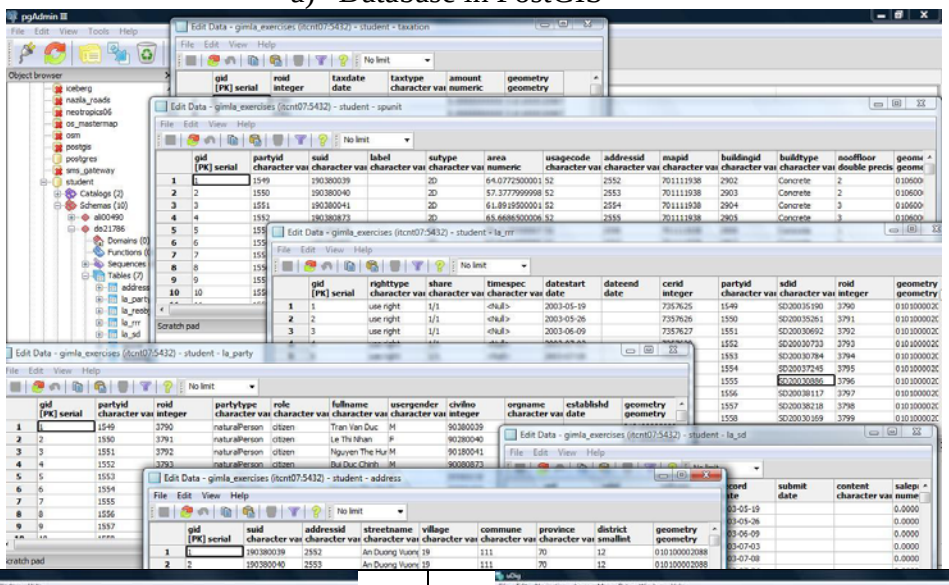
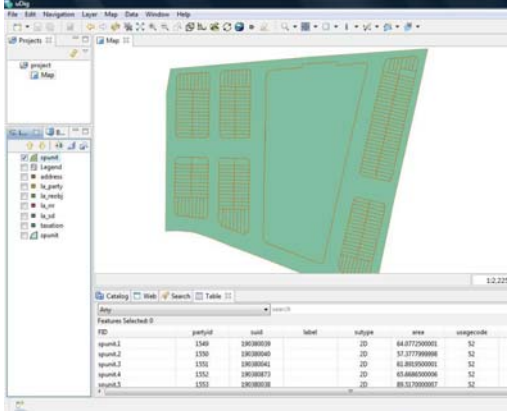


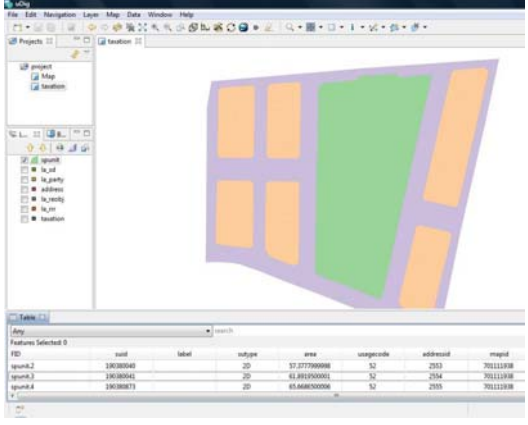
Figure 6-7: Database structure and relationship of prototyping case

a) Database in PostGIS





b) Land parcel



c) Land usage

Figure 6-8: Database in PostGIS and visualisation of data in Udig

6.5.3. Prototyping for registration of the transfer of LUR of whole parcel

As mentioned in prototyping approach, the case of registration of LUR transfer of whole parcel is taken for prototyping. The prototype has been implemented only for internal process at LRO. It consists three main steps: finding original information related to the parcel, change and update information after transaction, and final check the updated information. An example has been implemented in the prototype as follows:

Example of LUR transfer:
Mr. Tran Van Duc was the owner of parcel with suid= '190380039', his CivilNo is '903839'. He transferred his parcel with building to Ms. Nguyen Thu Hong (Civil number - 89880495) in 2005 and Ms. Hong applied for registration of the transfer of land use right on the whole parcel. Ms. Hong sent all required documents including title certificate of Mr. Duc, transferring contract, copy of her civil document and Mr. Duc's civil document to LRO at district level. Then, LRO checked all document by loading information regarding transferred parcel from e-LR system. After all information from applicants are verified, LRO updates and registers information about new owner of that parcel into the e-LR system. Finally, LRO checks all information again and sends results back to Ms.Hong.

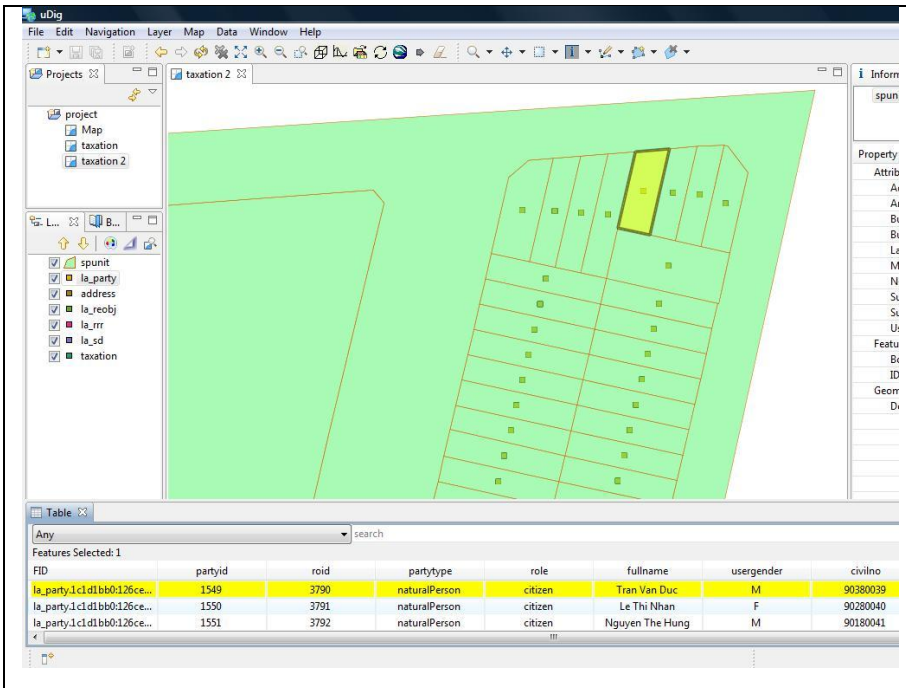
In this process the steps to be followed at LRO are as follows:

✓ **Step 1: Find all related information about parcel of Mr. Tran Van Duc.**

To perform this step, following query is applied into the system using PostGIS by LRO staff

*Select **
From la_party as p, la_reobj as o, la_rrr as r, la_sd as d, spunit as u, address as ad
Where p.partyid=r.partyid and r.roid=o.roid and o.suid=u.suid and u.addressid=ad.addressid and r.sdid=d.sdid and p.civilno='90380039';

The query gives all the information related to parcel of which Mr Duc is the owner. The result is then can visualised through uDig as shown in Figure 6-9



Partyid: 1549
Roid: 3790
Partytype: naturalPerson
Fullname: Tran Van Duc
CivilNo: 9038039
Regtype: urban
Datestart: 2003-05-19
Cerid: 735725
Sdid: SD20035190
Suid: 190380039
Area: 64.072
Usagecode: 52 (urban residential)
Addressed: 2552
Buildingid: 2902
Buildingtype: concrete
NoOfFloor: 2
….

Figure 6-9: Information about parcel 190380039 (highlight in yellow colour) before full transferring registration

✓ **Step 2: Change and update information of transferred parcel:**

In this step, the information related to the transferred parcel with id 190380039 after the registration are changed and updated. The information to be changed and updated are information about owner (user) of parcel, recordedobject, source document, and taxation. The other information about parcel are not changed. Due to unavailability of tax data, this information has not been incorporated in the prototype. This step begins with the update of RecoredObject in LA_ReObj. In the next step, the source document in LA_Sourcedocument is updated. Finally, the information about the new owner (user) in LA_RRR and in LA_Party are updated.

The LRO staff uses PostGIS to update thses information. The query command is used as follows:

a) Update in LA_ReObj

Update la_reobj
Set roid='4234'
Where suid='190380039';

b) Update in LA_SD

Update la_sd
Set record='2005-06-14', sdid='SD2005061414'
Where sdid='SD20035190';

c) Update in LA_RRR

Update la_rrr
Set partyid='1993',roid='4234', datestart='2005-06-14', sdid='SD2005061414'
Where partyid='1549';

d) Update LA_Party

Update la_party
Set partyid='1993',roid='4234', fullname='Nguyen Thu Hong', civilno='89880495', usergender='F'
Where partyid='1549';

✓ **Step 3: Find all related information about parcel 190380039.**

This is the final step of the internal process where, the updated information is checked for its correctness. To perform this step, the LRO staff will perform following query command using PostGIS:

*Select **
From la_party as p, la_reobj as o, la_rrr as r, la_sd as d, spunit as u, address as ad
Where p.partyid=r.partyid and r.roid=o.roid and o.suid=u.suid and u.addressid=ad.addressid and r.sdid=d.sdid and u.suid=190380039;

The query gives all information related to the transferred parcel with Ms. Hong as the new owner. The result is then can be visualised through uDig as shown in Figure 6-10:

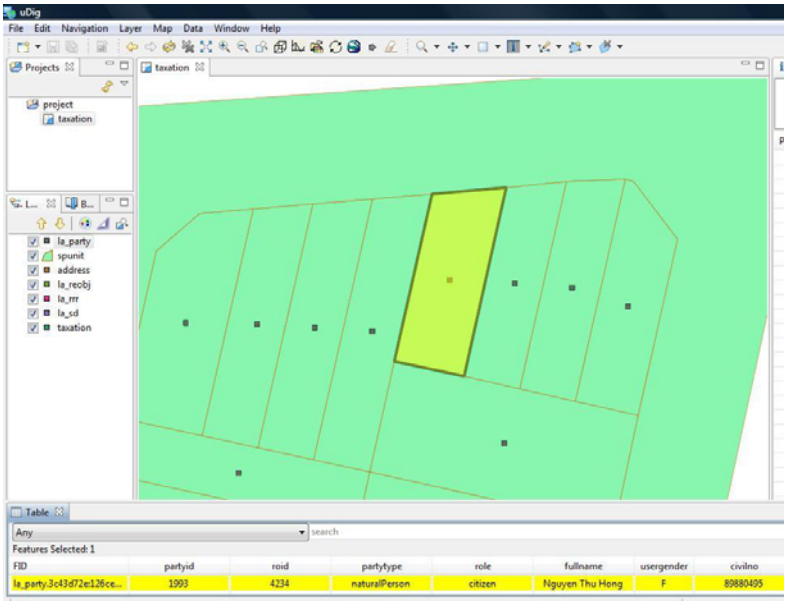
<table>
<tr><td rowspan="18"> 
</td><td>Partyid: 1993</td></tr>
<tr><td>Roid: 4234</td></tr>
<tr><td>Partytype: naturalPerson</td></tr>
<tr><td>Fullname: Nguyen Thu Hong</td></tr>
<tr><td>CivilNo: 89880495</td></tr>
<tr><td>Regtype: urban</td></tr>
<tr><td>Datestart: 2005-06-14</td></tr>
<tr><td>Cerid: 7357265</td></tr>
<tr><td>Sdid: SD2005061414</td></tr>
<tr><td>Suid: 190380039</td></tr>
<tr><td>Area: 64.072</td></tr>
<tr><td>Usagecode: 52 (urban residential)</td></tr>
<tr><td>Addressed: 2552</td></tr>
<tr><td>Buildingid: 2902</td></tr>
<tr><td>Buildingtype: concrete</td></tr>
<tr><td>NoOfFloor: 2</td></tr>
<tr><td>…</td></tr>
</table>

Figure 6-10: Information about parcel 190380039 (highlight in yellow colour) after full transferring registration

Discussion about the of results of the prototype

The results of the implementation of the given case in the prototype can be summarised as follows:

- As the tax data could not be collected, the data structure developed for tax data could not be implemented in the prototype. However, the staff from BoT has access to system and therefore, he or she can upload information about tax related to the transferred parcel.
- In this prototyping case, building data is integrated into e-LR system. This building information is provided and shared from BoUM.
- Main steps of registration process (transfer LUR of whole parcel) can run smoothly in e-environment and the results can be visualised by UDIG software. It means both applicants and LRO staff can visualise the data. And the model of OSS services can be applied at district level.

6.6. Conditions for implementation e-LAS

The section 5.5 has described the requirements of new system. As per the requirements, the system has to be citizen centric. Therefore, the focus of designing e-LAS is given on this requirement. This discussion is focused on how the system can be citizen centric and its implementation could be materialised. Different aspects of the system such as organisational aspect, technical aspect, legal aspect, and financial aspect are the aspects that determine the implementation of e-LAS

6.6.1. Organisational and institutional aspect:

The major requirements of the organisation aspect in the changed context are establishment of the facilities for the citizens like one-stop-shop, web-services, help desk, feedback system. To meet these requirements following conditions have to be fulfilled:

- Organisational restructuring:

Existing land registration service is delivered from provincial and district level organisations. With the changed system, the registration services will be provided only through the district level organisations. LRO will be principal organisation at the district level to deliver the services. LRO being the principal organisation of land registration services, one-stop-shop centre will be established at this office. Citizens seeking land registration services will be served from this counter. Citizens can apply for the services and receive service or back response from this centre. The centre will transfer the request to the responsible staff or organisation. Citizens will be free from existing situation of visiting all the organisations themselves and paying many visits for one service.

Since the system is e-based, the facility of web services will be available but it should be make available for the citizens as well and should be effective and efficient.
The other requirements for organisational restructuring are establishment of help desk and feedback system or grievance handling system. This will help the citizens to get support in case of any problem regarding the land registration services and they will have room for making suggestions or registering complaints. There should be a mechanism of prompt response to the citizens' queries or complaints. LRO being the principal organisation, at least it should establish these facilities.

- Inter-organisational coordination and cooperation

In the changed context, inter-organisational coordination and cooperation are must to me the system functional. Either the services offered from the different organisation should be integrated with LRO or they should provide prompt cooperation to LRO.

- Capacity development

In the changed context, the processing of services will be done digitally. Therefore there will be a need of providing training to the staff working at different level. At the same time, a group of core technical staff will be needed to maintain and update the system.

6.6.2. Technical Aspect

For the effective and efficient implementation of the system, technical aspect will play an important role. The technical aspect should focus following activities:

- Digitalisation

Existing land registration system is manual and hence the cadastral and land use related data and information are in analogue format. For the implementation of e-LAS, digitalisation of the data and information will be required.

- Data standards

It is essential to follow data standards so that it can respond efficiently to the e-LAS. Following data standards will ensure reliability, transparency, compatibility and interoperability among the organisations sharing the data from e-LAS database. LRO should develop data standard so that its line organisations can follow it. There is already defined data standard in the country but it is not sufficient to meet the requirement of e-LAS.

- Data quality

Data quality including accuracy, coverage, completeness, up-to-date, and logical consistency should be maintained so that the data will be useful and reliable for the efficient and effective functioning of e-LAS. With the support of ICT/geo-ICT tool, the expectation about data and its quality can be maintained.

- Security and Control

Adequate mechanism for security and control should be established to avoid the possibilities of data loss, informal transaction, and unauthorised access to the system. It is needed in all phases of the e-LAS, such as when developing, operating, and maintaining. Following measures should be applied:

- All data should be stored in a back-up everyday to be sure that in case of accident, lost data can be restored
- Only responsible staff should be authorised for accessing the system, network and program
- Security control should be established at different level of accessing to system

- User interface

One of the characteristics of e-LAS as well as that of e-government is to have varieties of users ranging from citizen (individual, representatives of an organisation, an association), private sectors to administrative agents (registrar, surveyor, lawyers, notary staff, tax office, district office, banks to ministries staff). To access, query and visualise data and information from e-LAS, user-friendly interface is needed that can display the same information in the same fashion on the user's computer screen.

- Interoperability

Interoperability is the ability of government organisations to share and integrate information and process by use of common standards. E-LAS need to process all kind of land information and related data from different sources. The development of standard communications, construction of data exchange, modelling, and web services are needed to maintain interoperability of the system.

- Hardware/Software

The operation of the system will be based on open source software, which will reduce the cost that would be needed to procure proprietary software. However, necessary hardware and skilled human resources will be needed.

6.6.3. Legal aspect

Functioning of the e-LAS will be greatly affected by the legal aspect. The proposed system will require change in role and responsibilities or jurisdiction of organisations to be compatible with the proposed model. The policies, for example, data sharing policy will have to be formulated. The other important thing to be handled by the legal framework in the changed context is the data security in digital environment. One of principles of e-LAS is to enhance the participation of citizens in the functioning of the system. In the changed context, a citizen should be considered not as a subject or unvolunteer customer but as a partner. Appropriate modalities should be developed to ensure citizens participation. To meet all these requirements, existing legal framework will be required to be revised or amended.

6.6.4. Financial aspect

The experience from developed countries which e-LAS are established and implemented such as Netherlands, Australia, and Sweden, e-LAS implementation need a huge budget including hardware,

software, communication, training, data capture, system operation and maintenance, etc. Thus, an adequate strategy will be required for managing huge amount of financial resources for the investment. The strategy can be developed to look internal and external resources for funding. Internal resources can include the support from the central government and support from respective district or provincial government. As an external source of investment, support from donor agencies and financial institutions within the country can be expected. To draw the attention of external resources, it will be necessary to clear vision about the system how will it bring change in lives of general people and ensure good governance. With the proposed system, modern tax system can be developed, from which the local government will greatly benefited. Similarly the financial institution will be benefitted by actual valuation of the parcel applied for mortgage. These benefits should be advocated to the respective organisations to acquire their support for the implementation of the program.

6.7. Concluding remarks

This chapter developed e-LAS models to minimise the gaps identified with existing LAS in Vietnam on the basis of requirements as identified and discussed in Chapter 5. The e-LAS model is then validated through prototyping.

A set of models of e-LAS including organisational model, functional model, dynamic and static models was developed to address the gaps between G2G and G2G. There can exist four alternatives of system structure for developing an organisational model. The fourth model is found to suitable for developing e-LAS in Vietnam. In this alternative, the central database is controlled and maintained at the central level whereas access to the database is provided to the district level for providing land registration services. The organisational model is developed in such a way that all the land registration services are provided at the district level. A service model of LR, which is also a functional model was developed to show that all services can be provided at one place, creating a possibility of establishing one stop shop facilities for service delivery.

Five different kinds of services regarding land registration services such as access to information, transfer of LUR, parcel sub-division, mortgage and lease registration are provided at district level. Among them, registration of transfer of LUR of whole parcel is chosen to developed dynamic model and static model, since it is one of the most common services delivered from the district level. The static model or the data model has been developed on the basis of the LADM.

A prototype based on PostGIS and uDig has been developed. The data model and internal process of the registration of LUR of whole parcel are validated with the help of the prototype based on empirical data. This is the limited validation because, it includes only the internal process of the registration in one hand, and the specific to the registration of whole parcel on the other. The validation revealed that newly developed system based on proposed models run smoothly in e-environment.

In order to ensure the operationalisation and sustainability of the system, different aspects should be taken into consideration before the implementation. The main aspects to be considered in this context are organisational, technical, legal, and financial. Organisational restructuring, inter-organisational coordination and cooperation, and capacity development are the requirements to be met for organisational/institutional aspect. Digitalisation, data standards, data quality, security, user interface, interoperability, and hardware/software are conditions in term of technical aspect. All the conditions cannot be implemented without supporting from legal framework and the implementation of the system need a huge amount of investment. Therefore, arrangement of necessary human as well as financial resources is required.

7. Conclusion and Recommendations

7.1. Introduction

In this chapter, conclusions are drawn as outcomes of the research in section 7.2. Then the recommendation for further research are presented in section 7.3.

7.2. Conclusion

Main objective of this research is to design an e-LAS for improving delivery of LA services. To achieve the main objective two sub-objectives were formulated. Each sub-objective was further supported by research questions. The conclusion is drawn based on the research questions as under:

Sub-Objective 1: Investigating the gap between the expectations of and availability of LA services for citizens, and the interaction among government organisations to deliver the LA services (in the context of G2C, and G2G relation).

1. What is the existing situation of LA services delivery?

Land registration service at district level in Vietnam is responsible for the individual registration. The process of registration is quite complex with a number of related organisations and need at least twelve basic steps to follow. Additionally, there are 6 organisations involving in the delivery of LRS including LRO, BoT, BoUM, State treasury, survey organisation, notary and bank (in case of mortgage registration). The system is not efficient because it requires many days and a number of organisations need to revisit to get the services done. There is no participation of citizens in LR system. Moreover, citizens are not aware of the procedures of land registration services. The state of rules of law is above average and usually citizens need support from the staff to understand it. Regarding information system, all the land use data and cadastral map using for registration system are paper based and not up-to-dated. Additionally, transfer of data and information between G2G and G2G is manual.

2. What are the expectations of citizens with respect to the delivery of LA services and how government organisations interact among themselves to deliver the services?

Citizens' expectations can be summarised in 6 main points such as awareness about land registration system by providing better information about the services, simplifications in the procedures to be followed by the citizens, reduced revisit time to the organisations for getting services, clear information on the requirements for LRS, and better attitude of staff responsible for providing LRS.
Regarding interaction between LA organisations and line agencies, it is lacking between LRO and BoUM in terms of sharing building data, and is not satisfactory between LRO and BoT in terms of back response time. Moreover, all data and information are transferred among these organisations manually and takes quite a long time.

3. What are the reasons of gap between G2G and between G2C?

The issues related to back response time, data sharing and accessing to information are identified as the main gaps between G2G relations. The reasons for the gap are identified as overlapping responsibilities, lack of trust, unclear responsibilities, lack of data sharing policy, lack of integrated working mechanism, and proper information system. Similarly, the gap between G2C, C2G is identified as efficiency of LRS, awareness of LRS, accessing to information. The reasons for these

gaps are lacking inter-organisational cooperation, complicated LR procedure, complicated legal framework of LR, lack of proper information system, lacking accountability, carelessness of citizens.

Sub-Objective 2: Designing and validating improved LAS based on e-government concept.

4. What elements should be taken into account to design improved LAS in the context of e-government?

The research recognised 5 major aspects of e-LAS to be taken into account before its designing. The new e-LAS should be citizen centric, and its organisational, technical, legal, and financial aspects should be well taken into account. The system can be citizen centric by creating availability of web services, improving feedback system to make citizen participation, and help desk. Regarding organisational aspect, proper structuring of LA organisations and cording among line organisation are required to provide one-stop-shop services to citizen. Regarding technical aspect, cadastral and land use information are need to digitalised and data standardization are needed to developed. Additionally, establishment of proper infrastructure for information system is the issue to be taken into account. The issue of legal aspect is the other aspect of concern that is inevitable to support and guide the new system. Lastly, a huge amount of investment is needed to develop and establish e-LAS, and hence adequate resources should be arranged.

5. How is the system developed?

e-LAS models are developed to have a completed view about proposed system and how the system can address the gaps. The models consists of organisational model, functional model, dynamic model, and static model. Organisational model is developed with the aim to view overall vision of the system. For this purpose, the alternative with main database at central level is proposed. District level will keep relevant data and copy of central database in order to develop one-stop-shop facility to citizens.
Functional model are designed for land registration service delivery at district level. The model presents who are the internal and external actors interact with e-LAS and what are the services provided by e-LAS. Among the services provided by e-LAS at district, registration for full transfer of LUR is chosen to develop in detail (dynamic model and static model) because it is basic and common service. Dynamic model for registration of full transfer of LUR including models in external system environment (use case diagram) and internal system environment (activity diagram). Static model or data model for registration of full transfer of LUR is developed based on land administration domain model with three core classes LA_RRR (Right, Responsibility,Restriction), LA_Party (subject), and LA_RecordedObject (administrative information regarding spatial unit), LA_SpatialUnit (object-parcel).

6. How can the newly designed system be validated?

Newly designed e-LAS models is validated through prototyping process of full transfer of LUR and discussion about its implementation in terms of organisational/institutional, technical, legal and financial aspects. PostGIS and uDig have been used as prototyping software. A prototyped dataset has been created following the data model. The process of full transfer is demonstrated to prove that the system can operate smoothly in e-environment. It proved the possibility of new e-LAS system in reducing and eliminating the gaps between G2C and G2G. However, to make such system can be implemented, different aspects of the system such as organisational aspect, technical aspect, legal aspect, and financial aspect are needed to be considered.

7.3. Recommendations

This study mainly focused on designing land registration services in e-LAS based on the citizens' requirements identified from the case study. E-LAS models were developed with detailed regarding land registration services in e-environment. Within the limited period of time, the following tasks could not be investigated fully and then recommended for further research.

- This research was focused in the designing of e-LAS based only on the citizens' requirements and government's requirements are not much taken care. Therefore, further research is recommended to investigate inclusion of government's interest in the system, as land administration is one of the important tasks of government, such as the issues like how to harmonise the government's and citizens' requirements.
- E-LAS models developed in this research were concentrated on providing e-land registration but has not fully covered the methods of submission and transferring of digital documents. Furthermore, one of the common services of land registration, registration by parcel subdivision has not been fully designed and investigated in this study. Therefore, a study is required to indentify how to design fully and introduce electronic registration system.
- E-LAS designed in this research is more concentrated on front-office and does not fully discuss about back-office. Therefore, it is recommended to develop a back-office based design.
- The prototyping for the visualisation of the system is designed in uDig environment. Possibility of visualisation with other interface software, especially open source, should be explored.

References

Anttiroiko, A. V. 2008, *Electronic government - concepts, methodologies, tools and applications*, Information Science reference, Hershey, NewYork.

Avison, D. and Fitzgerald, G. 1995, *Information system development: Methodologies, Techniques and Tools*, McGraw-Hill Book Company Europe, Berkshire.

Azad, B. and Faraj, S. 2009, 'E-Government institutionalizing practices of a land registration mapping system', *Government Information Quarterly* 26,(1). pp.5-14.

Bhatnagar, S. 2009, *Unlocking E-government potential; concepts, cases and practical insights*, SAGE Publications India New Delhi, India.

Checkland, P. B. 1981, *Systems thinking, systems practice* Wiley, Chichester.

Churchman, C. W. 1968, *The Systems approach*, Dell Publishing, New York.

Ciborra, C. and Navarra, D. D. 2005, 'Good governance, development theory, and aid policy: Risks and challenges of e-government in Jordan', *Information Technology for Development* 11,(2). pp.141-159.

Dang, H. V. 2007 'E-administration of land based on dialog between government and people', *Decision Makers Meeting on Good Administration of Land in Asia and the Pacific - Land Administration for Poverty Reduction and Economic growth*. pp.7.

Enemark, S. and van de Molen, P. (2006). A Framework for Self-Assessment of Capacity Needs in Land Administration. Proceedings of the XXIII FIG Congress. Munich**:** 27.

Evans, D. and Yen, D. C. 2006, 'E-Government: Evolving relationship of citizens and government, domestic, and international development', *Government Information Quarterly* 23,(2). pp.207-235.

Gottschalk, P. and Solli-Sæther, H. 2009, *E-Government Interoperability and Information Resource Integration: Frameworks for Aligned Development*, Information Science Reference, Hershey, New York.

Grant, G. and Chau, D. 2005, 'Developing a generic framework for e-government', *Journal of Global Information Management* 13,(1). pp.1-30.

Hawryszkiewycz, I. T. 1998, *Introduction to systems analysis and design*, Prentice-Hall, Sydney etc.

Heeks, R. (2003), E-government for development: success and failure rates of e-government in developing/transitional countries - overview. Available from: <http://www.egov4dev.org/success/sfrates.shtml> [1 December 2009].

Henderson-Sellers, B. and Edwards, J. M. 1990, 'The object-oriented systems life cycle', *Commun. ACM* 33,(9). pp.142-159.

Homburg, V. (2004). E-government and NPM: a perfect marriage? Proceedings of the 6th international conference on Electronic commerce. Delft, The Netherlands, ACM**:** 9.

Homburg, V. 2008, *Understanding e - government*, Routledge, London etc.

Kalantari, M., Rajabifard, A., et al. (2005). Toward e-land administration: Australian online land information services. In Proceedings: Spatial Sciences Institute Conference 2005. Melbourne Convention Centre**:** 10.

Lehaney, B. and Paul, R. J. (1996). Soft systems methodology and simulation modeling. Proceedings of the 28th conference on Winter simulation. Coronado, California, United States, IEEE Computer Society**:** 695-700.

Lemmen, C. H. J., van der Molen, P., et al. 2004, 'e - Land administration: an international seminar in Innsbruck', *In: 3rd FIG Regional conference for Asia and the Pacific: Surveying the future "contributions to economic, environmental and social development: Jakarta, Indonesia October 3th July, 2004, Technical session 5: e-Land administration and e-government.*,(International Federation of Surveyors). pp.7.

Lemmen, C. H. J., van Oosterom, P. J. M., et al. 2009, 'Transforming the Land Administration Domain Model LADM into an ISO Standard - ISO19152', *In: Proceedings of the FIG working*

week : Surveyors key role in accelerated development, Eilat, Israel, 3-8 May, 2009. ISBN 978-87-90907-73-0 24 p.

Markus, L., Majchrzak, A., et al. 2002, 'A Design Theory for Systems That Support Emergent Knowledge Processes', *MIS Quarterly* 26,(3). pp.179-212.

Navarra, D. D. and Cornford, T. 2003, 'A policy making view of e-government innovations in public governance'. *AMCIS 2003 Proceedings*, Tampa, Florida.

Navarra, D. D. and Cornford, T. (2007). State, democracy and the limits of new public management : exploring alternative models of e - govenment. London School of Economics and Political Science, Information Systems Group : working paper series;155. London, London School of Economics and Political Science**:** 14.

Navarra, D. D. and Cornford, T. 2009, 'Globalization, networks, and governance : researching global ICT programs', *In: Government information quarterly, 26(2009)1, pp. 35-41*.

OECD. 2003, *The E-Government Imperative (OECD E-Government Studies)*, Organization for Economic Cooperation & Devel.

Reeve, D. E. and Petch, J. R. 1999, *GIS, organisations and people : a socio - technical approach*, Taylor and Francis, London etc.

Rutayuga, A. B. (1996). Identifying models for the establishment of parcel based information system using object technology. Enschede, ITC.

Sambura, A. 2004, '*e*-Land administration in accession countries - Experience in Poland'. *FIG 2004: e - Land administration - proceedings International FIG Seminar, FIG Commision 7, Innsbruck, Austria 2 - 4 June 2004*, Wien, Austrian Society for Surveying and Geoinformation OVG. pp. 79-87.

Seifert, J. W. (2003). A primer on e-government: Sectors, Stages, Opportunities, and Challenges of online governance. Washington D.C, USA**:** 16.

Sharma, S. 2007, 'Exploring best practices in public-private partnership (PPP) in e-Government through select Asian case studies', *The International Information & Library Review* 39,(3-4). pp.203-210.

Stanford, J., Franjic, A., et al. (2006). Vietnam land administration report**:** 19.

Steudler, D. 2004, 'Modern trends in Land administration'. *FIG 2004: e - Land administration - proceedings International FIG Seminar, FIG Commision 7, Innsbruck, Austria 2 - 4 June 2004*, Wien, Austrian Society for Surveying and Geoinformation OVG. pp. 7-18.

Thomas, P. 2009, 'Bhoomi, Gyan Ganga, e-governance and the right to information: ICTs and development in India', *Telematics and Informatics* 26,(1). pp.20-31.

Torres, L., Pina, V., et al. 2005, 'E-government developments on delivering public services among EU cities', *Government Information Quarterly* 22,(2). pp.217-238.

Tuan, V. A. (2006). Reengineering of a land information system LIS for the Vietnamese land administration. Enschede, ITC**:** 111.

Tuladhar, A. M. 2002, 'Why is unified modeling language, UML, for cadastral systems ?', *In: Towards a cadastral core domain model : Proceedings of the 3rd workshop and 4th MC meeting of the COST G9 action : Modelling real property transactions, 10-12 October, Delft, the Netherlands, 12 p.*

Tuladhar, A. M. (2004). Parcel - based geo - information system : concepts and guidelines. ITC Dissertation;115. Enschede, ITC**:** 252.

UNECE (2005). Land administration in the UNECE region: development trends and main principles. Economic Commission for Europe: publications on human settlements;140. P. e. Dale. Geneva etc., United Nations Economic Commission for Europe (UNECE)**:** 104.

United Nations Department of Economic and Social Affairs, D. f. P. A. a. D. M. 2008, *UN e-Government Survey 2008: From e-Government to Connected Governance*, United Nations, New York.

van de Molen, P. 2001, 'Data communications: a lifeline between land administration organizations and society'. *In: Proceedings FIG Working week 2001*, Seoul Korea. pp. 12.

Vietnam National Assembly (2008). Resolution of National Assembly, XII Tenure, 4 Section, No. 15/2008/NQ-QH12 on 29 May 2008 about adjusting administrative border of Hanoi Capital and a number of relevant provinces. Vietnam, Vietnam National Assembly**:** 2.

VNG (2003). Land law 2003 Vietnam Government, National Political Publisher, Ha Noi**:** 339.

Vu, M. K. and Darrell, M. W. (2006). E-government and business competitiveness: a policy review, Vietnam Competitiveness Initiative**:** 19.

Walls, J. G., Widmeyer, G. R., et al. 1992, 'Building an Information System Design Theory for Vigilant EIS', *Information Systems Research* 3,(1). pp.36-59.

Wimmer, M., Codagnone, C., et al. 2007. 'Developing an E-Government Research Roadmap: Method and Example from E-GovRTD2020', in *Electronic government*, Springer Berlin, pp. 12.

World Bank. (2004), Definition of e-government. Available from: <http://go.worldbank.org/M1JHE0Z280> [1 December 2009].

Yildiz, M. 2007, 'E-government research: Reviewing the literature, limitations, and ways forward', *Government Information Quarterly* 24,(3). pp.646-665.

Yin, R. K. 2003, *Case study research: design and methods*, Sage, Newbury Park

Zevenbergen, J. A. (2002). Systems of land registration : aspects and effects. Netherlands Geodetic Commission NCG : Publications on Geodesy : New Series;51. Delft, Netherlands Geodetic Commission (NCG)**:** 223.

Zevenbergen, J. A. 2004, 'systems approach to land registration and cadastre', *In: Nordic journal of surveying and real estate research, 1(2004)1, pp. 11-24*.

Zhu, M. 2009, 'A Study of the One-Stop E-Government Application Model'. *E-Business and Information System Security, 2009. EBISS '09. International Conference on*. pp. 1-5.

Appendices

Appendix 1: Questionnaire for management group

Section 1: Respondent information

Ministry of Natural Resource and Environment (MoNRE)

Department:_____

Bureau:_____

Name of respondent:_____

Title:_____

Position:_____

Time: Date (dd/mm/yyyy):

Section 2: Discussion about the gap between land administration services and citizens

1. What are your main responsibilities?

_____
_____

2. Do you know how many locations citizens (customer) have to go to get the land use right registration done? And Which locations?

Number of locations: _____

Name of locations: _____
_____

3. Do your organization have any feedback mechanism for citizens to complain or recommend about land administration services?

Yes ☐ No ☐ Don't know ☐

If yes, please specify the mechanism: _____

If no, why: _____

4. How do citizens know about your organisation's tasks and responsibility?

_____
_____

5. Does your organization participate the citizens and stakeholders in the process of decision making concerning land administration services?

Yes ☐ No ☐ Don't know ☐

If yes, please specify how: _____

6. Are there well documented rules and guidelines for land use right registration services?

Yes ☐ Somehow ☐ No ☐ Don't know ☐

Other option: _____
_____

7. Are you aware of any problems/difficulties to be faced by the land administration staff while providing land use right registration services to citizens?

Yes ☐ No ☐ Don't know ☐

If yes, please specify? (And go to question 10)

_____
_____

If no, go to question 11

8. In your opinions, what are the reasons of the problems/difficulties?

_____
_____

9. Are you aware of any problems/difficulties citizens face when using land use right registration services from land administration organisations?

Yes ☐ No ☐ Don't know ☐

If yes, please specify? (And go to question 12)

_____
_____

If no, go to question 13

10. Until now, are there any efforts made from the land administration organisation to solve the problems regarding land administration staffs and citizens?

Yes ☐ No ☐ Don't know ☐

If yes, which action?

	Land administration staff's problem	Citizens' problems
Actions taken or efforts made		

And what is the priority action?

_____
_____

11. How would you suggest the solution to the problems mentioned above?

_____
_____

12. Would you like to add something else in this regard? (If yes, please specify)

_____
_____

Section 3: Discuss about land administration systems

13. What kind of information/data does your organisation need from district land administration organization? And how to get that information/data?

Information/data	Manually/Digitally (M/D)

14. What kind of information/data does your organisation provide district land administration organizations? And how is it provided?

Information/data	Manually/Digitally (M/D)

15. Are you using intranet/internet for official work?
Yes ☐ No ☐ Other option _____

If yes, for what purpose: _____
If no, do you have any plan to apply it? And when?
_____

16. Do you have any automated link with other concerning organizations?
Yes ☐ No ☐ Don't know ☐
If yes, with which organization: _____
And for what purpose: _____
If no, do you have any plan to apply it? And when?
_____

17. Are the land use map/data and cadastral map computerized?
Yes ☐ No ☐ Other option _____
If yes, in which system you feel easy to access and finding information?
Computerized ☐ Manual ☐
If no, does your organisation any have plans to computerize the maps completely, and when?
Yes ☐ And when _____

No ☐

18. Do you think online land use right registration system will make the services easier and faster?
Yes ☐ No ☐ Don't know ☐

19. In your opinion, is it easy and secured to transfer documents electronically than manually?
Yes ☐ No ☐ Don't know ☐

If yes, what kind of process do you think?
_____

20. Would you like to add something else in this regard? (If yes, please specify)
_____
_____

Appendix 2: Questionnaire for operation group

In case of Hanoi within the scope of land use right registration services

Section 1: Respondent information

District:_____ Bureau:_____

Name of respondent:_____

Title:_____

Position:_____

Time: Date (dd/mm/yyyy):

Section 2: General information about land use right registration services

1. What is your main responsibility?

_____

_____

2. Would you please, tell me what are the other organizations/bureau of other organisations also involved in land use right registration process? And their functions?

Participating unit	Function

3. Could you please provide some details about the number of employees working for different tasks in your organisation? From your point of view, is this number well enough to provide services effectively?

Tasks	Number of employees

_____

4. Which type of land use right registration is commonly related to your work?

Issuing land tenure certificate	
Changing land use purposes	
Transfer land use rights	
Registration of lease, sub-lease land use rights	
Registration of inheritance, donation of land use rights	
Registration, de-registration of mortgage, guarantee of land use rights	
Registration, de-registration of capital contributions of land use rights	

5. Is there any front-office at your organization?

Yes ☐ No ☐ Don't know ☐

If yes, how is the function of this office?

_____

_____

6. Is there any back-office at your organization?

Yes ☐ No ☐ Don't know ☐

If yes, how is the function of this office?

_____

_____

7. How many locations do the citizens (customer) have to go to get the land use right registration done? And Which locations?

Number of locations: _____
Name of locations: _____

8. How do your organization handle applications for land use right services?

First come, first service ☐ Pay more to get first service ☐

9. Do your organization have any feedback mechanism for citizens to complain or recommend about your services?

Yes ☐ No ☐ Don't know ☐
If yes, please specify: _____
If no, why: _____

10. How do citizens know about your tasks and responsibility? By what methods?

_____
_____

11. Do your organization consult citizens in decision making concerning land use right registration?

Yes ☐ No ☐ Don't know ☐
If yes, please specify how: _____

12. Are there well documented rules and guidelines for land use right registration services?

Yes ☐ Somehow ☐ No ☐ Don't know ☐
Other option: _____

Section 3: Discussion about interaction among related organizations

13. What kind of information/data do you need from related organization/bureau in order to provide land use right registration services? And how do you get that information/data?

Participating unit	Information/data	Manually/Digitally (M/D)

14. What kind of information/data do you need to provide related organization/bureau in order to provide land use right registration services? And how do you provide that information/data?

Participating unit	Information/data	Manually/Digitally (M/D)

15. Is there any duplication on working procedure among your organization and other related organisation?

Yes ☐ No ☐ Don't know ☐

If yes, please specify: _____

16. Do you think any steps can be removed or merged with another step?
Yes ☐ No ☐ Don't know ☐
If yes, which step: _____

17. What are the problems you are facing while performing your duty regarding interaction with other organisations? In your opinion, what are the reasons of the problems?

	Organisation 1:	Organisation 2:	Organisation 3:
Your organisation	Problem:	Problem:	Problem :
Reasons:			

18. What are the consequences created by this problem to the each organizations and citizens?

	Consequences
Your organisation	
Related organisation	
Land users (Citizens)	

19. How could you suggest the solution to solve this problem you mentioned before?
_____
_____

20. Would you like to add something else in this regard? (If yes, please specify)
_____
_____

Section 4: Discussion about gaps between the land administration services (land user right registration) and citizens

21. How do citizens (customer) submit the information/data required for land use right registration services?

Required information/data	Manually/Digitally (M/D)

22. Which problems/difficulties do you face when providing land use right registration services to citizens? In your opinion, what are the reasons of the problems/difficulties?

Land use right registration	Problems/Difficulties	Reasons
Issuing land tenure certificate		
Changing land use purposes		
Transfer land use rights		
Registration of lease, sub-lease land use rights		
Registration of inheritance, donation of land use rights		
Registration, de-registration of mortgage, guarantee of land use rights		
Registration, de-registration of capital contributions of land use rights		

23. What are the consequences created by this problem to the organizations and citizens?

	Consequences
Your organisation	
Land users (Citizens)	

24. How could you suggest the solution to solve this problem you mentioned before?

_____
_____

25. Is there any duplication on working procedure between your organization and citizens?
Yes ☐ No ☐ Don't know ☐

If yes, please specify: _____

26. Do you think any steps can be removed or merged with another step?
Yes ☐ No ☐ Don't know ☐

If yes, which step: _____

27. Would you like to add something else in this regard? (If yes, please specify)
_____
_____

Section 5.

28. How many days do you need to provide completely each type of land use right registration (in practices)? How is the cost/fee for each type of land use right registration?

Land use right registration	In practice (days)	Cost/fee
Issuing land tenure certificate		
Changing land use purposes		
Transfer land use rights		
Registration of lease, sub-lease land use rights		
Registration of inheritance, donation of land use rights		
Registration, de-registration of mortgage, guarantee of land use rights		
Registration, de-registration of capital contributions of land use rights		

29. Is the land use data and cadastral map computerized?
Yes ☐ No ☐ Other option _____
If yes, in which system you feel easy to access and finding information?
Computerized ☐ Manual ☐
If no, do your organisation has plan to completely computerized? And when?
Yes ☐ And when _____

No ☐

30. Are you using intranet/internet for official work?

Yes ☐ No ☐ Other option _____

If yes, for what purpose: _____
If no, do you have any plan to apply it? And when?
_____

31. Do you have any automated link with other concerning organizations?
Yes ☐ No ☐ Don't know ☐

If yes, with which organization: _____
And for what purpose: _____
If no, do you have any plan to apply it? And when?

_____

32. Do you think the computerization of records and online information system will make the process easier and faster?

Yes ☐ No ☐ Don't know ☐

33. In your opinion, is it easy and secured to transfer documents electronically than manually?

Yes ☐ No ☐ Don't know ☐

If yes, what kind of process do you think?

_____

34. Would you like to add something else in this regard? (If yes, please specify)

_____

_____

Appendix 3: Questionnaire for citizens

*The **privacy** of the respondents is highly acknowledged and respected. It is assured that all the information acquired from this questionnaire will only be used for the research and not for any other purposes.*

District: ..... 1-urban; 2-rural. ☐

Ward/Commune: .....

Time: Date:

1. Full name of respondent:.....
2. Address:.....
3. Gender: 1- Male ; 2- Female ☐ (to be noted down)
4. What is your academic level?
   1- Cannot read and write; 2- Primary school; 3- Secondary school;
   4- High school, Vocational school; 5- College, University and higher ☐
5. What is your businees?
   1- Public sector, 2- Private sector, 3 –Farmer, 4-Other..... ☐
6. Have you ever had used any services related to land use right registration?

(Can be more than one answer)

Services	Used	Using
Issuing land tenure certificate		
Changing land use purposes		
Transfer land use rights		
Registration of lease, sub-lease land use rights		
Registration of inheritance, donation of land use rights		
Registration, de-registration of mortgage, guarantee of land use rights		
Registration, de-registration of capital contributions of land use rights		

Finish the interview if respondent has never used any of those services

7. Which organization should you visit to use those services? *(tick X at the column ''Visit'' follow the respondent's answer)*

8. How many times did you visit those offices to get the service done? (*fill in column ''Time''*)

Local government office/organizations	**1**		**2**		**3**		**4**		**5**		**6**		**7**	
	Visit	**Time**	**Visit**	**Time**	**Visit**	**Time**	**Visit**	**Time**	**Visit**	**Time**	**Visit**	**Time**	**Visit**	**Time**
Commune People's Committee														
Bureau of natural resources and environment at district level														
Bureau of urban planning at district level														
District land registration office														
Bureau of financial at district level														
Bureau of tax														
Front office of District People's Committee	bo													
Other (specify):														

Issuing land tenure certificate – 1; Changing land use purposes – 2; Transfer land use rights – 3; Registration of lease, sub-lease land use rights – 4; Registration of inheritance, donation of land use rights – 5; Registration, de-registration of mortgage, guarantee of land use rights – 6; Registration, de-registration of capital contributions of land use rights – 7

9. How do the land administration organizations handle the requests for the services on land use right registration?

First come, first service ☐ Pay more to get first service ☐

Other opinion:.....

10.a) How many people should you approach to get the service(s) completed?

b) How long does it take to get the service(s) done? :

	1	**2**	**3**	**4**	**5**	**6**	**7**
Number of people							
Days							

11.a) How would you evaluate the quality of information provided by the organisation where you visited? (*Encircle the number in the column (a) on the following table based on the respondent's answer*)

b) How do you evaluate the attitude of staffs at the organization where you visited? (*Encircle the number at the column (b) on the following table based on the respondent's answer*)

Local government office/organizations	**Evaluate quality of information supply (a)**					**Evaluate the service attitude (b)**				
	Good	Quite good	Average	Bad	Very bad	Good	Quite good	Average	Bad	Very bad
Commune People's Committee	5	4	3	2	1	5	4	3	2	1
Bureau of natural resources and environment at district level	5	4	3	2	1	5	4	3	2	1
Bureau of urban planning at district level	5	4	3	2	1	5	4	3	2	1
District land registration office	5	4	3	2	1	5	4	3	2	1
Bureau of financial at district level	5	4	3	2	1	5	4	3	2	1
Bureau of tax	5	4	3	2	1	5	4	3	2	1
Other bureaus of District People's Committee	5	4	3	2	1	5	4	3	2	1
Other (specify):	5	4	3	2	1	5	4	3	2	1

12. How do you submit the information/data required for land use right registration services?

Required information/data	Manually/Digitally (M/D)

13. Which problems/difficulties did you face when using land use right registration services from land administration organisations?

Land use right registration	Problems/Difficulties
Issuing land tenure certificate	
Changing land use purposes	
Transfer land use rights	
Registration of lease, sub-lease land use rights	
Registration of inheritance, donation of land use rights	
Registration, de-registration of mortgage, guarantee of land use rights	
Registration, de-registration of capital contributions of land use rights	

14. What are the consequences created by these (this) problems/difficulties to you?

.....
.....

15. Are you aware of any mechanism for customer's feedback and complaint and grievance handling at land administration organisation?

Yes ☐ No ☐ Don't know ☐

If yes, by which mechanism?

Mail	
Phone	
Direct contact	
Complaint box	
Feedback/ Complaint Register	
Other:	

16. Have you ever involved in the process of decision making concerning land use right registration services?

Yes ☐ No ☐ Don't know ☐

If yes, please specify how:

.....

If no, do you think it is necessary?

Yes ☐ No ☐ Don't know ☐

17. Are there well documented rules and guidelines for land use right registration services?

Yes ☐ Somehow ☐ No ☐ Don't know ☐

18. Have you ever used online services?

Yes ☐ No ☐ Don't know ☐

If yes, where and for what?

.....
.....

19. Do you think, delivery of land use right registration services through online will make the service easier and faster?

Yes ☐ No ☐ Don't know ☐

20. In your opinion, is it secured to transfer documents electronically than manually?

Yes ☐ No ☐ Don't know ☐

21. What are your expectations about land administration services?

.....
.....

22. Would you like to add something else in this regard? (if yes, please specify)

.....
.....

Appendix 4: List of secondary data need to be collected

1. From Land administration organisation at district level:
   - Mandate of the organisation
   - Relevant legal document which guiding implementation land administration services
   - Cadastral data
   - Land use right data
   - Land registration data

2. From other organizations related to land use rights registration services:

Bureau of urban planning (*department of construction*)
   - Mandate of the organization
   - Relevant legal document which related to land administration services
   - Building data

Bureau of tax (*department of taxation)*
   - Mandate of the organization
   - Relevant legal document which related to land administration services
   - Tax data (optional) (or sample)

3. Collect working procedures at each organisations
4. Collect document related to use of Information technology at each organisations
5. Collect information about costs (service chartter) if possible
6. Collect spatial data (digital cadastral map), and land use data of one commune or ward (that data will be used for validation)