TRANSITION TO E-GOVERNANCE IN LAOS

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

ADB	Asian Development Bank
ADSL	Asynchronous Digital Subscriber Line
APT	Asia-Pacific Telecommunity
ASEAN	Association of Southeast Asian Nations
C2G	Citizen to Government
CCNA	Cisco Certified Network Associate
CMS	Case Management System
CPIA	World Bank Country Policy and Institutional Assessment
DB	Database
DHCP	Dynamic Host Configuration Protocol
DHIS	District Health Information Software
EBC	Extra Budgetary Contribution
EGDI	E-Government Development Index
FDI	Foreign Direct Investment
FTTH	Fiber to the Home
G2C	Government to Citizen
G2G	Government to Government
GFIS	Governmental Financial Management Information System
GOL	Government of Laos
ISP	Internet Service Provider
ITEC	International Technical Exchange Cooperation Program of India
ITU	International Telecommunication Union
KOFIH	Korea Foundation for International Healthcare
KOICA	Korea International Development Agency
LDCs	Least Development Countries

LICA	Lao ICT Commerce Association
LSMP	Legal Sector Master Plan
LTE	Long Term Evolution
MCTPC	Ministry of communication, Transport, Post and Construction of Laos
MDGs	Millennium Development Goals
MOD	Ministry of Defense of Laos
MOE	Ministry of Education of Laos
MOF	Ministry of Finance of Laos
MOFA	Ministry of Foreign Affairs of Laos
MOH	Ministry of Health of Laos
MOHA	Ministry of Home Affairs of Laos
MOIC	Ministry of Industry and Commerce of Laos
MOJ	Ministry of Justice of Laos
MOST	Ministry of Science and Technology of Laos
MPI	Ministry of Plan and Investment of Laos
MPT	Ministry of Posts and Telecommunications of Laos
MPWT	Ministry of Public Works and Transport of Laos
NA	National Assembly of Laos
NAST	National Authority for Science and Technology
NSEDP	The National Socio-Economic Development Plan
NUOL	National University of Laos
OA	Office Automation
ODA	Official Development Aid
ONT	Optical Network Terminal
OSPP	Office of the Supreme People's Prosecutors of Laos
PMO	Prime Minister's Office of Laos
RTC	Regional Telecommunication Center
SC	Supreme People's Court of Laos

SD	Secured Digital
SDGs	Sustainable Development Goals
SHDSL	Symmetrical High-speed Digital Subscriber Line
SIDA	Swedish International Development Cooperation Agency
SNU	Seoul National University
SPLSMP	Support Project of Legal Sector Master Plan
STEA	Science and Technology Agency
UI	User Interface
UNDESA	United Nations Department of Economic and Social Affair
UNDP	United Nations
UNICEF	United Nations Children's Fund
UPS	Uninterruptible Power Supply
WHO	World Health Organization

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Chapter 1. Introduction

1.1 Background

Since the late 1990s, the Government of Laos (GOL) has attempted to computerize major leading ministries in the country and has maintained a steady movement toward the digitalized governance. However, as Heeks (2003) pointed out [1], the switching or transition attempts to e-government in developing countries had been failed in many cases, and only 15% of them could be evaluated as a successful attempt. The main idea of the study was that the gap between the national capabilities at the time of the project and the design in the plan is often not easy to narrow down and lots of countries eventually failed due to the 'design-reality' gap. Even though the Laotian government also could not dodge from the gap issue, their willingness itself could be highly rated at the point of its continuous effort over the past 20 years, especially regarding steadily maintained ties with the various foreign donors to provide better government services and to build up their IT infrastructure. In the 2010s, government agencies in Laos have made a wider variety of informatization attempts than before. Still, there has been very little researches focusing on the GOL's national level strategies from the scratch. This study is planned to figure out the current e-government status of Laos, to analyze the previous e-government projects and to identify the factors that can be helpful for preparing the next national e-government plan.

1.2 Research Scope and Method

This study sets out the scope of this study as the planning implementation and outcome of the Laotian e-government projects that started in the late 1990s when the Lao government began to express their interest at the preparations for informatization of public services. The e-government

projects promoted from the early period to the present are divided into four periods based on the moment of meaningful change, and the results and policy changes derived from each period are described and analyzed in a comprehensive manner.

The main research method of e-government research targeting developing countries would be the literature study. However, in case of Laos, the existing research data itself is quite limited in quantity and quality. And most of the published e-government related papers were deliverables for the dedicated project that can be regarded as either preliminary research or post evaluation. Therefore, it was difficult to extract enough meaningful data from those papers. In this study, I focused on looking back the past projects through empirical study with preliminary survey and interviews, along with the base data found from the comprehensive document review. I tried to deliver some unique implications through identifying the changes in legislation, policies and organizational structures at each time, and how the dynamics within various stakeholders have contributed to the development of the Laotian e-governance.

This paper is composed of 6 chapters in total.

Chapter 1 describes the research background and defined the research scope and method.

Section 2 describes the definition/concept of e-government in consideration of local characteristics, and compares several international e-government evaluation methods and its implications for this case.

Chapter 3 summarizes e-government projects in Laos and has attempted four-period framing on the entire period. In this section, I examined and explained what kinds of projects were carried out in each period, the mechanism of establishing domestic e-government policy at the time, the preparation status of legal system, and the actual execution results.

Chapter 4 is the outcome of the empirical study, which can be regarded as the core of the above-mentioned empirical study. It contains the research process and results, including preparation for the field trip in last April, preliminary survey, interview with the public officials, and field visit to the target project area.

Chapter 5 contains the results of the overall effort, and it is filled with recommendations that can be applied to the Lao government's policy direction setting and project implementation in the future.

Finally, Chapter 6 briefly summarizes the overall contents, and significance, limitations of the study.

Chapter 2: Literature Review

2.1 Definition: What is E-governance/E-government?

Various definitions have been made to explain the concept of e-government under several different terms. Although they are all slightly different in detail, the two main pillars supporting these definitions would be the use of information technology and the quality public service delivery to citizens. In many case, e-government is planned and implemented to improve the overall quality of public services by using information and communication technology properly to make effective and efficient results at each node where the government plays the role. In short, it means a way to achieve good governance leveraged by technology.

National Authority for Science and Technology (NAST) of Laos, the main authority for the national e-government of Laos till 2011, adopted the definition of Pacific Council on International Policy while presenting the e-government strategy: “The use of ICT to promote more efficient and effective government, facilitate more accessible government services, allow greater public access to information, and make government more accountable to citizens.”[2]

Choi and Park [3] tried to explain the positive relationship between EGDI and governance efficiency through the effort on connecting the E-Government Development Index (EGDI), the representative e-government evaluation index announced by the United Nations, and the World Bank's Country Policy and Institutional Assessment (CPIA) scores with the three socio-economic development indices, basic human needs (BHN), foundations of wellbeing (FOW), and opportunity (OPP). The result of the study might point out the characteristic of the EGDI as a comprehensive development evaluation tool, but it also indirectly proves that the e-government

is an effective and powerful tool for the public sector empowerment of developing countries to achieve their goals such as the MDGs and SDGs.

In case of Laos, considering its status as one of the least developed countries (LDCs), there are lots of obstacles to digital government development, including geographical factors such as mountainous northern part and landlocked location. The poor physical infrastructure due to the factors that can be marginally connected to the problems such as digital divide, low quality of public healthcare system, and limited capability in logistics is the significant obstacle in the scene and the rigidity in the political system would be another concern for the country's road to transition to e-government. In order to achieve the goals aimed at the eighth five-year National Socio-Economic Development Plan(NSEDP) [39] to exit from the LDCs category by 2020 and from the absolute poverty group, it is essential to improve the efficiency of government operation through well-designed informatization.

2.2 Index system

2.2.1 The E-Government Development Index

Since 2003, United Nations Department of Economic and Social Affair (UNDESA) started to publish the E-government Development Index (EGDI), a global e-government assessment report, to promote the member countries' e-government development through increased global cooperation, benchmark and citizen participation. During the first three-year, UNDESA published the EGDI every year [4, 5, 6] and then they made it as a biannual index since 2008 [7, 8, 9, 10, 11] due to the change in their evaluation mechanism. In total, there are eight reports available.

EGDI is calculated through the summation of equally weighted three sub-indices, Online/Web Service Index (OSI), Infrastructure Index, and Human Capital Index (HCI), and the maximum score is 1. The title and components of each sub-index have been changed over the time as shown in the table 1, but the core implication of each sub-index is not changed. As the essential development-relevant factors are included in the math, the index can be easily used as an at-a-glance evaluation tool of the country's overall ICT development status.

Table 1. Changes of the title of the EGDI and its sub-indices (2003-2016)

Year	Web/Online	Infrastructure	Human Resource	Index Title
2003	Web Measure Index	Telecom Index	Human Capital Index	E-Readiness Index
2004	Web Measure Index	Telecommunications Infrastructure Index	Human Capital Index	E-government Readiness Index
2005	Web Measure Index	Infrastructure Index	Human Capital Index	E-government Readiness Index
2008	Web Measure Index	Telecommunication Infrastructure Index	Human Capital Index	E-government Readiness Index
2010	Online Service Index	Telecommunication Infrastructure Index	Human Capital Index	E-government Development Index
2012	Online Service Index	Telecommunication Infrastructure Index	Human Capital Index	E-government Development Index
2014	Online Service Index	Telecommunication Infrastructure Index	Human Capital Index	E-government Development Index
2016	Online Service Index	Telecommunication Infrastructure Index	Human Capital Index	E-government Development Index

(Source: elaboration based on UNDESA Report 2003-2016)

Table 2. Changes of the components of the EGDI sub-indices (2003-2016)

Year	Web/Online	Infrastructure	Human Resource
2003	5 stage model of web assessment 1. Emerging Presence 2. Enhanced Presence 3. Interactive Presence 4. Transactional Presence 5. Networked Presence	PCs/1,000 persons, Internet users/1,000 persons, Telephone Lines/1,000 persons, Online population/1,000 persons, Mobile phones/1,000 persons, TVs/1,000 persons.	Adult literacy rate (2/3 weight), Combined primary, secondary and tertiary gross enrolment ratio (1/3) (Based on the UNDP Education Index)
2004	5 stage model of web assessment	PCs/1000 persons,	Adult literacy rate (2/3 weight),

	1. Emerging Presence 2. Enhanced Presence 3. Interactive Presence 4. Transactional Presence 5. Networked Presence	Internet users/1000 persons, Telephone lines/1000 persons, Online population/1000 persons, Mobile phones/1000 persons, TVs/1000 persons.	Combined primary, secondary and tertiary gross enrolment ratio (1/3) (Based on the UNDP Education Index)
2005	5 stage model of web assessment 1. Emerging Presence 2. Enhanced Presence 3. Interactive Presence 4. Transactional Presence 5. Networked Presence	PCs/1000 persons, Internet users/1000 persons, Telephone lines/1000 persons, Online population/1000 persons, Mobile phones/1000 persons, TVs/1000 persons.	Adult literacy rate (2/3 weight), Combined primary, secondary and tertiary gross enrolment ratio (1/3) (Based on the UNDP Education Index)
2008	5 stage model of web assessment 1. Emerging Presence 2. Enhanced Presence 3. Interactive Presence 4. Transactional Presence 5. Connected Presence	Internet Users /100 persons PCs /100 persons Main Telephones Lines /100 persons Cellular telephones /100 persons Broad banding /100 persons	Adult literacy rate (2/3 weight), Combined primary, secondary and tertiary gross enrolment ratio (1/3) (Based on the UNESCO and UNDP data)
2010	4 stage model of online service assessment 1. Emerging Presence 2. Enhanced Presence 3. Transactional Presence 4. Connected Presence	Internet Users /100 persons PCs /100 persons Telephones Lines /100 persons Mobile subscription /100 persons Fixed broadband /100 persons	Adult literacy rate (2/3 weight), Combined primary, secondary and tertiary gross enrolment ratio (1/3) (Based on the UNESCO and UNDP data)
2012	4 stage model of online service assessment 1. Emerging Presence 2. Enhanced Presence 3. Transactional Presence 4. Connected Presence	Internet Users /100 persons Telephones Lines /100 persons Mobile subscription /100 persons Fixed internet subscription /100 persons Fixed broadband /100 persons	Adult literacy rate (2/3 weight), Combined primary, secondary and tertiary gross enrolment ratio (1/3) (Based on the UNDP and UNESCO, World Bank data)
2014	4 stage model of online service assessment 1. Emerging Presence 2. Enhanced Presence 3. Transactional Presence 4. Connected Presence	Internet Users /100 persons Fixed Telephones Lines /100 persons Mobile subscription /100 persons Wireless broadband /100 persons Fixed broadband /100 persons	Adult literacy (1/3) Gross enrolment ratio (2/9) Expected years of schooling(2/9) Mean years of schooling(2/9)
2016	4 stage model of online service assessment 1. Emerging Presence 2. Enhanced Presence 3. Transactional Presence 4. Connected Presence	Internet Users /100 persons Fixed Telephones Lines /100 persons Mobile subscription /100 persons Wireless broadband /100 persons Fixed broadband /100 persons	Adult literacy (1/3) Gross enrolment ratio (2/9) Expected years of schooling(2/9) Mean years of schooling(2/9)

(Source: elaboration based on UNDESA Report 2003-2016)

The NAST and the MPT adopted the 5 Phase of Web-Online Development of EGDI as their development strategy in their previous attempts of the national e-government planning and implementation [12, 13]. The meaning of each phase can be interpreted as:

(1) Emerging presence: Static, limited information on the ministry's website, few options for the public

(2) Enhanced presence: Offers more downloadable data, more links to line ministries/resources, still limited interaction

(3) Interactive presence: Offers basic interactive services through online, multimedia data, more frequent update

(4) Transactional presence: Offers richer interaction experience to public, e.g., C2G, e-transaction(payment), e-procurement

(5) Networked presence: Refers all-inclusive service, G2G, G2C, C2G.

Table 3. The EGDI of Laos in 2003-2016

	OSI	Infrastructure	HR	Ranking
2003	0.048	0.007	0.52	149(0.192)
2004	0.058	0.011	0.63	144(0.2329)
2005	0.0788	0.0074	0.64	147(0.2421)
2008	0.0368	0.0209	0.6632	156(0.2383)
2010	0.0270	0.0109	0.2259	151(0.2637)
2012	0.2157	0.0998	0.5651	153(0.2935)
2014	0.1417	0.1618	0.4941	152(0.2659)
2016	0.2826	0.1537	0.4907	148(0.3090)

(Source: elaboration based on UNDESA Report 2003-2016)

As we can see in the table 3, the EGDI of Laos did not change much during the whole period of assessment from 2003 to 2016, even though there were several national-level e-government

projects implemented in the country. More specifically, the GOL tried hard on the e-government project in 2006 with the Chinese ODA project [12] but the effect of the nationwide scale project could not make a significant effect on the OSI. In 2008, surprisingly, the OSI of the country fall down to half level of the previous OSI score [7]. It would be a questionable point as the OSI calculation model did not change during the time. In the other sub-indices, there have been several noticeable fluctuations in the index scores. For example, there was a noticeable drop of HCI between 2008 and 2010 even though the calculation scheme and the data source did not change at that period. In short, the e-government system of Laos can be considered as in their very early stage.

Noticeable limitation of the EGDI style evaluation is that the EGDI cannot correctly measure the effects from the new emerging technologies, especially the cloud computing, and the issues related to the internal dynamics within the country's e-government management mechanism such as stakeholder engagement, inter-ministerial cooperation, legal preparation, and central controlling body's role/capacity.

2.2.2 Brookings Institution

Brookings Institution designed another type of approach for measuring the E-government development status [14]. This index has its meaning for giving another perspective of assessment on the e-government of Laos. And the paper is one of the rare e-government focused research papers including a brief description the GOL's effort. This index system's main focus is in the evaluation of government-owned websites and the online services. The OSI component of EGDI can be marginally matched to this and can compared each other. In 2008, Laos ranked in 151th

[14] due to the poor scores in many criteria including online services, policies, maintenance, and interaction.

Table 4. Detailed Score in the E-government Country Ranking 2008

Rank	Online Services	Publications	Databases	Privacy Policy	Security Policy	Disability Accessibility
	0	86	29	0	0	29
151	Foreign Language	Ads	User Fee	Comments	Updates	Personalization
	100	14	0	0	0	0

(source: elaboration from the data in [14])

A noticeable limitation on the interpretation of the score system would be its narrow scope and coverage. In case of Laos, lack of human resource and IT infrastructure within the country's mountainous and landlocked territory are needed to be considered for the evaluation of nation's e-government readiness due to the significant effects from those factors. Additionally, the online service evaluation itself is somewhat tricky in case of Laos. There are lots of working web pages operated by the Laotian public agencies, but there are hidden problems-broken SSL certificate, delayed update, wrong translation, malfunction in redirection, database without data within, etc.- in the websites which cannot be easily measured with the given assessment method for checking the online service performance.

2.2.3 Waseda-IAC International Digital Government Rankings

The e-government status assessment of Waseda University with the International Academy of CIO(IAC) has a number of strong point for measuring the e-government system in developing countries. In the sub-indices of the index system, there are some important performance

indicators which are omitted in the above two ranking systems, such as operation and management, government chief information officer, promotion policy, and cybersecurity. In addition, there is an indicator for the emerging technologies. All these factors are closely related to the issues in the previous and current e-government projects implementation trials in Laos.

After adopting the cloud system for their e-government system in 2017, Thailand is seated at 21th within this ranking system [15]. On the other hand, according to the EGDI of 2016, the e-government of Thailand is considered and evaluated as 77th [11] in the world. A direct comparison might be not proper due to the significant systematical difference in evaluation mechanism between the two ranking systems and also the total number of the target countries. But, at least, the remarkably high ranking of Thailand here is showing the effect of the different measuring schemes and assessment approaches on the e-government evaluation. Detailed sub-indices, described as Indicators and Sub-indicators in the report, of the index is like below:

Table 5. Comparison: EGDI vs. Waseda-IAC Rankings

EGDI	Waseda-IAC
Online Service Index	Online Services/Functioning Applications National Portal/Homepage
Infrastructure Index	Network Preparedness/Infrastructure
Human Capital Index	N/A
E-participation Index	E-participation/Digital Inclusion
N/A	Management Optimization/Efficiency
N/A	Use of Emerging ICT: Cloud/IoT/Big Data
N/A	Open Government, Cyber security: Legal Framework/Cyber Crime Countermeasure
N/A	Government Chief Information Officer, E-government Promotion

(Source: elaborated with data from UNDESA, Waseda-IAC report [11, 15])

2.3 Barriers for E-governance in developing countries

In many studies, there are generally positive views on the achievable effects of e-government adoption in developing countries as the IT-assisted administration system can benefit in many ways to assist the economic development and social equity through the increased tasking efficiency, cooperation among line ministries, citizen participation and level of information dissemination. However, as mentioned in the paper of Heeks [1] about the e-government project failures in developing countries, there are plenty of failed practices in the LDCs. In these failed cases, the governments could not achieve the intended goals even though they adopt the proven frameworks and technologies for their e-government system planning and implementation. Danish Dada summarized and elaborated the issues through using the archetypes of failure conceptualized by Heeks [64] and the mentioned three types of design-reality gaps are including hard-soft gaps, private-public gaps, and country context gaps. Hard-soft gaps can be seen when the soft sides, say user, culture, and political characteristics, are not ready to take the hard sides that came with new technologies. To mitigate the gap here, the soft part should be prepared for the associated changes coming from the hard part changes. In other words, the new applied technologies embedded in the system will bring the changes in the way of work and the members of society need to be prepared for the radical system changes. Awareness of the system change is important. Participants and stakeholders should understand the reason that why the changes are needed and they need to understand the relevant technologies and policies through continuous information sessions such as seminar and training. Secondly, there are private-public gaps. In general, most of the LDCs are not having a sufficient financial capability to cover up the whole public sector expenditures. Therefore, it is usually hard to induce a top talent to public sector and is also hard to retain the talent pool due to the limitation on budget size. Besides the human

capital issues, there are concerns about the aid money based projects. It is a common situation that the supported project is losing its efficacy just after the project period mainly due to the weak financial independence of the government and lack of sustainable mid-to-long term funding plan. Third, country context gaps are there. It is important to figure out the unique context of the country because the LDCs are having very limited resources to handle and support the new administrative system.

Chen et al. picked two case regions, China and the U.S., as examples of the developing and the developed country respectively and delivered summarized comparison on the issues to be considered for e-government project planning [66]. Here also, they mentioned some pitfalls when applying a proven effective framework from a developed country to a developing country. The described characteristics of the developing countries are mostly matched with the issues of the LDCs stated in the above. Developing countries are usually having a short development history and the public sectors are suffering from a shortage of available budget. And lack of information infrastructure and human capital capacity are the weak points in that countries. Therefore, they argued that setting a customized strategy fits well with the designated county's context/situation and overall capacity would be the key to successful implementation of e-government system.

Another paper regarding the issue is the paper by Valentina Ndou (2004). The major challenges described in this paper are related to the issues of infrastructure, policy, strategy, and leadership, cooperation, change management and human capital [67]. And Lanvin et. al., also produced a fine summary of the considerable issues on the barriers of e-government development in developing countries while picking up the issues in 13 categories: infrastructure, law and policy, digital divide, privacy and security, transparency, interoperability, record management,

preservation, awareness and education, collaboration/competition, labor, cost, and benchmarking [68].

In common, developing countries having chronical infrastructure problems due to the limited capacity on social overhead capital, and in many cases, they do not have a sufficient capacity in human capital and hardware sides to deal with the changes through the application of technology leveraged public service administration. Lots of projects are done with the individual ministry level project supported by international donors and there are not enough staffs in capacity to customize the overall planning and to lead the projects in long-term. In education sector of developing countries, only a small number of advanced engineering school is existing and the quality of education is usually poor. IT market is not matured and IT relevant public sector cannot induce the small number of good talents from the engineering schools because of the budget limit. Awareness level of the e-government transition is usually low in these countries and the mentioned budget limit makes it hard to hold inclusive and sustainable campaigns and information sessions for citizens and government workers. Considering all these problems, to minimize the chance of failure, it is essential to take in-depth researches on the country contexts and to customize the framework before implementation, and also building an active feedback system would be needed during the actual deployment as each country has its own set of barriers.

2.4 Country Profile

2.4.1 IT Infrastructure in Laos

Laos is the only landlocked country in Southeast Asia, and the three fourth of the country is mountainous, especially in the northern part of the country. As there are so many harsh

mountainous areas in the north, an average of 1,500 meter above sea level, it is difficult to find a communication network/service with perfect domestic coverage due to the cost issue in establishing the broadband backbone network [16]. Based on the GOL 's statistics data [17], it is said that 3G broadband network covers most of the administrative districts in 145 provinces in 18 provinces nationwide starting from 2014, but it is not a problem that can be covered in a short time because there are many rugged mountains in the country. Another statistic data from World Bank shows that only 11.4% of households use the Internet, and only about 65% of the population can access the 3G network in 2015 [18]. Therefore, it is hard to say that the infrastructure for internet connection in the country is prepared enough for the digitized public service.

On the positive side, there are almost half a million new entrants into the Fiber to the x(FTTX) market each year [19], after the long era of the copper-line-based digital subscriber line(xDSL) services as a result of the recent installation of fiber-optic cable linking the Vientiane capital and the metropolitan cities with the led by the private telecom companies. The rapid technological jump is common in the scene. Recent statistic data shows that installed fiber cable length, combined, for FTTX is more than 70,000 km and covers all 18 states [21]. Currently FTTH, Fiber to the home, is having the largest portion in the wired internet connection method, pulling down the xDSL technology to the second position in market share [19, 20].

2.4.2 Telecommunication Service Providers

Currently there are two leading broadband internet service providers in the market, Lao Telecom and Unitel. The two companies are providing comparatively wider coverage with newer technology, say Long Term Evolution(4G/LTE) and FTTX, for their internet service compare to

the state companies, ETL and SKY telecom, through aggressive investment on infrastructure and promotion.

On the side of the mobile service market also Unitel and Lao Telecom would be regarded as the market leader in terms of technology advance. There are no other companies in the country providing the LTE data service than those two companies. Lao Telecom is the leader 4G mobile service market and holding over 50% of market share in the country's mobile service market [22]. They invested in the LTE infrastructure heavily and became the first 4G operator in Laos. Still they are keeping the gap in the market share through competitive pricing, stable performance, and active promotion. Unitel has successfully increased its market share by offering free broadband services to the public educational institutions in early 2010 and is responding to the transition to next generation technologies such as LTE and FTTH by investing in infrastructure improvements in timely manners. Besides, ETL and Beeline(formerly Tigo) provides mobile services through the 3G network. ETL, the state mobile operator, could get a massive user pool from the scratch as it was normally provided telecom service to the public workers. ETL is the second runner in terms of market share. However, they failed to invest in the next generation telecom infrastructure at right time. Beeline is providing mobile and fixed line services through 3G network and FTTH with limited coverage.

In Laos, with a population of about 7 million, there are about 5 competing telecom service operators [23], so it is unlikely that additional operators will enter the market and make an impact on the market. Considering the overall situation, there are no competitors that have enough capital capacity to build a solid infrastructure covering the whole country, except the two major companies that are market leaders.

Chapter 3: The history of e-government in Laos

3.1 Introduction

It is not certain when the GOL formally started to publish its first plan for the nation's E-government as there are several different opinions regarding the issue. But, roughly, there are two noticeable markers in the timeline; 1996 and 2006. Majority of the published papers and articles are considering that the e-government plan and implementation are started in 2006 with the massive Chinese aid project [13, 27]. However, if we set the year 2006 as the starting point of the national e-government planning and implementation, a couple of valuable actions of the GOL might be placed out of the sight. As a national center of e-government system, the Science and Technology Agency(STEA) -later reshaped as the NAST and then transferred to the e-government center under the MPT- did make an early draft for the purpose in 1996 [28]. And there was a noticeable effort of drafting a master plan for building the nation's first e-government center in Vientiane capital in 2004 [12]. So, it would be more precise to include the STEA's early effort into the overall timeline. The history of the e-government of Laos can be categorized based on the change of national level e-government plan and the shift of major donor for the implementation process. According to the criteria, the timeline could be segmented with the 4 periods as below;

Table 6. The timeline of e-government in Laos

Year	1996~2004	2004~2006	2006~2012	2012~Current
Major Donors	N/A, driven by internal forces	South Korea	China	Mixed, No prevalence of nationwide scale project
Major Outputs	Lao National Plan on IT: Master Plan	E-government center in VTE	Infrastructure: Fiber+WiMAX, E-government centers, applications	New master plans, S/W development by individual agencies
Office in charge	STEA	STEA-NAST	NAST-MPT	MPT

(Source: Elaboration from [12, 13, 24, 25, 26, 27, 28, 29, 31])

There are a handful of papers delivering a retrospective analysis of the e-government of Laos [26, 27, 30, 31], but none of them tightly focused on the efforts during the first and second periods in the proposed timeline and were not fully including minor donors' contribution happened at every periods. Moreover, the downside of the implementation after the major projects implementation was not assessed in the studies. So, in this chapter, inclusive background of each period will be described, and the key projects enabled by cooperation activities with the various stakeholders will be assessed.

3.1.1 The first period: The first plan and the trials for computerization. 1996-2004.

STEA was designated as the country's leading organization for ICT policy making by the Prime Minister's order and the agency did establish the first national IT utilization plan for public sector through drafting the Lao National Plan on IT: Master Plan up to the Year 2000 (1996~2000), which contains the partial computerization of the government's functions. According to the ITU's case study material [28], the initial plan includes; software standardization, securing connection among public agencies, and online application development

for public use. Another plan for the national ICT policy making and partially relevant to the computerization of government services in this period is the Ministry of communication, Transport, Post and Construction(MCTPC)'s Telecommunication Master Plan, built as a result of international cooperation with the Japanese government. However, the detailed contents and deployment results of both plans were not available to check and the ITU's assessment pointed out that there was no follow-up to the master plan [28].

One early effort on computerization of public service can be found in the ministry of foreign affairs(MOFA)'s network system build project that was implemented by the bilateral cooperation between the MOFA of Laos and the Korea International Cooperation Agency(KOICA) of South Korea since 1996 [32]. Overall cost for the implementation of two initial phases was approximately USD 0.8 million. The first phase of the project, namely "Computerization of the Ministry of Foreign Affairs, Phase 1", was the project for building a mixture of basic IT system for the MOFA, including computer network, one file server, personal computers and relevant OA products within the MOFA building in the Vientiane capital. The second phase of the project was named as the project for computerization of the MOFA and this was a similar type of IT equipment support project [33]. Therefore, the focal point of the two consecutive projects was giving out the basic computing environment to the ministry, such as basic network within the office, and simple file server and database system. Almost 90% of the total budget was used for the IT equipment procurement and only a small portion of the money was invested into the local staff training and the further operation. During the project, KOICA selected the products manufactured by major Korean manufacturers such as Samsung, LG, Daewoo, Sambo and Hyundai Electronics. But, for network devices and relevant software, major global suppliers like Cisco, 3Com, and US-Robotics were selected [32, 33].

3.1.2. The second period: Stepping into e-governance. 2004-2006.

3.1.2.1. Overview

In late 2003, STEA agreed to make a more tangible project through KOICA's aid project and implemented the USD 1.4 million size e-government project in two years of project time, from the year 2004 to 2005 [12, 35].

KOICA was the major project financing partner as described in the cost estimates for the project [35]. As we can see in the portion of domestic fund in the table, allotted charges on the GOL was almost negligible in the project. Besides the financial contribution, the GOL provided the land and the relevant administrative support.

Table 7. Cost Estimates in the E-government Project Proposal (Mar. 2005, in USD, million)

	First Year	Second Year	Third Year (O&M only)	Total
Domestic Fund	0.03	0.05	0.02	0.1
KOICA	2.97	4.95	1.98	9.9
Total	3.00	5.00	2.00	10.0

(Source: elaboration from the table in [35], p.126)

The detail of the plan, including objective, scope, financing plan, implementation schedule, stakeholders, and framework, can be found in two donor organization's documents, and can be summarized as following: [12], [35]

Table 8. Objective, Activities, and Outcome of the E-government Project 2004-2006.

Objectives:	Activities	Expected outcomes
- Facilitate digital economic development - Reduce the cost of government - Provide quality service	-Building the E-government Center in Vientiane capital -Provision of equipment and materials for developing an e-government prototype system	-The capacity of Lao officials to manage e-Government Plan is formulated

- Establish e-government infrastructure, including e-government Centre, e-government portal, a high-speed internet network linking all government agencies with all provinces, one-stop public services	-Provision of e-government applications, including Electronic Approval System, National Homepage (Database management), Electronic document distribution and exchange, Electronic document management system. -Provision of technical advice for establishing the e-government Plan by dispatching Korean experts to Laos -Provision of the technical training for Lao officials in Korea to obtain knowledge and experience in the e-government	-Better environment for formulating e-Government Plan in the Lao PDR through applying the Korean model -Skills and knowledge of the e-Government plan, especially the ICT legal frameworks like regulations, laws and policy, are improved In 2005, the first E-government center opened in Vientiane capital, at the government complex near the Patuxay, and the prototype applications were distributed as a result of the project.

(Source: elaboration from [35])

3.1.2.2. Implementation Result

Major deliverables of the project can be summarized with 5 categories: Physical building, Network setup, Prototype software development, Technical support, and Technical training [44]. Through the project, KOICA successfully build the nation's first e-government center building at the government complex in Vientiane capital. And there was a prototype e-government software package developed by Korean IT company, POSDATA, for the initial deployment and demonstration with the potential chance of further development. The prototype is comprised of five major modules/functions: frontpage, portal page(civil services), intranet & document transaction, immigration control, and vehicle registration. According to the project completion report published by KOICA in 2006, most of the programs were not fully developed and had a limited functionality [44].

There is a similarity in the procurement criteria of IT equipment between this project and the prior computerization projects at the MOFA. KOICA selected CISCO and 3COM products for

the network system, and the Korean domestic branded products for the other computing devices, including main servers and personal computers [12, 44]. In terms of specification, the selection itself was fine in general regarding the required computing power. And most of the selected networking devices were having enough capacity for the purpose. However, it seems like that there was a low utilization of feedback from the past for the new project planning. During the first and second projects at the MOFA, there was a considerable number of maintenance issues due to the hardship of parts and consumables supply in Laos [32, 33]. This happened exactly same in this e-government project and the Chinese government's aid project in the next phase of e-government development of Laos. Positive change could be found in the KOICA's next project, the third phase of the aid project for the MOFA through the consideration of maintenance and service availability [34]. The STEA, the office in charge for the e-government project, abolished by national public sector reorganization during this period and the NAST took the role of the STEA.

3.1.3. The third period: Era of Infrastructure & Increased complexity of stakeholders. 2006-2012.

3.1.3.1. Overview

The third period would be simply described as the nation's first nationwide scale infrastructure build up. In this period, Chinese government played the main actor role while providing a comparably larger amount of the concession loan for the overall implementation than the amount of investment for the earlier projects and publishing the e-government action plan with the GOL in 2006. But, at that time, some minor projects were actively under development too, mostly by foreign investment.

After the Korean aid project in the second period, the NAST published a new e-government action plan on April 11, 2006, along with the Chinese government's full support in financing, human resource, and procurement. During the planning process, there is no evidence of follow-up or legacy utilization consideration. The new project planned in 2006 was the 5-year long, USD 35 million sized one, and the main focus of the project was the infrastructure build-up using the direct fiber connection among the related ministries offices in the capital city and the wireless connection, WiMAX, for the connection among the provincial offices and the offices in Vientiane capital, regarding the mountainous geographical characteristic of the country. The implementation of the project was done through the 3 phases in five years; a year for phase 1, and two years for phase 2 and 3. And the scope of the plan is including the major agencies in the capital city and also the provincial, district, regional level offices in the nation's 17 provinces, covering 17 provincial centers, 141 district offices, and 1200 regional area offices [29].

3.1.3.2 The E-government Action Plan 2006 and the deliverables

(1) Overview of the plan: Vision and objective

The inclusive e-government system was planned with the below vision and objective:

(a) Vision: "adopt ICT tools across various tiers of administration at the ministries, departments, provinces, districts, and villages of Lao PDR to bring about SMART Government and offer appropriate interfaces to the people (in cities as well as villages) through electronic delivery channels." [26, 29]

(b) Objective: "anywhere, anytime access to government information to bring about transparency, efficiency and empowerment of citizens; e-delivery of government services to

citizens through Web and Integrated Citizen Service Centers, which are expected to be particularly beneficial to poor communities in remote areas; increased internal efficiency and prompt delivery of citizen services; and strengthening of communitization. [26, 29]

(2) Project Components [27, 36, 41]

(a) Infrastructure

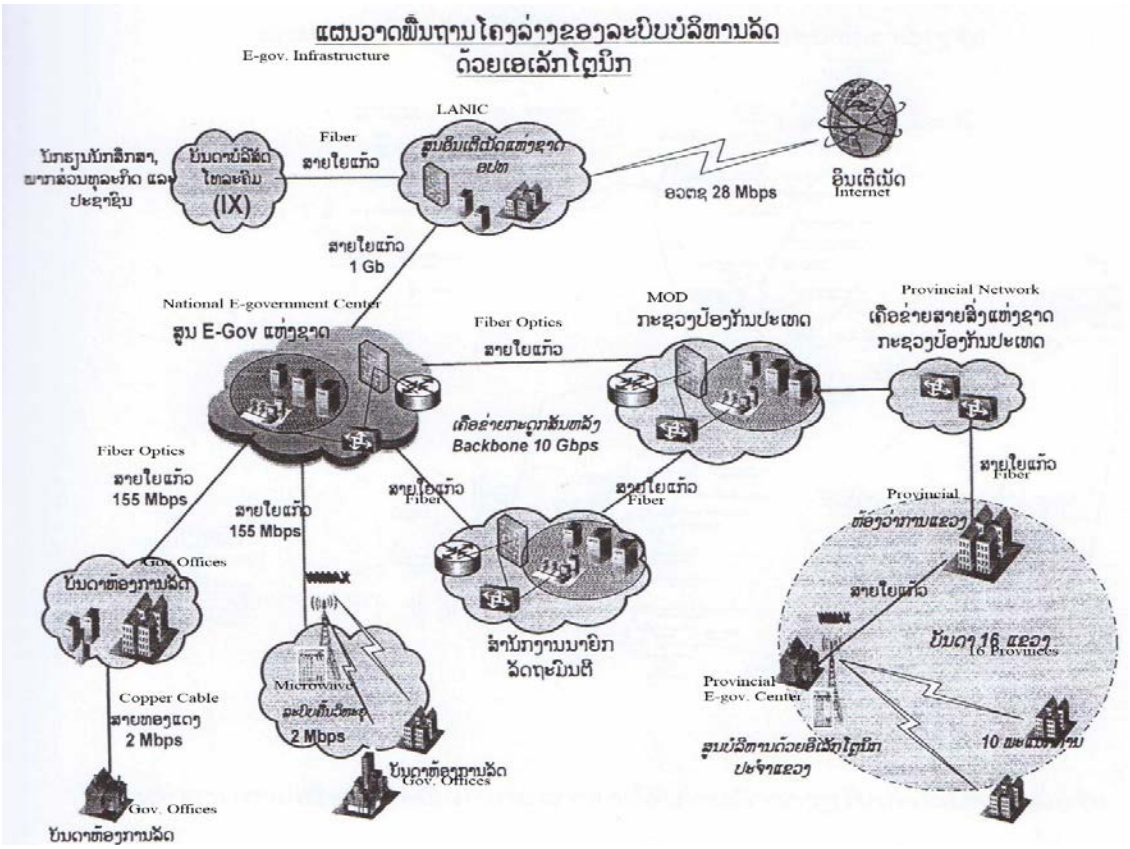
Original configuration for the public sector network, called as E-government Infrastructure in the original plan in 2006 [29], is designed for deploying a mixture of wired and wireless network system for public use.

First of all, there is a 2.5 Gbps capacity IP backbone for the connection among the national e-government center, telecom operators and line ministries. And then there are three major connection options designed to provide the service for all the participating agencies: FTTX, ADSL, WiMAX.

As mentioned in the earlier chapter, the mountainous geography of Laos made the infrastructure construction hard and there was no internet service provider offering a nationwide coverage at that time. Therefore, GOL planned to make a fiber optics infrastructure for communication with the major ministries in capital city and a number of big cities in the country. And they used the conventional ADSL type connection for connecting the branches of the main offices. WiMAX is used to provide a point-to-point connection when the cable installation is not easy due to the geographical limitation. According to the plan, about 50 agencies in Vientiane capital was going to be connected through a stable fiber optic link and a xDSL connection was going to be used for the 75 other government offices. The optical link was planned to make a connection to 16 provincial governor’s offices and 16 provincial e-government centers. For the wireless

connection, 10 WiMAX base stations installed to cover 20 square kilometers of Vientiane municipality and to provide connection to 250 government offices. To get the signal from the capital city, one WiMAX station was planned to be installed to provide connection per province and to use it for a signal extender in that province while delivering connection to 10 government offices [27, 36].

Figure 1. Network configuration diagram for the e-government network



(Source: elaboration from the figure in page 10, [36])

The above picture is an overview of the government network in the e-government handbook released in 2011 [36]. There is no change in the backbone network speed other than the initial planned installation of 2.5 Gbps to 10 Gbps. At the time of installation, the xDSL system which

used copper cable was connected with the SHDSL modem(Symmetrical High-speed DSL, 2.3Mbps, Figure 2 left), and there has been a prevalence of installation of optical cable, converter or ONT(optical network terminal, Figure 2 right). For all the network connection types, Chinese-made network devices were selected and installed.

Figure 2. Changes of modem type in the GOL's network

(Source: Own picture, taken at OSPP)

(b) Computing Devices

The computing and the other OA devices were procured and distributed. The 126 ministry offices in Vientiane could get a mixed IT devices package including one server, 10 PCs, a teleconference room, and a local area network. Some major ministries could get a bigger package due to the importance of their work and the size of the staffs. The criteria for the distribution was designed through the 5-level system as described in the table # and the 8 highest-level offices, level 5, took 50 PCs and 3 servers and bigger UPS system to fill the expected power consumption.[29] For the 200 district and provincial offices, a smaller set of devices was given including three PCs, one printer, and a local area network as well [27].

Table 9. The 5-level distribution scheme in the 2006 e-government project.

Level 1	2 PCs, 1 Laser printer, 1 1kVA UPS, 1 Phone, 1 Modem, SW support
Level 2	5 PCs, 1 Server, 1 Dot printer, 1 Laser printer, 1 Scanner, 1 2kVA UPS, 1 1kVA UPS, Switch/Hub, Modem, SW support
Level 3	10 PCs, 2 Server, 1 Printer server, 1 Laser printer, 1 Scanner, 1 5kVA UPS, 1 2kVA UPS, Switch/Hub, Modem, SW support
Level 4	25 PCs, 2 Server, 1 Printer server, 1 Laser printer, 1 Scanner, 2 5kVA UPS, 2 2kVA UPS, Switch/Hub, Router, SW support
Level 5	50 PCs, 3 Server, 2 Printer server, 1 Laser printer, 1 Scanner, 5 5kVA UPS, 2 2kVA UPS, Switch/Hub, Router, SW support

(Source: elaborated from the annex data in p54-56, [29])

The detailed information about the procurement for training facilities is summarized in the table below. The procurement method was exactly same to the previous KOICA project. Domestic products of China, Lenovo, Shanghai Lucent Bell, TP-Link products, were adopted for the overall deployment. For the servers, Lenovo Thinkserver lineup was selected. And same Lenovo products were picked up for the other devices, PCs and printers, scanners. For the videoconference system, Alcatel-Lucent products were used for both hardware and software.

Table 10. Training facilities built in the third period

National E-government Center	90 PCs (30 PCs * 3 training labs)
16 e-Government Provincial Center's Training Room, Internet Room, Network Room, etc.	10 PCs per training room 10 PCs per internet room

(Source: elaboration from [27])

(c) Software

During this period, several programs were developed and some of them were applied to the government agencies and could be alive until the end of project period. Chinese builders were participated for the coding and implementation for the supplied software package.

One thing is that there is a gap between the planned programs in the 2006's original plan and the developed programs. According to the year 2009's e-government user manual circulated among the public agencies, some of the planned programs were not developed and on the other hand, some new programs, that were not in the original plan, were developed during the project period. A brief information of the relevant software/applications developed during the project is in Table 11. Majority of the software was built as stand-alone and could be regarded as a local server based software. Therefore, the software products in this period were having a value of elementary-level service computerization of public services.

Table 11. Applications developed during the third period: planned vs. implemented.

A comparison between the original plan in 2006 and the implementation status in 2009

Planned in 2006 action plan [29]	Distributed, or Under development [41]
Email	Email(mail.laopdr.gov.la)
E-archive, E-document	E-archive, E-document (official/personal level), Request/Approval
N/A	Teleconference
N/A	Real time messenger
Integrated Personnel Information System	Personnel Information Database
Inventory Management and Control System	Inventory Database
N/A	Project Activities Database
E-registration	E-registration
E-learning	E-learning
E-map	E-map
Portal and webpages	Portal and agency websites
E-procurement, E-license, E-Immigration, E-passport, E-custom, E-transport, E-banking, E-treasury, E-employee insurance system, Instant money order service, National occupational	N/A, partially transferred into the individual projects.

classification system, Driver card registration service	

(Source: elaboration from data in [29, 41])

(d) Human resource development

As in the e-government project of second period, there was a series of programs for the purpose of human resource development. To maximize the efficiency of the training programs in the context of nationwide project coverage of this project, there were several training programs planned and implemented at the local regional e-government centers and there was a full IT device support for the regional centers as well.

By this time, these are the identified training programs confirmed as implemented through the project: Training programs for ICT specialists, ICT engineers, content providers, and end-users. The training targets were to train 40 ICT engineers, 300 ICT engineers from various ministries, and 1,500 government personnel from various organizations [26].

At the same time, Indian government came to the scene. There was a MOU under the International Technical Exchange Cooperation(ITEC) Program between the two government and the detail of MOU was as following: [37]

Setting up an ICT Training Laboratory: 25 computers and relevant software packages

a) Capacity Building: training program for 150 Government officials, four courses in 5 days
b) Capacity Building: training students, 3 years
c) Setting up the national datacenter
d) Setting up the rural telecentre: 5 centers as pilot
e) Setting up a VSAT-based(satellite) network for province governors and centers

f) Policy/Legal preparation: Cyber security

g) Quality ICT education: Entrepreneur development programme

h) Solving the localization issue

Ministry of Communications and Information Technology of India was the project implementation agency in 2006.[45] Their approach can be categorized into two major parts; One part was building the NAST's database system through the National Data Centre Project, and another part was building the regional telecommunication centers(RTCs) in major cities of Laos along the Mekong river, 10 centers in total; seven centers in Vientiane Province, Luang Prabang, Xayabury, Khammuane, Savannakhet, Saravane, Champasack, and three more RTCs in the Vientiane capital [27]. In addition, training programs were added into the project as usual and the National Informatics Centre of India tried to contribute for the project through taking in-depth research on e-government status assessment, and designing the initial version of the national portal for GOL and the fundamental framework. Despite the narrow targeted, regional-focused strategic approach, currently, those RTCs and the database system are not working as planned and the webpages, the portal and the rural bazar(www.tarad.gov.la) and the framework(www.sumson.gov.la) developed during the project are not in use [46].

3.1.3.3 Key projects in the third period

(1) Chinese Aid Project through the E-government action plan 2006

As explained above, this project is the main part of the third period. First, this is the biggest project in terms of the investment amount and the GOL planned their national plan based on the implementation of this project. Secondly, the project's legacy network infrastructure and a part

of software were used after the project completion, and the e-government center planned the next phase infrastructure development plan based on the network system built in this period through this project [36].

The installation of this nationwide coverage network infrastructure for public service was the first trial in Laos and never planned before. After the project delivery and completion, SKY telecom received the role of administrator of the network after the restructuring of the public network management structure. The network was originally managed by the Ministry of Defense(MOD) and after giving the management authority to the state company, there was a partial renovation on the backbone configuration and the terminal devices for the fiber cabling, and then still some offices are using the fiber network.

In the perspective of the project effectiveness, sustainability, this project could not be titled as a good example considering the current status of the delivered network infrastructure utilization and the supplied software package use. However, as the first national infrastructure building project connecting the public sector nationwide, the effort of making a national e-government network supporting both wired and wireless connectivity needs to be recognized as a worthy legacy and a meaningful practice. And it is having a value as a completed package of the national level e-government project. In other words, the project was trying to deliver one complete system, including plan, infrastructure, human resource development, procurement, software development, as a turnkey system delivery.

(2) The other projects in the third period

The unique characteristic of the third period is that there were emerging international donors interested in the e-government system of Laos. The interest was combined with the individual

industry's needs and connected to the direct support of individual ministry's projects. The blooming external investment from various donors is getting larger afterwards. The shortage of the 2006's national plan is the weakness on establishment of the controlling agency designation and the cooperation mechanism within the line ministries.

Minor donors and its projects during this period are summarized in the Table 12. The classification criteria between major and minor donors for the table is the size of overall investment and coverage. There were more minor donors, including SIDA and French government, and their projects during the period.

Table 12. Minor donors for the public IT development projects in Laos. 2006-2012

Countries-Agencies	Projects
India- Ministry of Communications and Information Technology, National Informatics Centre	10 Rural Telecenters, National Portal, 2 applications(Rural Bazar, Open eNRICH), Training & Scholarship programs. USD 3 million.
Korea-KOICA	MOFA Network Development Phase 3; Capacity Building: Groupware, Infrastructure. USD 1.2 million.
Malaysia	Provided education funding
ADB	Community E-centers for Better Health; 16 centers, USD 0.6 million

(Source: elaboration from [34, 46, 47]

Legacy system utilization was weak in this period. The two main legacies from the Korean government supported period, the e-government center building and the implemented IT system, were not considered for reuse in the new action plan in 2006.

3.1.4. The fourth period: restarting from the lessons. 2012-current.

3.1.4.1. Overview

The last period could be described with its characteristic features like emerging individual G2C applications developed by the major government agencies along with the wide array of foreign funding sources. There is significantly increased number of computerized approaches among the public service providers. Partially due to the lessons earned from the last attempts, the GOL is focusing on making clearer national plans and trajectory regarding the national e-government development and there is no evidence of relying on one donor or one framework for the current stage of implementation. E-government center's opinion for the situation is supporting the idea. During the interview with the personnel in the center, he argued that the GOL's plan for the e-government should be based on the public agencies' own needs, while expressing the need of further interoperability and the national standard for the framework and document sharing.

3.1.4.2. Policy and legal preparation

(1) Policy side

The ICT related national plans prepared by the national government during the period are like below: [13, 48]

-E-government Development Plan 2013~2020

-ICT Strategic Plan towards 2025

-ICT Cooperation towards Co-prosperity 2015~2020

-National ICT Policy 2015~2025

-Vision 2030, National Socio-Economic Development Plan 2016-2020(8th NSEDP)

The NSEDP is the core development plan of the country and the other plans can be regarded as supportive and a targeted ICT sector development plans. The main part of these plans is mostly same in the all given plans as the contents in the NSEDP regardless of the title.

As the core national plan and the basis of Laotian national development policy, the NSEDP is composed of Vision 2030, a long-term goal for 2020 to abolish the status of the poorest nation and achieve the national main development goals, and the 5-year socio-economic development plan to achieve this goal.

Vision 2030 described in the eighth NSEDP is defined as following [39, 40]:

“Lao PDR is ranked as a developing country with upper-middle income and with innovative, green and sustainable economic growth; there is availability of industrial pillars and a strong basic infrastructure system to support industrialization and modernization; the country systematically follows a socialist market economy; there is social justice, peace and order; people’s livelihoods are improved and solidarity promoted; there are improved development disparities between urban and rural areas; there is improved human development that ensures all have access to quality social services; people’s rights are protected under the effective rule of law, the administrative system is enhanced by following the 3-builds directive; there is environmental protection through efficient utilization of the natural resources to ensure sustainability; there is political stability and strength; the country is actively moving toward regional and international integration.”

The application of science and technology development and ICT technology is recognized as an important tool for achieving the goals of the national five-year plan. For the purpose of

revitalizing the existing low interest on the R&D sector, the GOL set a goal of increasing R&D investment at 2% of the total amount of private investment, and the long-term effectiveness-oriented goals- such as expansion of private investment, designation of science and technology complex, establishment of national research institutes in accordance with international standards, establishment of four regional research institutes, and establishment of national data centers- for the strengthening fundamental capacity of the science and technology sector in Laos.

In addition, e-government has become an important issue. By 2020, the GOL aims to achieve a 50% nationwide e-government service utilization rate through expanding fiber lines, expanding wireless data networks(3G/LTE), improving computer literacy rate, and installing national data centers and backup centers in 2018.

The MPT and the Ministry of Science and Technology(MOST) are the ministries in charge of the ICT sector development planning through holding iterative discussion sessions with various stakeholders, namely PMO, MOHA, MOF, MOJ, MOE, MOIC, etc., to make a proper political environment to achieve goals set in the 8th Five-year National Socio-economic Development Plan(NSEDP) 2016~2020, the main inclusive development plan of the country. Aside the drafted or published national plans, the major difference of this period is that the GOL started to focus on the legal preparation to secure the effectiveness.

(2) Related legal preparation

The GOL suffered from lack of adequate legal readiness for the national e-government projects implemented earlier till this period. In the fourth period, the situation is getting much better as there are several newly enacted laws and decrees. More specifically, there are more formal laws

for the ICT sector regulation such as the E-Transaction Law in 2012 and the Law on information and Communications technology in 2016.

and the e-governance rather than the decrees. This is the unique factor in this period because the GOL usually selected the decrees announcement for controlling the ICT sector. But still, the GOL use the decrees for the purpose and the examples are: Decree on Management and Use of Internet, Internet domain name application of Lao PDR in 2012, Decree on Online Information Management in 2014 and Decree on Data Center pass through Internet in 2016.

The legislation for the development and regulation of the Lao ICT sector is based on the Telecommunications Act. The Telecommunications Act in 2011 is the base law for controlling the domestic ISPs, mobile telecom carriers and relevant regulation in Laos. Basically, it encompasses the various regulations that are required to manage domestic/international, wired/wireless communication service providers. Besides, various related laws and regulations have begun to emerge since the year 2012. The national e-government center, which is a subsidiary of the MPT and dedicated to the development of Laos e-government system, have been acted as a leading organization for the establishment of relevant national standards covering frameworks, document standards, security, data centers, etc. in this period.

The recent law about the data security, the Law on Data Protection law in 2017, is making a fundamental legal basis for dealing with cybercrimes in the country. The major contents of the law are: legal definition of cyber crime, designation of the ministry in charge, emergency response process, establishment of LaoCERT under the MPT, general management, capacity building and data dissemination, international cooperation, investigation, and punishment.

3.1.4.3. Legacy system: Fiber/WiMAX network and applications

Almost all the services/applications from the previous periods are stopped or not in use. In the domain of infrastructure, only the fiber network, the MOD fiber, is alive under the management of SKY Telecom, and still in use for certain purposes, such as the connection for finance management program, namely GFIS, among the relevant ministries. The network devices for the wired and wireless network system, such as core router, optical network terminal, splitters, WiMAX transceiver, etc., were completely replaced when the SKY Telecom was in the reconstruction process in early 2010s. According to the e-government center of Laos, WiMAX system is confirmed as abolished and is not being considered for the nationwide wireless connection method.

3.1.4.4. Key Projects in the fourth period: Software and Hardware

The important figure of the fourth period is that there is no existence of the national level e-government plan yet and are many individual project based trials for the system development. Therefore, this period needs to be assessed with different approaching perspective than the earlier projects in the second and the third period.

In this part, the overall assessment of the direction of public services computerization in various public agencies will be delivered along with the brief description of the major projects and the donors of those.

(1) United Nations Development Programme(UNDP) Laos: Legal sector improvement

UNDP has been working with the legal agencies to develop the core competency of the country's legal capacity through holding a number of multilateral supporting projects. Due to the short history of the modern Laotian legal system, there are several big holes within the nation's legal framework.

Recently, UNDP planned and implemented the legal sector master plan project with the core legal agencies. Briefly, the project is having a goal of achieving the case data sharing system and improved efficiency, faster case completion, greater transparency through the system.

-SPLMSP and LSMP: Promoting effective and cooperative e-governance in legal sector

Since the original formal law framework is planned and adopted in 1991, the GOL tried to formulate cohesive, effective, credible and predictable legal framework that is an essential basis for overall development in various ways. However, they are still having trouble in the legal system, mainly due to lack of coordinating authority, cooperation, and integration among the legal and judicial sector. To get rid of the hurdle, the Legal Sector Master Plan (LSMP), a comprehensive long-term strategic plan on the development of the rule of law state by 2020 is established on 11 September 2009 [69]. The LSMP is based on the four major focus areas named as "pillars" for the proposed systematic goal:(a) the framework of laws, decrees and regulations, (b) the law-related institutions that implement that legal framework, (c) the means of educating and training in the use of the system, and (d) the means of assuring that all the laws and regulations are widely disseminated and accessible to both state agencies and citizens.

The Support Project for Implementation of the Legal Sector Master Plan (SPLSMP) is the first project planned to support the nation's major legal sector renovation project, the LSMP. As the preparatory step to achieve the goals of LSMP, UNDP, EU, France and USA and the other

participants launched the SPLSMP in January 2014. It lasted 3 years till 2016, with a total estimated budget of USD 3,894,494 [69]. Through the project, Lao legal sector wanted to make cohesive sector-wide coordination environment to cope with the LSMP. The objective of this project in its inception phase is to assist the government in setting up an effective nationwide legal framework to manage and implement the LSMP, which could eventually oversee and provide guidance to the entire legal sector of Lao PDR.

On the other hand, the project is implemented to meet the United Nations Development Assistance Framework Action Plan. It is designed to contribute to the outcome 2: “By 2015, the poor and vulnerable benefit from the improved delivery of public services, an effective protection of their rights and greater participation in transparent decision-making.” And it is also designed to contribute to the United Nations Development Assistance Framework Acton Plan Output 2.4: “The Legal Sector Master Plan is effectively implemented advancing the Rule of Law and accelerated realization and protection of human rights.”

The SPLSMP was expected to deliver 6 key outputs: [69]

(a) Enhanced capacity, procedures, and standards for legislative development and implementation in Lao PDR (implemented by Ministry of Justice(MOJ))

(b) Institutional capacity, structure, and arrangements further improved at legal and judicial institutions for more effective and responsive judicial process (implemented by Office of the Supreme People’s Prosecutor(OSPP))

(c) More systematic development of legal and judicial professionals enabled through the establishment of a unified judicial training institute (implemented by MOJ)

(d) Increased public understanding of legal rights and information, and increased participation in the legal system towards full realization of their rights (implemented by MOJ)

(e) Lao PDR's further integration into regional and international communities enabled through adoption, implementation, enforcement, monitoring, and reporting of international legal instruments (implemented by MOFA)

(f) Enhanced capacity of the Secretariat for more effective coordination in the legal sector and implementation of the LSMP (implemented by MOJ)

A mid-term evaluation was conducted from November 15, 2015, to March 31, 2016, by Mark Aiken of Notio Partners, an international development consultancy firm in cooperation with SPLSMP staff members in Vientiane, Laos [70]. The key findings from the mid-term evaluation were some issues related to the challenging tight timeline and wide scope of SPLSMP in the given project period, the vague/weak governance structure and also the several on-going pilot projects in a wide variety, with limited human and financial resources.

As the implementation results of the project is not clear in the document, I tried to find out the outputs during the field trip. In short, the newly coded case management system, the PSC-CMS(People's Supreme Court-Case Management System) that is developed by the local third party, DATACOM, is in final development phase and is waiting for its first trial use period in the SC, and there are newly adopted serves in the MOJ, OSPP, and SC for running the new software. However, it is still a long way to go to set a shared case data environment, one of the main purpose of the LSMP, as the software is designed to be used inside the Supreme Court(SC), and the OSPP, the partner organization of legal enforcement and trials, is having its own case management software developed by the local third-party software company, APIS.

(2) Asia-Pacific Telecommunity(APT): supporting the IT assisted public services

APT has been one of the participating multilateral agencies for the e-governance capacity building of Laos. The budget size of each project is usually smaller than the other participating donors, but they are implementing various pilot projects through their extra budget, called as EBC(Extra Budgetary Contribution). The common factor with the other donor-driven projects is that participation of domestic ICT companies from the donor side is encouraged and is usually attached to the plan.

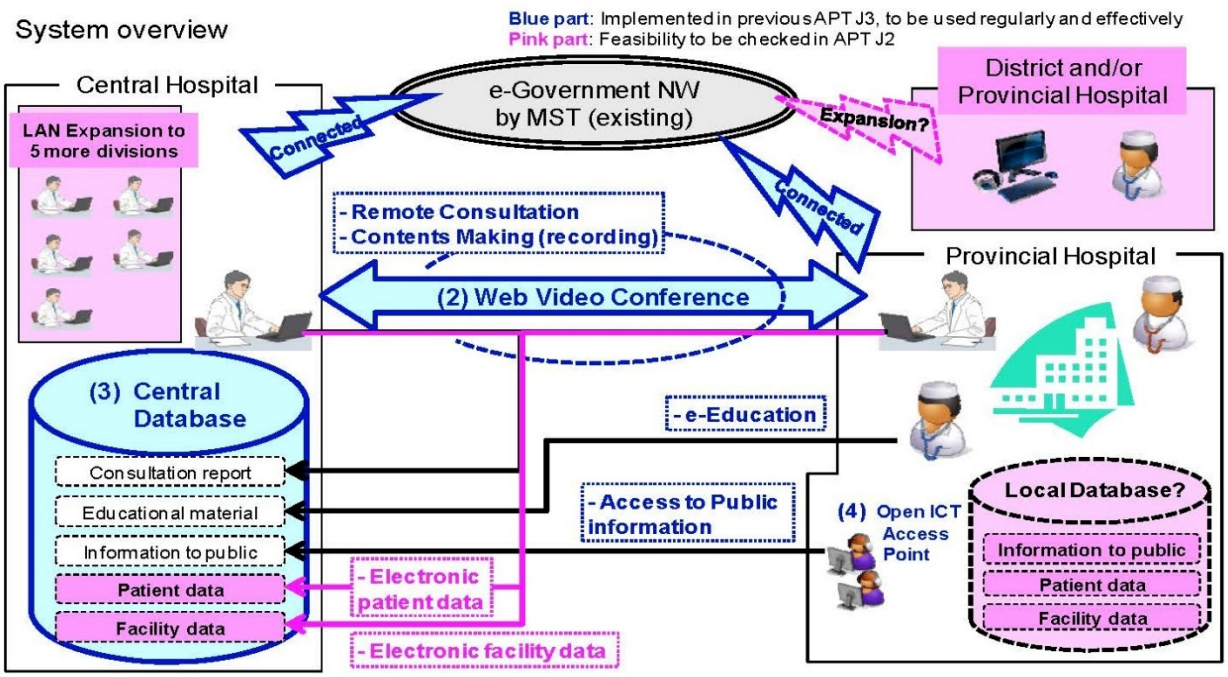
(a) APT EBC J-2,3: E-health project

This is one of the long-lasted health sector computerization effort by both the GOL and the APT. Initial project started in 2008 with EBC J2-1, and the final phase of the project was EBC J3-2 which was ended in March 2013. The MPT, the MOST and the MOH were in the GOL's side for the project implementation, and the APT, JTEC, and Fujitsu were the donor side participants for it [7]. As the project was supported by EBC J, which means Japan funded one, Japanese private companies took the processes of procurement and overall consulting.

The main idea of the project is adopting ICT for rural area healthcare to solve these severe issues of imbalanced public healthcare service in the country while relieving a partial burden of physicians working for the public hospitals in Vientiane capital through the computerized patient database system.

Key factors of the project include providing broadband infrastructure, providing a collaborative diagnosis environment, and providing a remote medical care environment.

Figure 3. EBC J2 & J3 Project: System overview



(Source: Figure 3.2.2. page 17, [49])

The problem here is that the system will be operating normally under the assumption that the existing legacy network is stable and the local hospital is well maintained. The fact is that the central government has admitted failure in the government broadband network, so it is necessary to make effort to reconstruct the network and to build the system under consideration of the local condition and capacity.

(b) APT EBC K: Public Wi-Fi project

In 2018, APT decided to plan and implement another project under the financial support of South Korea. Ministry of Science and ICT of Korea will provide a free public Wi-Fi system targeting the Vientiane Capital's core business area while allocating the budget ranging USD 55,000 for the first year of deployment, from March 2018 to 2019.[50] Detailed information of the project,

such as the scope, network design, detailed AP specification, routing style, security scheme, etc., is not opened to the public.

(3) UNICEF, SNU-KOFIH, WHO, APT, KOICA: Health sector projects

The public health system in Laos is divided into three levels, like other public services: Central, Provincial, and District Level. And the public health service providers are as follows:

The Ministry of Health(MOH) and its 17 Provincial branches, University of Health Sciences(UHS, the only medical school in Laos) and its 7 provincial schools, Public hospitals(5 central, 3 specialized, 17 provincial, 27 army, 10 police [51]) and many supporting district level offices, hospitals and healthcare volunteers. The number of physicians and nurses discharged by UHS, the only medical institution in Laos, does not meet the current number of healthcare workers required, and there are significant urban-rural and rich-poor gaps in terms of the public healthcare system performance throughout the country [52].

Jean-Marc Thome and Soulivanh Pholsena described the issues in the healthcare system of Laos as following [53]:

- Under-funded: Low per capita health-care spending, low government funding
- Inequitable: Overly dependent on direct household expenditure for curative care
- Weak in social protection: low coverage of the population
- Inefficient and with low productivity

The problem is ongoing. Doctors working in the five public hospitals in the capital city have to see a lot of patients within limited working hours. And due to the paper-based work style, it is difficult to fully concentrate on medical activities. In addition, due to the lack of proper

rewarding system, they are treated as the other public officials and receive a flat basic salary of approximately USD 200~300 regardless of the service quality. It can be also addressed that the service quality imbalance from local medical professionals graduated from the medical school in Laos. The rich people in Laos does not trust the local doctors of domestic hospitals at all and just travel beyond the borders to the hospitals in Thailand.

What is more serious is the lack of provision of medical services to the rural population and the poor. Basically, public hospitals in Laos provide a certain level of service with very low out of pocket expense. However, the small fee is often regarded as a huge burden for the poor population in the rural area.

Due to the failure of computerization of the central government's public services, various foreign donors have been actively intervening. The positive part is that the healthcare sector is making the most visible outcome in the Lao government's steps to the e-governance. Websites and databases built with foreign aid are constantly updated and remain available. And in many cases, those programs are long-term projects having a better survival rate.

UNICEF started the new healthcare program in 2016 utilizing the nation's increased mobile penetration rate. The program, named as Interactive Voice Response(IVR), is using mobile applications running on the participant's own mobile phone and captures voice to make data sharing and dissemination. Village chiefs and local healthcare providers/supporters can hear the recorded voice data from the citizens under the healthcare issues and they can deal with the problems along with the central and regional MOH offices' guiding and technical support [54].

Another pilot program implemented in a rural area of Laos, in Sing District of Luang Namtha Province, was also used mobile phone but in different method. The trial project used SD card as

a tool for healthcare data dissemination. Inside the card, there were various basic but important essential materials including immunization, mother-child health, and so on. Participants of the program, usually the village chief and district level community health workers, took the card from UNICEF, and insert it to their phone and they could utilize the information inside the card through their own phone [55].

The MOH announced to adopt the District Health Information Software 2(DHIS2) as the nation's healthcare management information system in 2016 [56]. Before this, MOE tried to build its ICT applied management system since 2004, but the effort could not make impressive results due to the above-mentioned shortages on human resource and infrastructure, and poor implementation. In short, the DHIS2 is an open source software assists data gathering and management and it is widely adopted by many underdeveloped countries worldwide.

The program is proved as an effective tool for the purpose. However, there is an undergoing concern with the data availability within line ministries in Laos as the data could not available for external use. One informant working in the Ministry of Home Affairs(MOHA) said:

"The Ministry of Health is using their own DHIS2, having the health data nationwide, and they did not share the data inside their system to let other ministries use for the other purposes. They just post some summary/numbers on their website or give some processed numbers about the population/regional health status data to us."

Another project in this sector is the Seoul National University and the Korean government agency's collaborative ODA project. They made a cloud type document repository named as Lao Space. It is a customized software based on MIT's DSpace which is adopted by Cornell University for the document repository purpose too. ARGONET, a Korean IT/SW company, is

known to be a provider of customization and management services [57]. Under the MOH's supervision, project-related documents, a wide range of medical papers focused on Laotian healthcare system, and relevant presentation materials are being shared. The main difference from existing shared systems is that there is a company that manages servers, software, and infrastructure. The MOH could build the service without worrying about the maintenance, scalability and emergency support and they can use it continuously through paying a monthly fee.

In Laos, a sudden system disposal due to unexpected and severe maintenance problems often occurs after the project delivery due to the lack of human resource and lack of proper/efficient government budget allocation. Through the cloud system adoption, 24/7 accessibility is guaranteed by paying a certain amount of monthly fee, and the scalability problem during long-term use can be easily coped with the concept.

(4) The National Data Center

It has been about a year since the Ministry of Science and Technology of Laos(MOST) established a new national data center with investments from the Japanese government and private companies in Japan.

The data center is characterized as a container type that is built outdoors, not a traditional datacenter which is deployed in a concrete building. And the system is assembled with the assumption of switching into cloud type services according to the manufacturer's opinion [58].

For the health sector, the MPT and the e-government center did care about the data transaction and the server maintenance in many projects but through using the new flexible data center, the

MOH might implement a better working data sharing environment. A supporting idea from the informant working in the MPT is here. He said that the government of Laos will allow wider accessible locations, less strict regulation for the new data center with the proper security provided by the system. And he mentioned that private data might be stored in there so that the various stakeholders in the healthcare projects could share or utilize the data inside more effectively.

3.1.4.5 Identified issues across previous E-government projects in Laos

(1) Long hiatus between the 3rd and 4th period

The second national e-government project planned in 2006 officially ended at the end of 2009. In the NAST's development plan in 2008[12], it is revealed that it has the goal of going to the 4th – 5th phase of the EGDI's 5-phase mature model, i.e., transaction and integration stage, at the end of the project implementation. The 5-level development model is including: Level 1 Infrastructure, Level 2 Publish Information, Level 3 (limited) Interactive Information, Level 4 Transaction, Level 5 Integration.

The GOL could not reach the target. Still, lots of government agencies are staying at the level 2 or 3 of the 5-level model. The recent OSI of Laos in EGDI would support the idea that lots of government websites could not make the information transaction environment for level 4 of the model. In the 7th NSEDP, ICT and e-government were the main issues, and they are also targeted as core goal in this 8th plan, which is planned for 2016-2020. However, due to various reasons, national level development has not been achieved, and existing infrastructure has become obsolete as it missed the right time to upgrade. As a result, there was a problem that only

the development of an individual institution needed to develop it as needed so that the first half of the fourth period could be seen as a long hiatus. In 2018, the MPT will be preparing a new action plan. For the planning, priority would be assigned to the whole assessment of these individual efforts-unexpected diversity in document formats, data formats, communication type, database management, etc., before writing the draft. During these seven to eight years, there were also many individually developed programs that made a positive impact on the productivity of the ministries though, the issue should be resolved to avoid the future interoperability issue. Some ministries are having difficulty in exchanging data with the others, especially when there is a need for inter-ministerial tasks, e.g., MOHA-NA-MOE and MOJ-Police-OSPP-SC, which will need a good environment for sharing. It is necessary for the integrated e-government so the MPT should put higher value on sustainability through the standardized environment deployment to improve the national e-government readiness.

(2) Emerging ministry level software without national plan and regulation

As mentioned earlier, as the national standard for overall e-government system is not existing and the integration plan is still under development by the national e-government center. While the preparation is undergoing, large amount of foreign investments flowed into individual programs of each ministry for public sector development programs.

In many cases, it can be considered that there was some effectiveness-side gain from the projects, but the problem is that there is no common or standard framework for the software development. For example, almost every webpage developed by government agencies in the fourth period are made by a unique set of developing tools and technologies embedded. And the situation is exactly same for the database system building and the server system specification. It is expected to be difficult to set a framework at current stage because many of them were

designed without taking into serious consideration of the collaboration with line ministries and the further data migration and integration.

(3) Lack of legal preparedness

This part has been a constant problem until early 2010. Document storage and distribution through construction of electronic-approval system and relevant document database have been considered since the first period, leading to the insertion of those functions in some projects. However, it was hard to find a working document management system in the major authorities even in the Vientiane capital.

The partial reason of the absence of computerized environment for document transaction would be the organization's stiffness towards the innovation that can be also inferred from the interview with local officers. But the more rational and important reason of the situation would be that it lacked legitimacy because it was not legally backed up. The electronic approval system was planned since the third period's national e-government system under the function name of 'my approval' inside the distributed software package but there was no digital signature law to give the right legitimacy to end-users working in the government agencies. Therefore, all the agencies have adhered to the conventional paper and fax-based processing methods until now.

Recently the e-government center is moving faster than before to build up the required legal base for the nation's step forward to e-governance. In 2013, GOL finally decided to adopt the relevant law, namely the Law on Electronic Transactions [42], and the MOST is taking the responsibility for the law. It is a positive point that the active efforts to solve this problem are in the current stage. However, there is still long way to go for securing the right level of security which meets

international security standard, and the system integration availability and sustainable maintenance, and intensive support through strong policy driving is needed.

(4) Resource asymmetries

Even in central government agencies, there is a wide variation in available IT resources, appropriate staffing arrangements, available operation budgets and legacy equipment. For example, in the case of a sector-centered project such as SPLSMP/LSMP in legal sector, the implementation must ensure that the main players in the sector, namely MOJ, SC, OSPP, and its subordinate branches and educational facilities, are having the minimum infrastructure and IT manpower, and O&M budget to maintain an appropriate balance. As a result of adoption of the progress-focused method that focuses on the mere execution within the delivery deadline, it could be concluded that the project was successful as all the project components such as the external expert dispatch, supply and installation of equipment, software development, and initial staff seminars, were done along with the plan. However, in many cases, the real problems are coming after that. Due to the absence of resource balancing plan after the planned project delivery, many agencies are suffering from maintaining the effectiveness. Because of the poor legacy system, additional resource redistribution is often made by individual institutional needs. The infrastructure settings could be changed during the process. And usually there is no central controlling office for the issue after the delivery. It is a common vicious cycle that brings a problem in efficiency and sustainability of the whole project.

This problem becomes even more serious if we expand the scope to local offices in nationwide perspective. In Laos, basically, the level of IT equipment composition between the central offices and the regional offices is significantly different. In many cases, the introduction of new equipment or projects takes place at the center first, and then the planning and distribution of

branch offices are completed. The above-mentioned cycle is the main causes of losing their effectiveness after the project is terminated. In the long-run, due to the lack of proper management due to the shortage of managerial capacity, it is often that the entire project leaves marginal legacies and results and the rural offices are just relying on a new project when the program is finished. A reluctant public office for providing consulting service and technical support for the long-term resource management would be needed.

Infrastructure is still a huge barrier to the dissemination of the program. In the case of local offices in rural areas, there are still many places where the internet connection is not stable and the access to the service ran by the central offices is not an easy thing. As shown in the case of the APT e-health project, the connectivity issue was the main reason for building rural community centers for securing the connectivity.

(5) Donor-driven projects

Since the second phase, majority of the e-government projects that can be categorized as major projects are planned and implemented by foreign governmental organizations and international organizations through utilizing their human resource and investment. In case of Laos, due to the GOL's limited financing capability, influence and pressure of the main donor are usually taken seriously in the international cooperation regardless of the project scope. In the same vein, in a large portion of the projects, donor sides did not fully consider the local IT market condition, the legacy systems, and the local human resource. Rather applying the limitation from the local side, donors tried to use their own standardized software while encouraging participation of companies from their domestic market. This type of strategy will be marginally helpful for the project management allowing more controlling power over the potential uncertainties.

However, there are several considerable downsides from using the strategy. First of all, the investment efficiency problem from the overlapped investment is one of those. For example, during the Chinese government-supported project in the third phase, most of the networking and computing devices were from the mainland China for the purpose of nationwide distribution and installation. Alcatel-Lucent Shanghai Bell and Lenovo did not have authorized local distribution channels and service providers network at that time and till now. And during the procurement process, domestic models, made exclusively for the Chinese market, were selected for the project and the selection made severe maintenance and life-span issues soon after the installation because it was hard to find the right consumables for the printers and the projectors and parts for the desktops and servers. Especially, given the poor logistic infrastructure of the country, provincial level offices could not deal with the maintenance troubles in time and lots of offices gave up using the new devices.

The recent decisions of adopting the container type data centers can be understood with the same rationale. It would make more sense when considering the pathway as a result of donor-driven, or investor-driven planning than describing the container type facilities implemented by multiple vendors at multiple physical locations as pure strategic steps of the GOL to the LEED (Leadership in Energy and Environmental Design) certified energy efficient building for further data center integration. There is no evidence of the existence of supporting ideas in the national plan and the potential brand dependency, or lock-in, was not fully considered and examined in the process of planning. The issue can be related to the cloud vendor lock-in in the future too.

(6) Interoperability

As mentioned in the previous section, the willingness of foreign aid agencies exerted a great deal of effort in the development process. However, there is a severe lack of standard for the system

and this acted as a huge barrier to faster development of the overall system in Laos. Similar situation can be found in case of Chinese e-government system. Chen and Choi (2011) argued that the Chinese system could not develop as it should due to the poor readiness on interoperability and recommended to make a concrete set of standards and framework for all the components of the e-government system [59]. They compared the systems of China and South Korea to figure out the major factor affecting the delayed development of the Chinese e-government system. In China, the individual projects were increased the quality of IT devices and basic infrastructure in some sense but they failed on making the timely intervention of legal support and standard framework development for their system. As a result, China is still seating at the 63th in the EGDI even though they tried hard to modernize the public service system.

The situation in Laos is same. They just started to find a right framework for the next generation of e-government and it will take some time to research about it. And the situation would be even harder for Laos due to the lack of financial independence/ability as the participating external financial sources might influence their choices for the framework.

(7) Ownership, Controlling Capacity

It is confirmed that lots of ministries are developing their own applications through contracting with local IT companies. The reason they avoid in-house development is vary among the ministries but one common factor is lack of human resource, especially competent coders.

The MPT offers co-location service to the ministries for the server monitoring, but, in most cases, the physical locations of servers were in the dedicated ministry's office due to the security reason, and the contracting company takes full authority and duty for operation and management.

Therefore, even after the co-location they will have limited ability of maintenance as there is no one can handle the maintenance problem.

Specific contractor's operation and management capacity is a huge factor on the overall performance. The supreme prosecutor's office(OSPP)'s case management system(CMS) can be an example. They hired a local company, The APIS Resource, a well-known enterprise-type software company in the country, to build the program and placed the DB server and the web server at the IT department of OSPP. For every program updates and some server failure recoveries, they needed to call the company as the 24/7 monitoring was not covered by the builder and the company did not allow them to modify the system. Therefore, due to the ownership issue, new ideas could not be adopted into their webpage. The Google Apps application was once considered as their pilot groupware for the office, as it was free at that time and could provide basic but powerful features. But it could not be implemented due to the contract clause with the company that does not allowing the modification of their website.

Many other ministries are having similar problems. Key reason of the late software update and webpage malfunctions is the ownership. This can be applied to the recent projects too. The USAID supported Lao Official Gazette service would be an example. The webpage itself is in good running condition but there is no control or maintenance on the section of public comment for the legislation draft which is an important part for the specific website.

(8) Stiffness in organizational culture

Another major finding from the field trip is an intangible hesitation of the senior high-ranking government officials towards the recent movement into computerization. Most of the decision-making high rankers in public sectors are in their late 50s to 60s, and they got very limited

exposure to the IT devices and relevant system, especially when it comes to their working place. Therefore, electronic way of work is usually processed through their secretaries. During the interview with the officials, there was a common concern about security and privacy. A mid-level IT officer in the MOHA answered the question about this issue as below.

“Security is the main concern. A large percentage of the high-level officers would not agree on the point that the electronic signature or electronic transaction system will be safe and trustable. So, they prefer the “original” document.”

For the reason, the interviewees expected that the actual e-document, e-signature system usage will stay low for a while, even after the system usage is forced by law.

Chapter 4. Empirical study: Survey, Interview, and Field Visit

4.1 Survey

4.1.1 Background and Survey Design

It was hard to find a comprehensive research approach to the e-government system of Laos and most of the available materials were describing the planning and its implementation. There was a limited number of post-evaluation papers published by donor sides after completion of their projects but those papers were not describing the micro-level landscape, in other words the perspective of the various independent officials in many different levels and places.

The main purpose of the survey was getting a rough and brief census data from the active end-users of the e-government system of Laos in wide-spectrum. Initial distribution coverage was the whole participating ministries under the past and current e-government plan but there was a time constraint for the survey implementation, so the target group was selected before the distribution period. Various ministries and public offices, such as MPT, OSPP, SC, MOH, MOFA, were selected as the target group and some private IT companies were also picked up as the survey target.

The questionnaire contains 58 questions in 6 sections as below:

(1) General Question

(2) E-government System Usage

(3) E-government Policy Awareness

(4) Efficiency, Legacy System Utilization

(5) Policy Effectiveness

(6) Personal Idea, Suggestion

The formats of the survey and interview questionnaire are attached in Annex for further reference.

After the preparation of initial draft in English and Laotian, there was a proofreading process with the supporting people in the OSPP. While making the revised version, we discussed about the contents and the scaling scheme for the multiple questions. The Likert-type scale was selected as we saw that several previous surveys targeting the public sector of Laos were bearing bias troubles due to the numbered scales and the biased baseline. Also, we tried to label all the choices as clear as possible.

4.1.2 Distribution

The distribution had been possible through cooperation with the supportive people in OSPP. They took the role of liaison for this study and made the whole preparatory work before the actual digital formatted distribution in mid-March. Starting from the legal organizations, it took ten days to get the 40 answer sheets from the group of respondents. Google Docs was the main tool for this survey but we also used a printed hardcopy for some high-level officers in MPT, SC, and OSPP.

4.1.3 Survey Result

(1) General Question

Table 13. Descriptive statistics of the survey respondents

Category		Frequency	Percentage
Gender	Male	26	65%
	Female	14	35%
Age	20-29	15	37.5%
	30-39	18	45%
	40-49	5	12.5%
	50-59	1	2.5%
	60-	1	2.5%
Education Level	High School	0	0%
	College(2 years)	2	5%
	Bachelor's Degree	19	47.5%
	Master's Degree	15	37.5%
	Ph.D.	4	10%
Position	Staff	24	60%
	Manager	1	2.5%
	Head(Dept., Office)	13	32.5%
	Other	2	5%
Working Site	Vientiane Capital	33	82.5%
	Provincial Level	4	10%
	Other(District)	3	7.5%
Self-assessed IT Skill	Very Good	5	12.5%
	Good	12	30%
	Average	17	42.5%
	Below Average	2	5%
	Novice	4	10%
Computer usage at Office	Yes	39	97.5%
	No	1	2.5%
Name of Office	Prosecutors Office	15	37.5%
	Public Hospital	3	7.5%
	MPT	3	7.5%
	MOFA	1	2.5%
	Court(SC, Province)	2	5%
	MOH	3	7.5%
	MOE	3	7.5%
	Others	4	10%
	N/A	6	15%

(Source: elaboration from own survey data, N=40)

This table shows the general characteristics of the respondents. Except the three exceptions, the affiliated private technology companies working with the public sector, 37 answers came from

the current government workers. Most of the respondents are highly educated and actively using IT devices for their work. We tried to get more answers from the provincial, district level offices to capture the expected issues regarding the IT resource imbalance, but only 17.5% was the answer from rural area.

(2) E-government System Usage

The second part of the survey contains questions to ask the current usage of the e-government applications and infrastructure. The intended catch from this section can be summarized as following:

-Existence/Actual use of E-government Application

-Dependency on the applications for daily work

-Infrastructure-related issues: Connection type, working platform

-Tendency, Changes over time

Table 14. Current e-government software use

E-Gov. App: Existence	Yes: 55% No: 45%
E-Gov. App: Frequency	I do not use it: 41% Everyday: 38.5% Somedays: 20.5%
E-Gov. App: Platform	PC: 37.8% PC & Mobile: 32.4% I do not use it: 18.9% Mobile: 10.8%
E-Gov. App: Connection Type	Wi-Fi>Ethernet>Mobile(3G/4G)

(Source: elaboration from own survey data)

(3) E-government Policy Awareness

47.5% of respondents knew or heard about the national e-government policy through the channel of formal office meeting, casual talk with colleagues, and television news. However, 59.4% of the respondents picked “I do not know” or “Just heard about it” for the understanding level self-assessment question. Individual answers indicates that the concept of e-government is still not that familiar thing for the public officers except the IT department staffs and MPT staffs.

About 60% of respondents said that they do not know about the previous ODA projects in the e-government area. Especially, awareness on the projects implemented by the international organizations were almost zero. It was surprising result because UNDP’s ICT project has been in the legal sector computerization recently. Just one officer mentioned the APT project.

The result in this section is showing that the overall awareness is very low and the cooperation among the agencies is not active. Major issues in this section can be summarized as:

-Low level of understanding, participation

-Low awareness: Previous official development aid projects from Korea, Japan and China

-Low awareness: The national data center

(4) Efficiency, Legacy System Utilization

In this section, we wanted to get a proof of e-government software and deployed hardware in use and the satisfaction level from the usage. Main ideas of the questions are:

-Satisfaction level check: Development trials till now

-Alive system and software: Internet (Former MOD-SKY Telecom), document transaction system, video conference, etc.

Lots of respondents misunderstood the questions in this section due to the lack of awareness. Significant inconstancies were in the answer sheet as it seems like they think the e-government as a simple internet connectivity, email, file transfer, or basic database system.

However, there was some meaningful common ideas from the answer, including:

-Resource asymmetry: Central Office vs. Provincial/District Office

-Unstable internet infrastructure, network maintenance issues

-Hardcopy documents: No evidence of E-signature or E-document in sharing environment

(5) Policy Effectiveness

For the question asking the satisfaction level on the current plan, 32.5% of respondents answered that they are satisfied and 25% of respondents picked no, and 42.5% of them said they do not know the plan. For the major reason of the dissatisfaction, they leaved similar comments mentioning the GOL need to develop a clear, focused plan as the past versions were somewhat vague and not concrete. And several staffs said that there were not enough information sessions/seminars about the national e-governments and that is the reason of low level of awareness.

For the question asking the current cooperation level among the ministries, 42.5% of them mentioned that cooperation among the public agencies is not active. For the idea of better communication, staffs worried about the low communication and development of the similar

applications in various ministries and said the GOL need to make a better channel of communication to solve the issue.

Respondents evaluated the foreign aid projects as generally effective. Only 7 people selected the answer of no effect at all and marginally effective. However, there was several comments mentioning the sustainability issue after the funding cut.

Lastly, in the section of idea about the rural area development for the wider application of e-government, majority of respondents mentioned lack of infrastructure, especially high-speed broadband internet connectivity and available computers in the area, and said infrastructure development need to be prioritized in the rural area development.

4.2 Interview: Design and Result

In early April, I conducted a field trip for one week in Vientiane, Laos and interviewed the contacted government officials at the e-government centers, and the other e-government-related project managers working for the other public institutions. I could meet the mid to high-level managers in the Ministry of Posts and Telecommunications, the E-government center, the Office of Supreme People's Prosecutors, the Supreme Court, the Ministry of Home Affairs, the Ministry of Education, the Ministry of Health, and the field working physicians at selected public hospitals. Originally, I tried to conduct an e-health interview with WHO and UNICEF representatives, but it was canceled because it was difficult to adjust the schedule. Detail of the interview schedule is in the annex.

At the national e-government center, a comprehensive inquiry has been made to the director in charge. I asked about various issues such as new plan preparation situation, e-government related

national standards and legal preparation situation, opinion about the imported national frameworks, national network infrastructure configuration situation, technical detail and deployment purpose of the new datacenter, inter-departmental collaboration, cloud systemization, past national e-government projects and high-level IT education system in the country.

At the other organizations, I have asked about the infrastructure and e-government related software they are using, comments on national policies on e-government, and comments on the system they are actually using. In the case of hardware, especially the network infrastructure, we tried to look closely at the equipment installed in the organizations. In the case of software, we tried to run the software that actually used at each department and listen closely to the staff's opinion about it.

At the hospital, interviews were conducted with current doctors. We asked physicians about the actual IT systems/infrastructure they use for daily work and tried to hear about how they use it and how often the system is used for medical/administration purpose. And I asked about how they make collaborative work with the MOH or the other hospitals in other provinces. We also took the time to review the effectiveness of several e-health projects which have already been done and are now known to have ended.

There are common factors among the postulated ideas during the series of interviews and those can be summarized as following:

1. Failed stakeholder engagement, low level of cooperation

   A mid-managerial level officer working in the MPT said,

"Previously, many agencies tried to make their own programs. For example, the MOHA develop e-registration, the MOST got e-document, e-library, and the MOF is working on their e-tax/smart tax… So, the cooperation among the agencies was not that good. We did not have a clear policy. So, for example, Ministry A wants to do a project, then they make their own program, Ministry B, same. We cannot integrate these into one. Therefore, I think a clear policy and standard should be needed."

Similar comments have been made in interviews with legal sectors and with the healthcare sector. The MPT and the e-government center should gather a large number of stakeholders before the next plan production to listen to and collect opinions actively, and to make sure that the foreign donors establish a guideline for some legal enforcement in the investment process.

2. Scattered plan, emerging individually developed software

   The MPT did not control the ministry-level individual projects by this time. The MOF have a long line of things to do with foreign donors for their upcoming projects. The MOHA is doing their E-registration project with the Korean government's support. The MOST was building their data center with the Japanese government and the MPT, as a ministry in charge of the nation's e-government system, was not participating at the planning and implementation process even though the project title was named as the national data center.

   In addition to this, various software was adopted through many projects as written in the preceding chapters. The operating system and the end-user software style was varied by the different donors, therefore, the file system embedded in the OS was also varied. The

problem is that even if the GOL try to integrate sooner or later, it will become more difficult. Although the MPT is acknowledging the seriousness of the problem and working on the standards, it is expected that it will take a long time until it is actually applied.

3. Need of infrastructure restructure, especially the MOD line

The MOHA is currently using the service of Unitel for cost and stability reasons, and the OSPP is using Lao Telecom for the same reason. The regional offices of these organizations were also found to be using private ISPs as a result of the choice due to the coverage and the decision maker's opinion. The entire public sector is said to be rarely using the national network. The common points were poor coverage, expensive charges, and poor connectivity. Asked whether the central ministry could be free to configure their own network, the MOHA representative answered:

"We are using Unitel's internet service under the 2-year contract. And it can be renewed after 2 years. There is no obligation for selecting the ISP, so lots of government agencies are using the private ISPs. Main criteria for selecting an ISP would be the price, performance(speed) and so on. Because some companies' services are not stable or not meeting the specification, such as lower speed than advertised, contracted, so they are choosing with their own preference for the service provider."

(Source: MOHA informant interview)

This structure could not be confirmed by the proposed network scheme in the any existing government plan. It is necessary to reorganize wired and wireless networks after

review with current discarded WiMAX. The reason why the infrastructure problem should be solved quickly is that there are overlapping security or connection issues such as application of public IP band in the development of public programs. There is a possibility that the network equipment brought by the private ISPs can change the connection plan with the legacies. In particular, the security policies of wireless networks were found to be significantly different for each organization.

“We have a decree about the internet connection. But lots of the offices are not following that. Lack of budget is one problem, and the service quality from the state company is somewhat not stable or not enough to meet the needs. Service fee for all the offices in case of using the company is paid by the offices, no exception for some rural areas… We developed WiMAX before, and made the connection among the offices in Vientiane. At that time, project delivery, the network connection was not ready so could not use it much… And now it is already an old technology. So, lots of officers are moving into the new technologies, such as 3G/LTE.”

(Source: MPT informant interview)

The reason why WiMAX did not play the role it expected was that the base station installation was not done outside the capital city and the base cities, and therefore, it was meaningful only as a method of point-to-point data transfer service, which could not cover the whole area as the mesh network could do. In addition, the maintenance of Alcatel equipment was a problem that made the connection impossible. It was also a major cause that the major carriers moved into 3G and even to LTE quickly and the new technologies could make better coverage at lower cost and offer much faster data transfer.

4. Strong need of document repository, sharing, processing system(G2G)

   As expected, it is confirmed that there is a weak sharing environment among the line ministries. There was no evidence of existing shared case management system in the legal sector. The MOHA and the MOH did not fully sharing their own data and there was same situation among the public hospitals.

   “I think most of the agencies are doing their own projects and it would be hard to find a case of cooperation among the agencies. When they need some software then make some contract with a local IT company and make their own system regardless of the interoperability. And I could not find a case of sharing information, from their own system.

   The ministry of health is using their own DHIS2, having the health data nationwide, and they do not share the raw data inside their system to let other ministries use for the other purposes. They just post some summary/numbers on their website or give some numbers about the population/regional health status data to us.

   The public security office also probably got their own system, but they do not allow sharing the data.

   Therefore, we are using paper always. There is no electronically connected system. So, in the future, I hope we can get some linked system among the agencies to save our energy and effort. In addition, there is no control tower to handle the issue.”

   (Source: MOHA informant interview)

   The situation is same in the other agencies. For example, the legal sector does not have a document/case exchange system yet, such as a centered network attached repository or a cloud type one like SNU supported Lao Space. The document sharing system in the MPT

is also still a closed-loop, internal use model and they did not have a plan for widening the system to the other ministries.

5. Weak legal preparation, but ongoing effort

   All the interviewees pointed out the legal preparedness issues as a barrier for the e-government in Laos. The MPT started to produce meaningful results in the legal/policy preparation after 2012 but there are still many areas to be covered. As the informant in MOHA said, one of the major reason of using the conventional paper-type document transaction is the lack of supporting law. Even though there is a newly adopted relevant law, there is still no enforcement to the relevant system and the implemented systems are sometimes not compatible due to the different set of database and file types.

6. Low level of understanding among the high-level managers

   Another recognized issue was the computer-literacy issue among the high-level officers in line ministries. They did not use IT devices for their daily work until now and a sudden change will not work at all. The situation would have some meaning on the strategic approach/selection for IT ODA projects targeting Laos. Those people are the final decision makers and usually have authorities for the selection of outsourcing companies too. In this context, just building a technologically perfect system would not make the significant change and there is a need of soft side capacity development along with the hardware side.

   “It is very hard to ask them to change their working style. You know, traditional paper-based working. You know, high ranking people, they never used computer and usually,

they utilize their staffs such as their secretary to make document processing. So, we are trying to start from making the policy first. Strategy, master plan, roadmap, those would be followed after that."

(Source: MPT informant interview)

"Another thing would be the lack of understanding of the technology. Especially the policy makers and decision makers in public agencies are usually having a low level of understanding about IT and often the need of IT is neglected. Some high-level officials are worried about the new system, high tech system, for their working environment."

(Source: MOHA informant interview)

7. Budget issue, Ownership issue, Donor driven implementation

   The e-government center staff said that the GOL needs some external funding for the implementation of the national e-government system and some ministries are using that as a funding source of their own IT project.

   "The government budget is not enough. So external sources are very important for the GOL. We are trying to get support when the project is large in size and has significant effect on the citizens. Also, their support is important to serve all the needs of the people as our budget is not sufficient now."

   "Previously, many agencies tried to make their own programs. For example, MOHA e-registration, MOST e-document, e-library, MOF e-tax/smart tax… So, the cooperation among the agencies was not that good. We did not have a clear policy. So, ministry A

wants to do a project, then they make their own program, ministry B, same. We cannot integrate these into one. Therefore, I think a clear policy and standard should be needed. (MPT informant interview)

Another issue to be mentioned here would be the ownership. Mostly, due to the lack of human resource for implementation and maintenance, lots of public agencies are selecting outsourcing as their project delivery and operation method through picking up a local company to take care of their services. Even the MPT had the document repository and personnel management system developed and managed by a Vietnamese company. And the SC was running a case management software provided by a local company and the OSPP was also doing same way with a local IT company. The outsourcing itself can be an understandable choice for the country's internal capacity but at least they need to have a minimum level of human resource to manage it better while having a solid ownership. However, in many cases, the operation and management were solely provided by the private company.

8. Power game between the core implementors: vague pathway, in need of a powerful steering agency

   During interviewing about the infrastructure, I was surprised that the current relevant legislation is having just limited legal force. In fact, many projects related to e-government are going directly to the MOST. In this case, coordination with MPT and the e-government centers is not large. The new national data center management is in charge of the MOST, not the e-government center or the MPT, or the national IT agencies such

as LANIC and LaoCERT. There was a vague plan on the server management and the system integration.

9. Lack of awareness, even among the public workers in major ministries

   I could confirm the low awareness about the national project through the survey. Often, public workers were not aware of the e-government as a clear concept, and only some employee who directly carried out tasks related to e-government know basis of the projects. I could guess the general citizen's perception. In order to maximize the effects of e-government, participation of the citizens and the overall participants should be increased.

10. Overlapped investment, lack of legacy system utilization, need of integration

    Almost all institutions did not pay much attention to the issue of overlapping investment and the serious efficacy leakage due to the problem. Since foreign direct investment is taking a large portion in the development financing scene of Laos and the country has been designated as one of the most important country for their ODA strategy by the adjacent Asian countries, such as Korea, Japan, China, and even Thailand, Laos is having a steady funding source. That would affect the current situation. In the same vein, there are few plans of utilizing reusable resources. If new projects are allocated and new models are procured and installed, old devices will be just allocated to the provincial/district offices. And the maintenance was not that easy in the rural area and it is the reason leading the rural area offices staying poor at the level of IT

equipment/readiness. I think that if this tendency is continued, there will be sustaining problems in the development of the balance.

4.3 Additional Findings: In the perspective of software/application

One more thing in the interview process was the existence of programs that were actually being used by individual institutions. This section provides a brief description of the programs known to be in use by each organization, a brief description of the operating principles and UI, and the relevant hardware and infrastructure needed to use the program.

4.3.1 OSPP: Case Management System(CMS) and Finance-GFIS

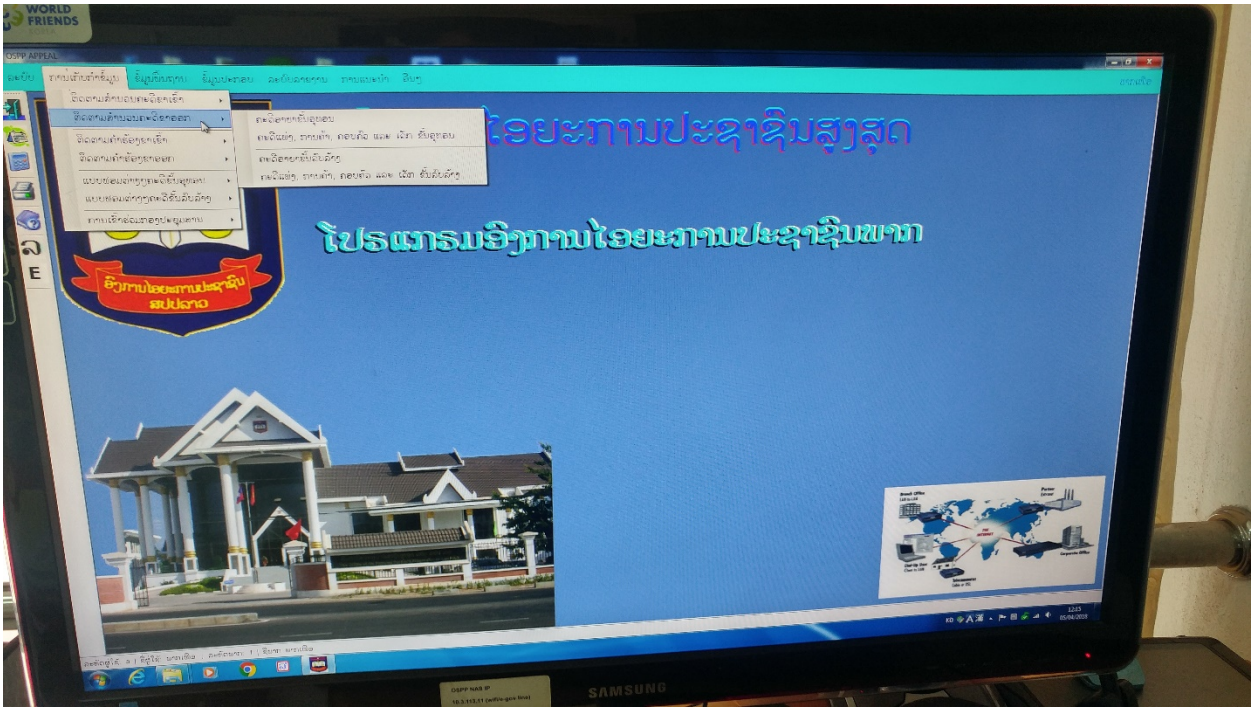
In the OSPP, the OSPP-CMS has been found to be rarely used after its development. The GFIS used by the finance department is currently active in usage and the Ministry of Finance(MOF) developed version is still in use. However, it was not made to fully collaborate with related organizations. It could be regarded as an internal computerized system that functions as document management, storage and printing tools. Unlike the other software developed for internal purposes, it is still used for collaborative daily work among the financial departments of line ministries. For that point, it can be said that the intended purpose of the software build has been achieved

In the case of the CMS, the program was developed by APIS, a local software company. It was developed as several packages of standalone type programs for each legal case category, rather

than an integrated set of modules in one program. The server is inside the Public Prosecutor's Office and has a basic 24/7 management system with the surveillance system.

In order to promote ICT application to the nation’s entire prosecution organization, the Supreme Prosecutor 's Office has an IT department. It does not develop programs in-house but develops it through outsourcing and takes charge of management only. The IT department have been restructured and teamed up as department level in early 2010s due to the increasing importance of DB application in case management and now, a Korean doctoral level ICT specialist is dispatched to the IT department as an IT advisor.

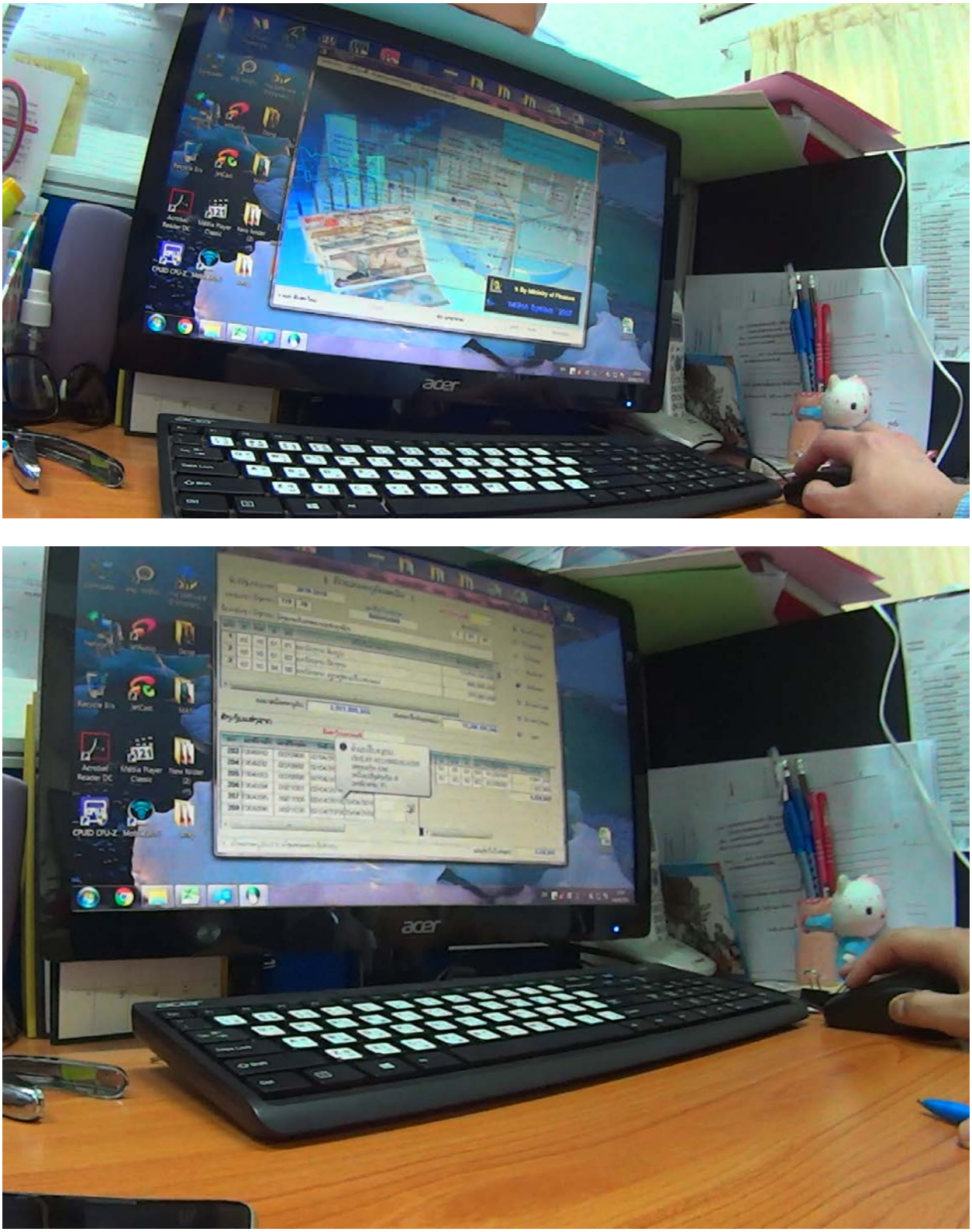
Figure4. OSPP-CMS UI(top) and document management system(bottom)

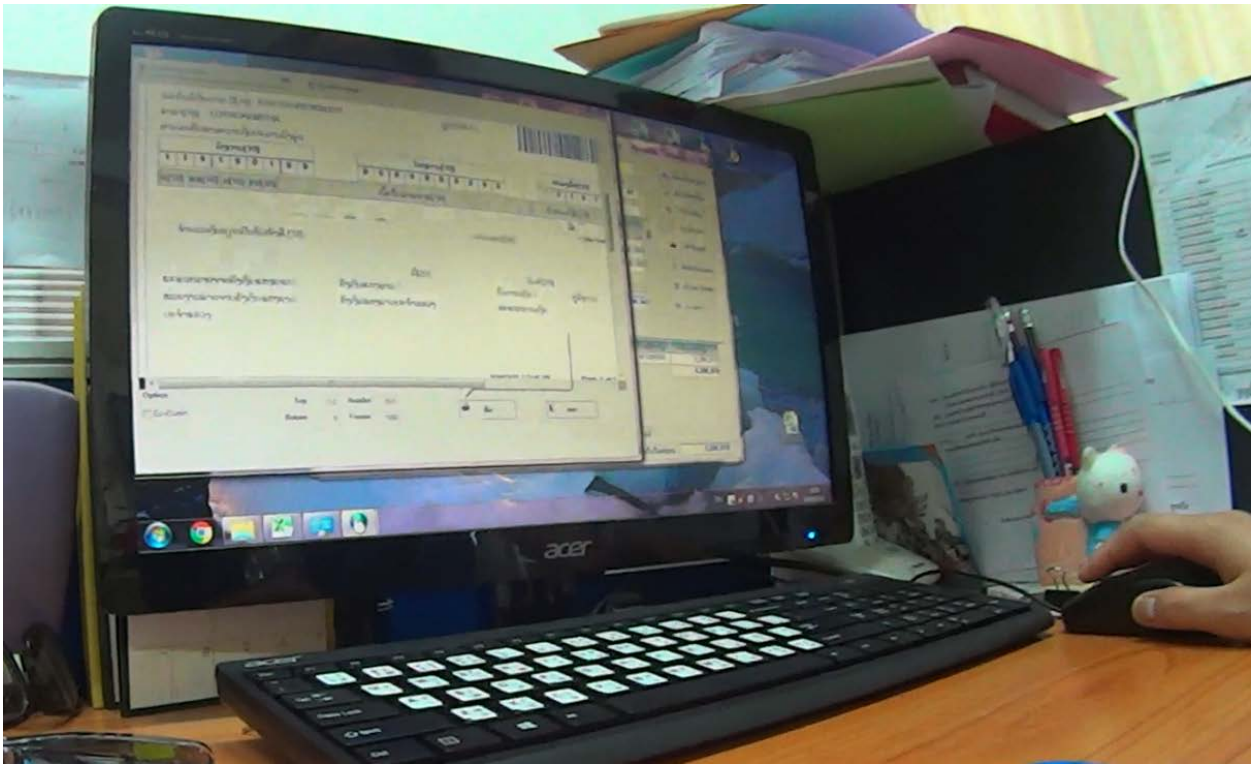


ລ/ດ	ເລກນັບ	ລາຍການຂໍ້ມູນ	ເດືອນ1	ເດືອນ2	ເດືອນ3	ເດືອນ4	ເດືອນ5	ເດືອນ6	ເດືອນ7	ເດືອນ8	ເດືອນ9	ເດືອນ10	ເດືອນ11	ເດືອນ12	ໝາຍເຫດ
1	I	**ຄະດີແໜ່ງຂັ້ນລົບລ້າງ**													
2	1	ຄະດີຄ້າງມາເດືອນເກົ່າ	0	9	24	32	41	51	54	55	55	55	55	55	
3	2	ຄະດີເຂົ້າໃໝ່ໃນເດືອນ	9	15	8	9	10	3	1	0	0	0	0	0	
4	3	ລວມຄະດີທັ້ງໝົດໃນເດືອນ	9	24	32	41	51	54	55	55	55	55	55	55	
5	4	ຄະດີທີ່ໄດ້ແກ້ໄຂໃນເດືອນ	0	0	0	0	0	0	0	0	0	0	0	0	
6	*	- ຄຳຖະແຫຼງຍັ້ງຢືນ	0	0	0	0	0	0	0	0	0	0	0	0	
7	*	- ຄຳຖະແຫຼງປ່ຽນແປງ	0	0	0	0	0	0	0	0	0	0	0	0	
8	5	ຄະດີຄ້າງໃນເດືອນ	9	24	32	41	51	54	55	55	55	55	55	55	
9	II	**ສຳນວນຄະດີຫວາງມາ (ຕາມຂໍ້ຕົກລົງຂອງສະພາບ ແລະ ຕາມຄຳຮ**													
10	1	ຄະດີຄ້າງມາເດືອນເກົ່າ	0	6	7	17	19	23	29	29	29	29	29	29	
11	2	ຄະດີເຂົ້າໃໝ່ໃນເດືອນ	6	1	10	2	4	6	0	0	0	0	0	0	
12	3	ລວມຄະດີທັ້ງໝົດໃນເດືອນ	6	7	17	19	23	29	29	29	29	29	29	29	
13	4	ຄະດີທີ່ໄດ້ແກ້ໄຂໃນເດືອນ	0	0	0	0	0	0	0	0	0	0	0	0	
14	*	- ສະເໜີຮື້ຟື້ນຕາມຂໍ້ຕົກລົງຂອງສະພາບ	0	0	0	0	0	0	0	0	0	0	0	0	
15	*	- ຄຳຕົກລົງບໍ່ຮື້ຟື້ນຕາມຂໍ້ຕົກລົງຂອງສະພາບ	0	0	0	0	0	0	0	0	0	0	0	0	
16	*	- ສະເໜີຮື້ຟື້ນຕາມຄຳຮ້ອງຂໍຮື້ຟື້ນ	0	0	0	0	0	0	0	0	0	0	0	0	
17	*	- ຄຳຕົກລົງບໍ່ຮື້ຟື້ນຕາມຄຳຮ້ອງຂໍຮື້ຟື້ນ	0	0	0	0	0	0	0	0	0	0	0	0	

Overall, this is a basic program for document repository purpose and there is an embedded sorting function showing out the statistics as shown in the Figure 4, bottom. The UI is pretty similar to the finance department's GFIS application for e-taxation and the database system is made of simple MS-SQL DB.

Figure 5. GFIS at the OSPP and the document processing at the financial department

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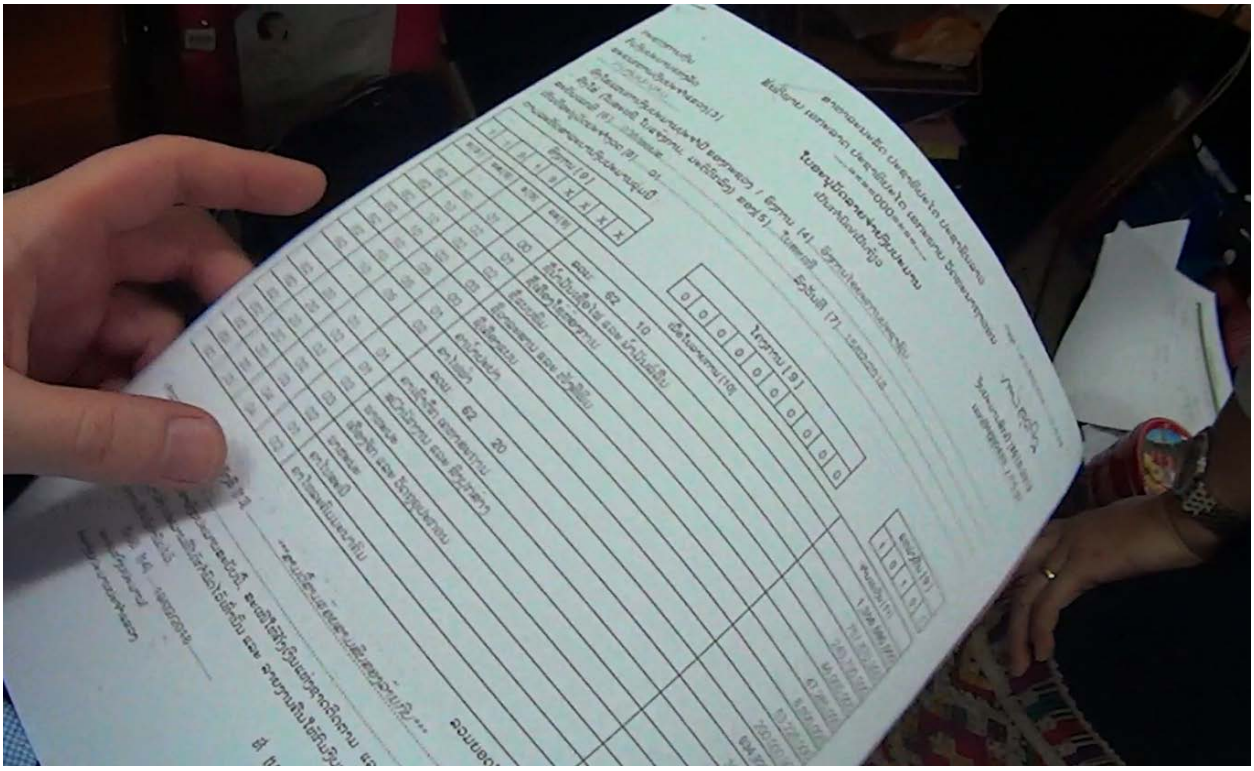
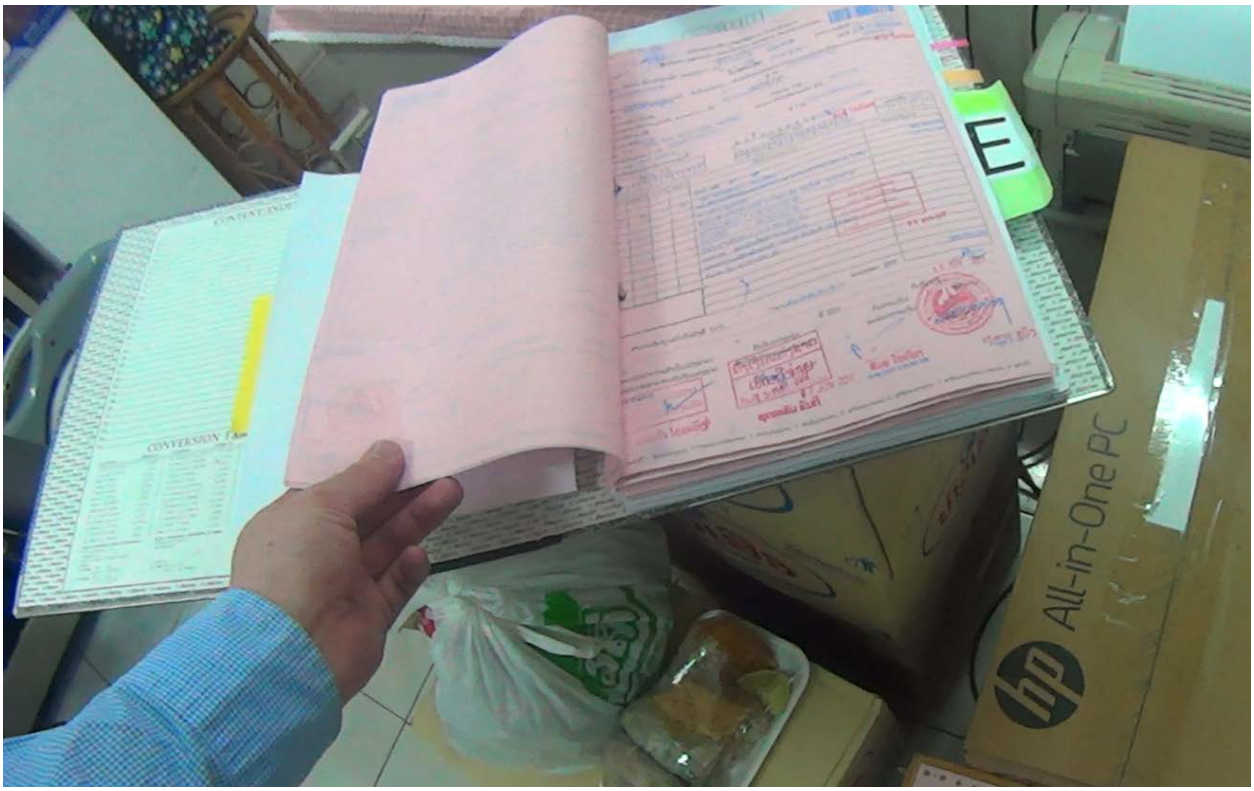
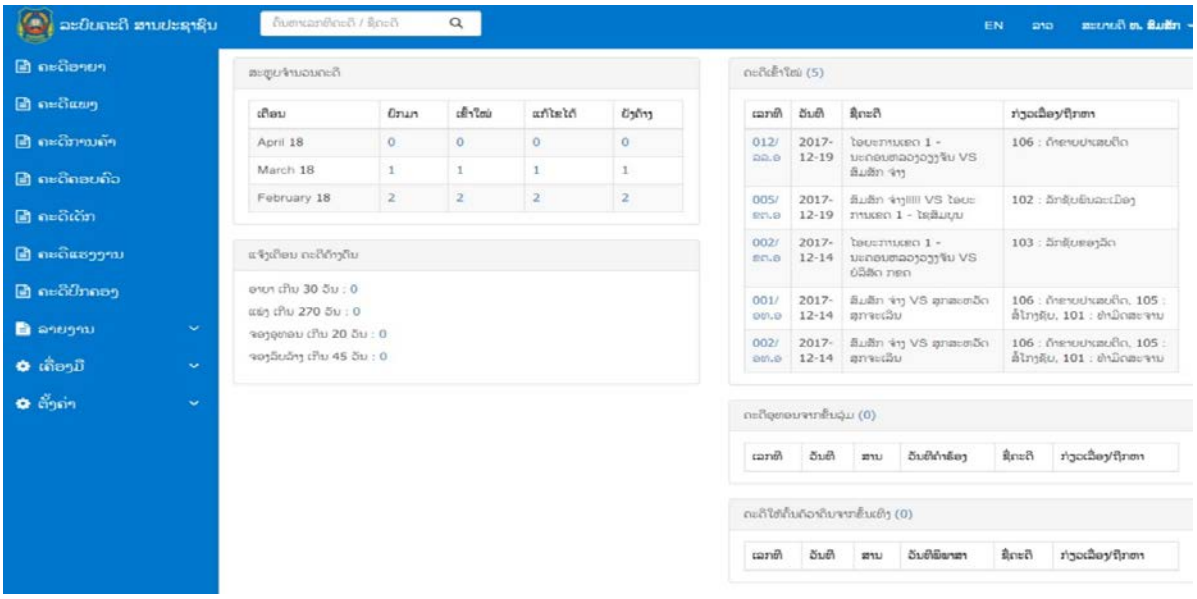




4.3.2 The IT department of SC: CMS only

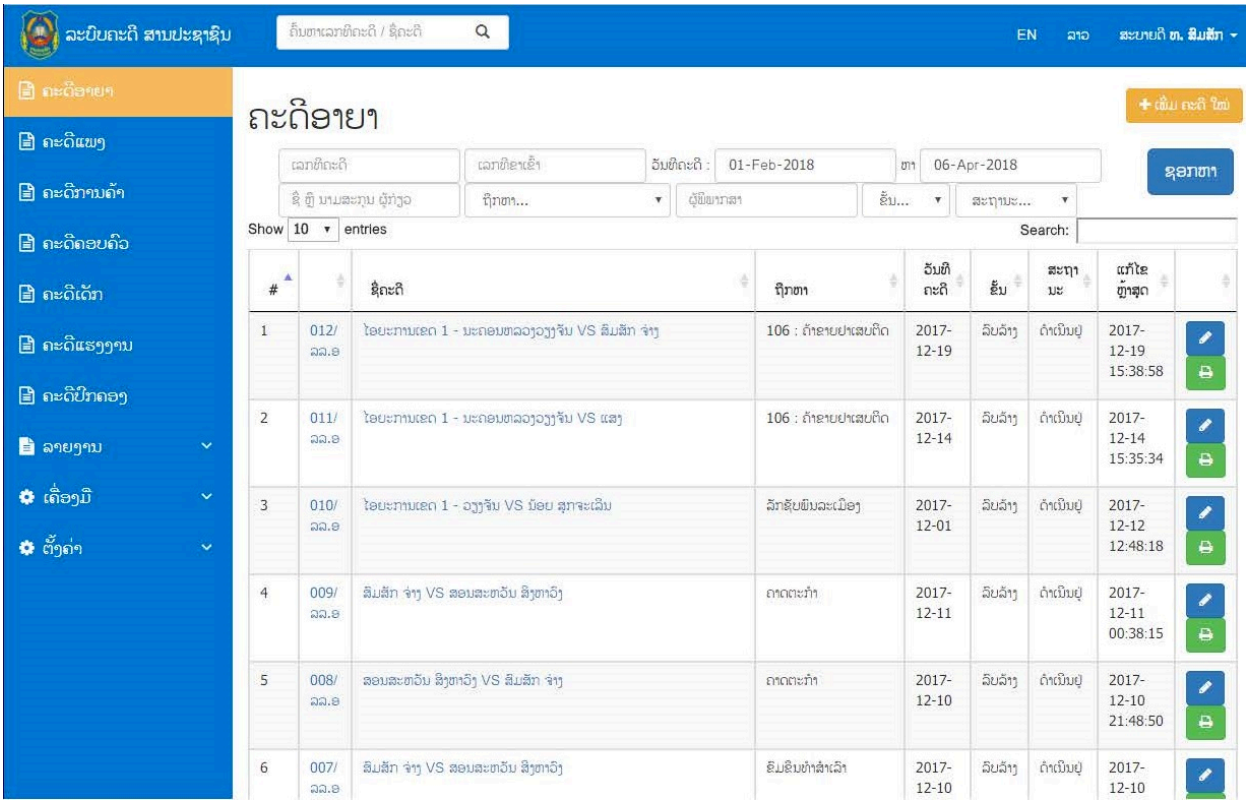
Currently there is no available e-government related software in the SC. There is an IT division under the cabinet department of SC but it is understaffed, and their role is basic trouble-shooting(PC, Laptop, etc.). However, they are developing programs called as PSC-CMS(People's Supreme Court-Case management system) under support of UNDP-LSMP. Local IT company, Datacom, is the subcontractor for the software building and they are making program now. It basically has a clean and intuitive UI. Unlike the prosecutor's office system, various case categories are included in one program, which will help in case management and schedule management.

Figure 6. PSC-CMS GUI



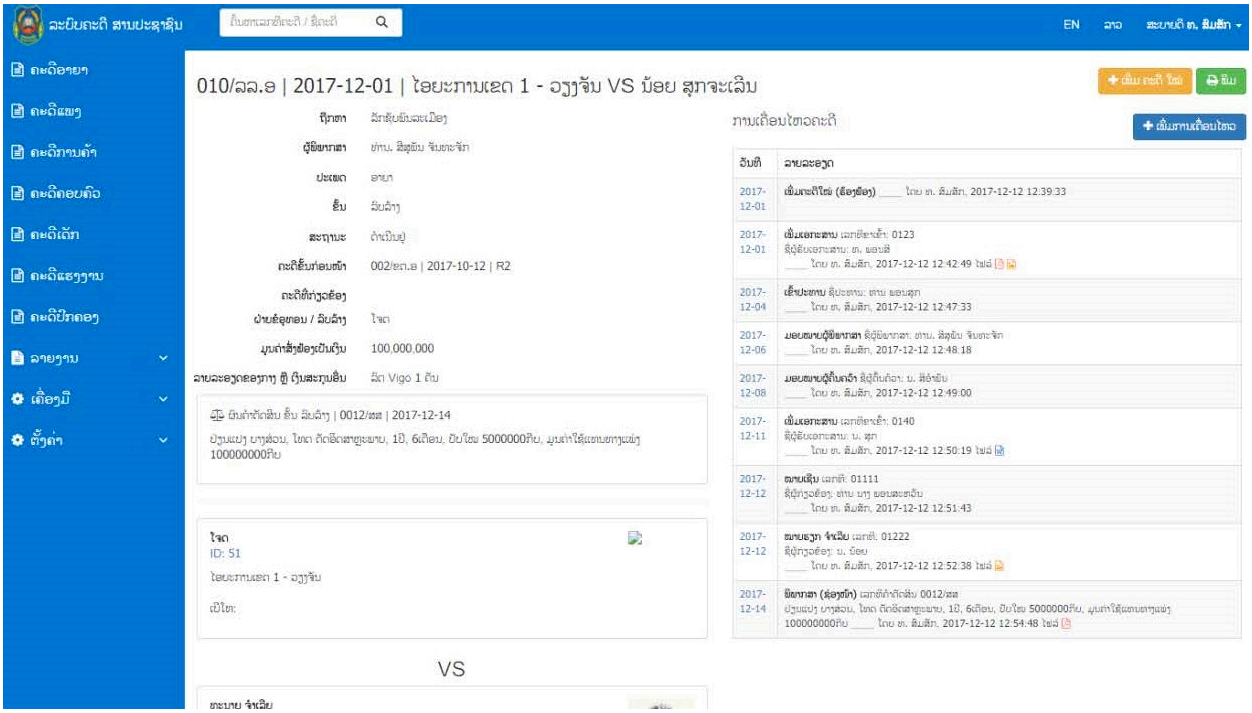
On the frontpage, the program is showing the basic statistics, number of cases per category, and the new cases by prosecution.

Figure 7. PSC-CMS Criminal Case DB



Left side menu is showing the case categories. This screen is showing the criminal cases, and there is a built-in search option with various parameters: case categories, case number, date, name, etc.

Figure 8. PSC-CMS Criminal Case Detail: Suspect vs. Prosecutor



It is showing the legal background, preparatory for the case, and the detailed information about the case itself, and also the prosecutor side information.

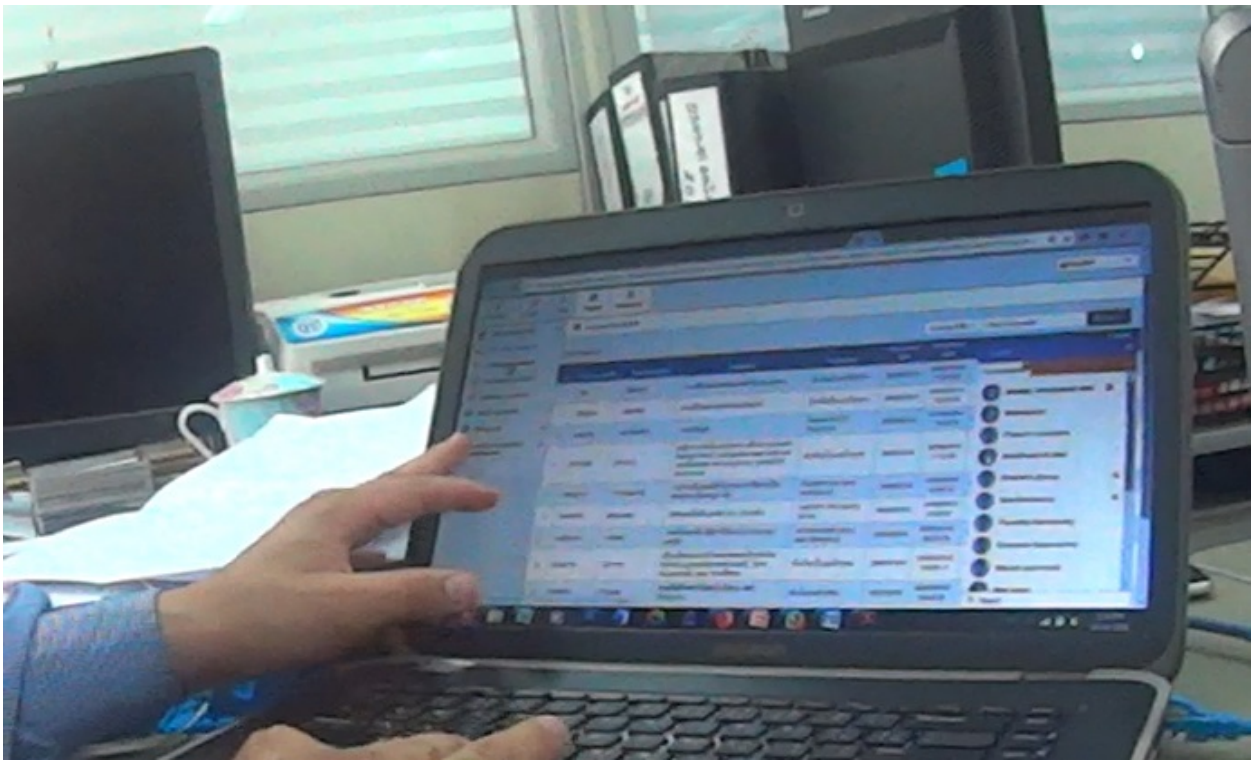
For their infrastructure, the MOD line was installed at the supreme court according to the e-government action plan of 2006, and still, there is a facility for the connection in the office. Now, their internet connection is provided by SKY telecom, the state company. Wireless connection is available in the office and the connection is made through a basic DHCP setup and there was no evidence of planning on network infrastructure development. Similar to the other public agencies, SC's provincial or district level offices are suffering from the IT resource asymmetry.

Most of the communication is done through the conventional way, fax and posts. Their short-term goal is achieving effective case relevant documents sharing environment through the development of CMS. Ultimately, to make it possible, the close cooperation between legal sector and enforcing forces is needed. However, the system is designed as a standalone one and OSPP is using their own CMS now.

4.3.3 The Ministry of Posts and Telecommunications(MPT): beta version of Groupware

Despite being the country's leading ICT agency, it did not have a significantly improved software compare to other ministries. Currently, groupware is in use, and this software has been recently developed by the Vietnamese company after making the MOU on e-government development support with the Vietnamese government, and it is supposed to be used internally, so it will not be used with other ministries.

Figure 9. MPT groupware UI

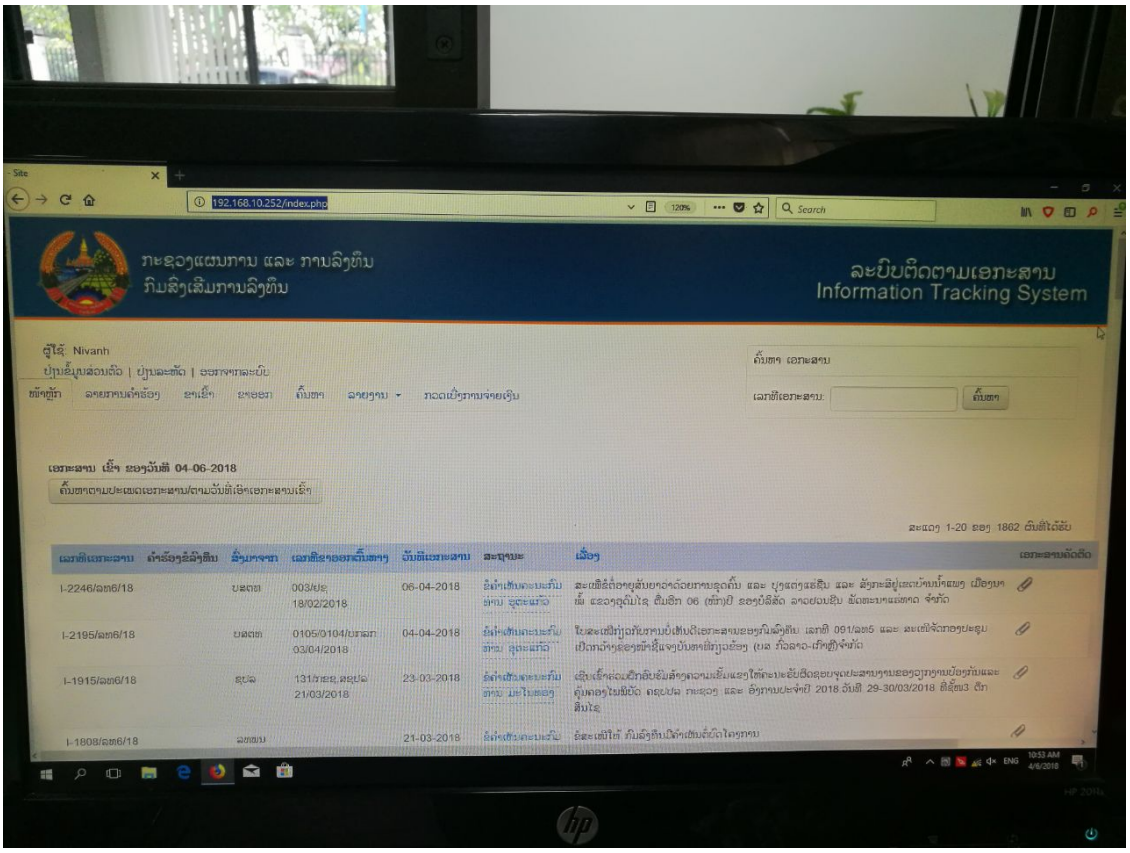


As you can see in the UI, it is a typical groupware type and has basic functions such as staff management, document circulation for business, and communication tools like group chat. Inside the MPT, this is known as a second attempt to apply the groupware, and it is planned to expand its application range from this year to the national scope. For the electronic signature/transaction feature, it is confirmed that it does not support now and will be considered after the legal preparation is on its right track.

4.3.4 The Ministry of Plan and Investment(MPI)

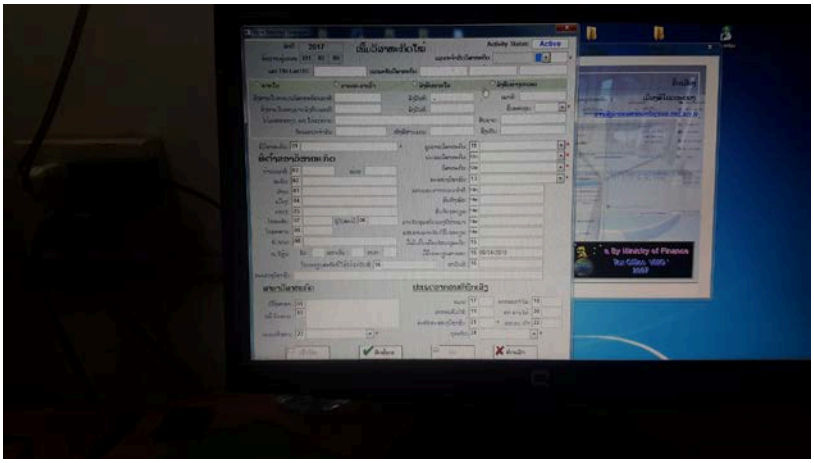
As mentioned above, it is a very active organization that is conducting a relatively large number of programs. For their DB, it is confirmed that the MPI is having an internal database named as Information Tracking System.

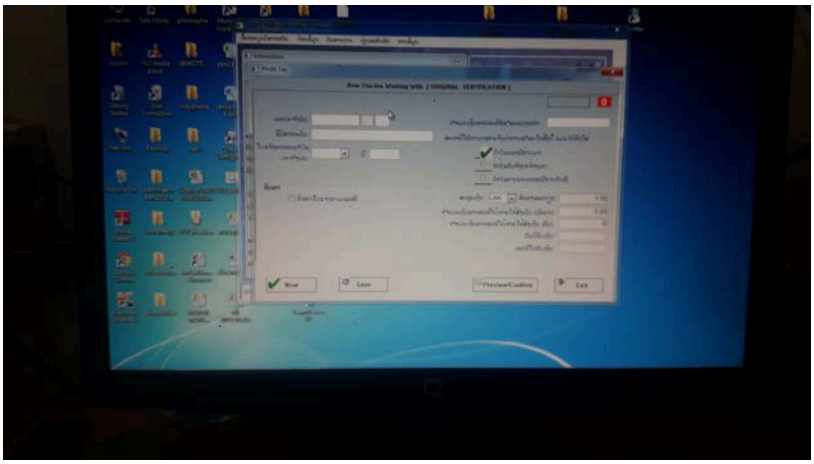
Figure 10. Internal Information Tracking system of MPI

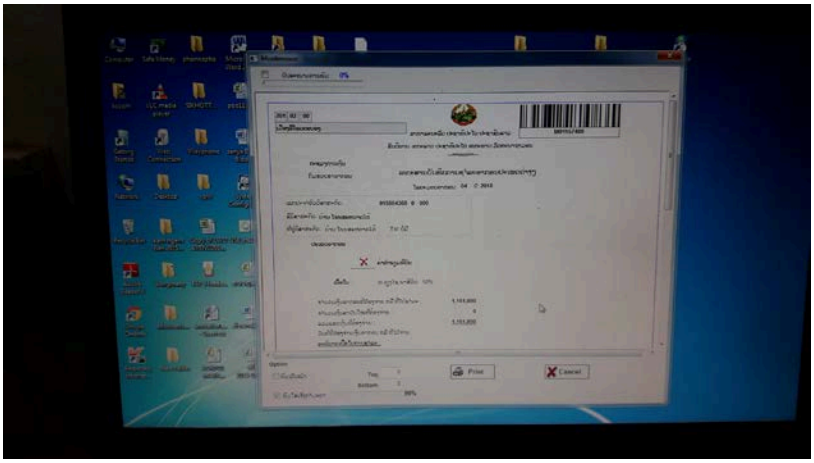


Other than the above program, the MOF's GFIS was in use. The detail of this program is just same as that used in the OSPP.

Figure 11. GFIS of MPI

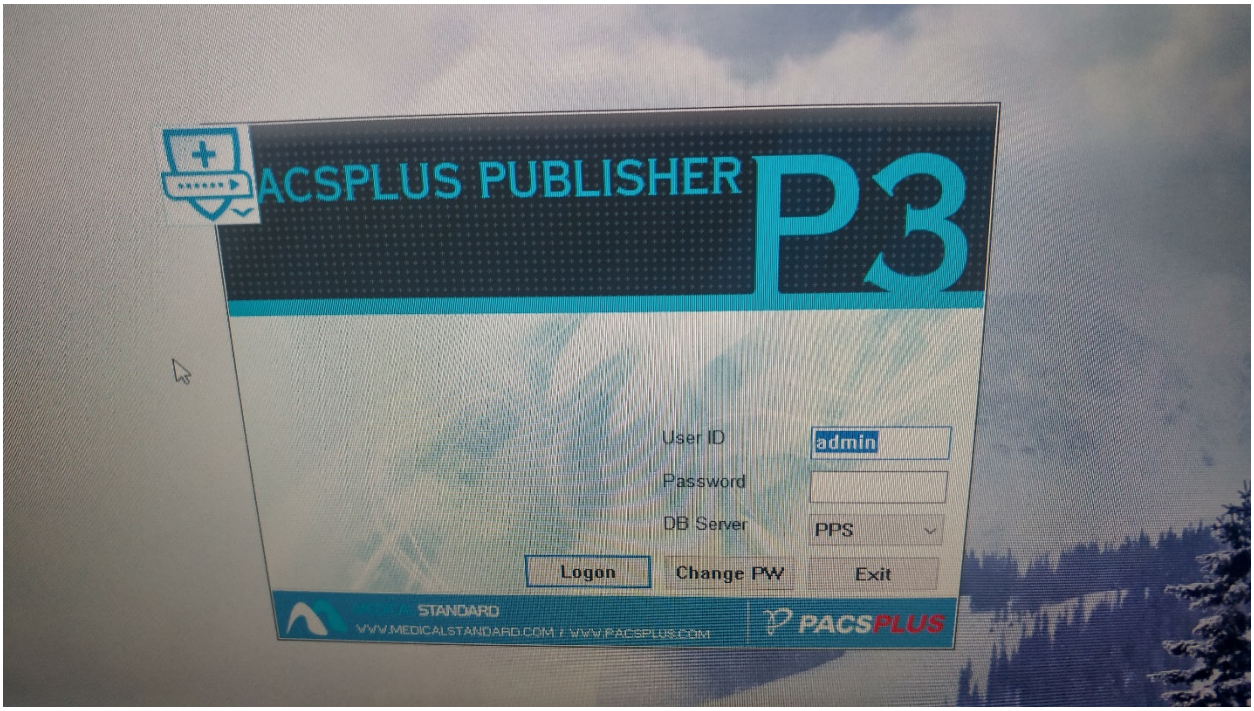






4.3.5 MOH, Hospitals

Figure 12. PACS system at Children's Hospital, in Vientiane Capital.



Chapter 5. Recommendation

5.1 Legal factors: amendments on ICT laws

As has been outlined before, a large number of ICT related legal reforms have been implemented since late 2012, and a variety of development methods coexisted in the 2000s when various national projects were in place. The staff at the e-government confirms that they are working hard for making the relevant legal setup for the new datacenter and the security issues in database sharing.

They should remind the failures during the second and the third period due to the late provision of the digital document related law. China suffered the delay of its development due to the same problem

5.2 Asset, Legacy Management

Almost all the equipment and software development results in the second and third phases could not be used in the next project. Different governments have invested in and have brought their own domestic equipment, and there has been almost no consideration of what other governments have built. There are many cases where reuse is possible, but it is very unfortunate that many network devices are not even considered to be reused in new projects. It seems necessary to apply the concept of central management type inventory management managed by e-government center.

5.3 Infrastructure: Stable and affordable National Fiber Network

Still some of the offices are stick with the national fiber services and the new immigration control system would be attached to the network so it would be certain that the network is going to be alive for a while.

However, as many informants have pointed out in the interview and the survey, it is necessary to overcome the situation where the national network gets out of the sight due to its poor performance and expensive monthly fee. It is clear that the official government network is now a fiber-optic network managed by Sky Telecom. However, since quality problems have been constantly arising and relatively expensive monthly fees are being collected from the participating agencies, they are turning their attention to private ISP companies.

The GOL should control the quality of the national fiber service in cooperation with the state company, and make a stronger legal enforcement for the use. The ISP change is not just the change of ISP. As MOHA staff said during the interview, in many cases, their network configuration also gets changed along with the contract with the private companies. This can be a minor issue but still it is important that the MPT, and the e-government center know about each ministry's network configuration for the next phase of the e-government infrastructure project.

In addition, the e-government center should update the national wireless connection scheme. In the 2011's e-government plan, there was still a description of WiMAX as the country's public wireless communication technology even though the station is not working anymore and the maintenance is not supported by the MPT. For the wireless connection, say point-to-point connection to the regional offices from the central offices in Vientiane, newer technologies such

as LTE needs to be considered. It is much faster and cost-effective. And they could utilize the pre-installed base station infrastructure from the system of the Lao telecom.

5.4 National Standard: Framework, File type, Software and Hardware

There are systems currently in the pipeline that bring the framework of the donor countries to the current e-government setup of Laos. Most of the frameworks are proven to be efficient and powerful in the top-tier countries in the world of e-governance. For example, the e-taxation project of the MOF is currently prepared with the South Korean government's national e-government standard framework, which is using the Spring open source framework. However, an intensive research on national framework selection and customization has not yet been conducted. And there are several donors using their own national standard software to build the application for the same purpose.

Joshi et al. [43] argued that the earlier integration intervention is meaningful in the developing countries. While explaining the e-government of Nepal, they insisted that the late integration would be the reason of the efficacy problem and recommended a cloud type G2G framework for better interoperability along with the preparation of well-made national standard for proper management and regulation.

Similar recommendation can be inserted here for the government of Laos. In Nepal, the government of Nepal worked 10 years with the Korean government aid programs but the scattered individual approaches without having the proper standard and the central control tower made the whole picture as a disordered one. Laos tried hard with the various donors as Nepal and is having similar issues due to lack of a clear national framework and long-term plan based on

the mutual agreements among the stakeholders. Cloud system can be an easy-to-approach solution for the GOL and the other conventional type system integration based on the national framework can be answer for the next step of e-government development in Laos. Regardless of the direction, the prerequisite should be placed on the implementation of a set of strong national standard and framework.

To make this, a deeply devoted conversation effort with as many stakeholders as possible should be preceded. And then the MPT may pick an open source framework as pilot which meets the stakeholders' needs including proper scalability and compatibility with the legacy systems. A series of tests would decrease the rate of unexpected failures on the actual implementation process.

5.5 Controlling authority: for better cooperation, interoperability

As we can see in the results of interviews and survey, most of the government agencies' staff expressed that the current cooperation status among line ministries is not at the satisfactory level. It would be hard to say one perfect solution for the case as the partial reason of the low-level cooperation is laying in the very solid hierarchical governance structure in the country.

The case of LSMP can be a supporting example of the argument. The UNDP supported project is almost closed now and I could not find a well-established cooperative legal case management system in those participating organizations in legal sector. External donor's actual power inside the mechanism could be regarded as negligible as it does not make a visible and tangible difference.

It is hard to overstate the importance of strong control tower for the next generation e-government of Laos. As in the fourth period, there is wider array of participants and stakeholders than before in the e-government related projects and the potential chance of conflict is getting higher. The PMO would be the best authority for the handling in the initial stage. Establishing a new regulatory body as an arbitration task force would be an answer to increase the efficiency of handling process. Only the top-level organization will make the difference in case of Laos and the authority needs to be clearly stated in the relevant law as well. And all the individual ministries should report their own ICT adopted projects to the controlling body before the implementation stage.

5.6 Sustainability: long-term plan and secured budget

Nearly all projects failed to meet their initial goals, and devices were not utilized as planned life spans. At the time of project planning, it is necessary to set up a long-term plan and arrange professional staffs dedicated into the project management to ensure long-term effectiveness. It is necessary to provide systematic education to local staffs so that they can handle their own work in the long-run.

5.7 Capacity Build: Education

An overall review of IT education policies at the national level is needed. As in the field of medicine, the field of engineering also lacks human and material support for higher education. At present, there are few universities that specialize in electronics and communications engineering except for the national universities. The MPT is running a technical college but the facility is outdated and also under a lack of quality education.

There were many graduates suffering from lack of core theoretical knowledge and practical skills, so I looked for problems in the curriculum, but it seemed to be fine in terms of the overall structure. Below is the list of major courses in the IT/Computer major curriculum at the National University of Laos(NUOL).

Table 15. The NOUL IT/CS curriculum

382CP211	Computer Programming I	3	(2-2-0)
382CP212	Computer Programming II	3	(2-2-0)
382OP321	Object Oriented Programming	3	(3-0-0)
382WA321	Windows Server Management	3	(2-2-0)
382LA321	Linux Server Management	3	(2-2-0)
382DC221	Data Comunication	3	(3-0-0)
382EP421	English for Professional Purposes	2	(0-4-0)
382WN321	Wireless Technology	3	(3-0-0)
382NH321	CCNA-D1	3	(3-0-0)
382SM321	CCNA-D1	3	(3-0-0)
382DB321	Database System	3	(2-2-0)
382IL221	Fundamental of Linux	3	(3-0-0)
382MI321	Information Technology Management	3	(3-0-0)
382CA321	Computer Architecture	3	(3-0-0)
382CN221	Computer Network	3	(3-0-0)
382SW221	Software engineering	3	(3-0-0)
382WP421	Web Programming	3	(3-0-0)
382SP421	Software Project Management	3	(3-0-0)
382MS321	Multimedia System and Application	3	(3-0-0)
382IE431	Introduction to economics	3	(3-0-0)
382BI221	Business on Internet	2	(2-0-0)
382SD321	System Analysis and Design	3	(3-0-0)
382IS321	Information Systems Security	3	(3-0-0)
308PA421	Parallel Programming	3	(3-0-0)
382DB322	Database System 2	3	(2-2-0)

382XX421	Elective subject in IT	3	(3-0-0)
382XX422	Elective subject in IT	3	(3-0-0)
382ES321	Engineering Seminar	1	(0-2-0)
381CP211	Computer Programming I	3	(2-2-0)
381DL211	Digital Circuit and Logic Design	3	(3-0-0)
381AD221	Advance Digital System Design	3	(3-0-0)
381CP221	Computer Program 2	3	(2-2-0)
381MC321	Microprocessor and Microcomputer	3	(3-0-0)
381ML321	Lab Microprocessor 1	1	(0-0-2)
381DC221	Data Communication	3	(3-0-0)
381DS321	Data Structure and algorithms	3	(2-2-0)
381DB321	Database Systems 1	3	(2-2-0)
381MI321	Microprocessor Interfacing	3	(2-2-0)
381CA321	Computer architecture	3	(3-0-0)
381CN221	Computer Network	3	(3-0-0)
381SW221	Software Engineering	3	(3-0-0)
381WT221	Web Technology	3	(2-2-0)
381SD321	Information Analysis and Design	3	(3-0-0)
381DP321	Digital signal processing	3	(3-0-0)
308PA421	Advance Programming	3	(3-0-0)
381OS321	Operating Systems	3	(3-0-0)
381OP321	Object oriented programming	3	(3-0-0)
381SA321	Server management	3	(2-2-0)
381WP421	Web Programming	3	(2-2-0)
381IS321	Information Systems Security	3	(3-0-0)
381IL221	Basic Linux	3	(2-2-0)
381HS121	Introduction to Computer Science	3	(2-2-0)
381DB321	Database Systems 2	3	(2-2-0)
381CE321	Control System Engineering	2	(2-0-0)
381XX431	Elective subject in Engineering	3	(3-0-0)

(Source: NUOL curriculum in 2014. [60, 61])

78 credits from the major required subjects are needed for graduation, and the composition itself is fine except the lack of elective courses compared with the curriculum of leading universities. However, the time allocated to the lab is generally not enough. Among the given courses, CCNA, C/JAVA programming, and Digital Logic Design would be the typical courses requiring the enough experiment time added to the lecture time for improving the level of the understanding. In addition, most of the faculty members are invited lecturers, and the faculty is having only one regular lecturer with doctorate degree, and majority of them were holding master's degrees obtained in their own countries or nearby countries, Thailand and Vietnam. Some lecturers were holding Bachelor degrees only. In order to provide high-quality education, I think it is necessary to recruit more educated faculty members and it is necessary to make a good use of ODA cooperation in this area.

In general, it is not easy for government agencies to acquire capable new graduates among the graduates as they tend to be in the private sector rather than in the public sector due to the low salary. It is necessary to approach this issue through both establishing an education policy based on long-term perspective and considering about the better rewarding system for public officers.

5.8 IT market regulation

The IT market in Laos is in its infancy. In the case of large projects such as government projects, domestic procurement is almost impossible due to the overpriced devices and the limited selection of the high-end equipment such as server, firewall, and service router, and the core competitiveness of the local software companies is still below international standards. It is necessary to increase the size of market pie through any feasible methods such as tax incentives

for related IT businesses, support for research and development expenses at the national level, and support for industry-academia cooperation. This will allow foreign major IT companies to enter the market targeting the mature market and will build a competitive landscape which is needed to speed up the development in the country. It is also important to construct a channel to participate in the development through private-public cooperation such as inducing participation of the private sector in the national led project.

5.9 Strategic Stakeholder Engagement

It is more than important for having a solid inter-ministry collaboration to achieve long-term efficacy. To do this, the MPT must actively recognize stakeholders and manage the dynamic inside the structure appropriately to ensure the long-term performance. The MPT need to recognize this as a business function rather than an incidental element and build a system of systematic feedback, reflection based on a preemptive response plan. I think it would be helpful to establish and implement a stakeholder engagement plan so am attaching the proposed plan in the annex.

Chapter 6. Conclusion

6.1 Conclusion

So far, we have looked at the progress of the Lao government's transitioning steps to the e-government system from the initial stage to the present. Beginning in the 1990s, the system has evolved through the provision of a variety of external financial investors, dispatched professionals, and linked training programs. Although it is mentioned in the national economic development plan as a major matter on the premise that it will help achieve the economic development goal, it can be concluded that there are still a lot of deficiencies considering the development status so far, even though the GOL tried hard during the 20 years of continuous marching toward the good e-governance.

While considering the revealed issues from the proposed four periods of the Laotian e-government history, interesting facts would be that it has similar problems that the other developing countries with similar economic and geographic figures suffered for or still dealing with. In the study of Thai digital government by Jackson and Chongthammakun (2011), they mentioned about the issues running through the Thailand government's e-government system such as resource asymmetries, security and privacy, redundancy, interoperability, ownership, and legal restrictions [62]. As discussed in earlier chapter, e-government system of Laos is having the same issues due to the incomplete legal preparation, standards, frameworks, and controlling mechanism in their governing system even though there are minor differences in context.

Thailand, which once suffered from those troubles and stagnated in its digital government development due to the issues, recently announced its transition to the cloud attached public

service system, called as g-cloud, and made a tangible improvement in the international assessment indices, especially in the Waseda index. A positive part of the progress is that they focused on the entire plan and structural preparedness before the implementation this time. And there has been a clear controlling operator for the system, the EGA. This could be a meaningful reference for the GOL and the MPT. Another case that can be a reference for the GOL would be the case of Kazakhstan E-government. Kazakhstan was having a poor digital format governance before and is a landlocked country like Laos. However, they made a surprising jump on their e-government development through the single-entry national platform using a shared central database and the transaction focused strategy [63]. In the 2016 EGDI, Kazakhstan is placed at 33th [11]. This means that the well-driven policy and the framework were effective in their e-government system development as they could continuously increase the ranking in the EGDI from 83th in 2003 to the current place.

The MPT needs to reorganize the e-government center into an organization with strong controlling capacity under a certain, clear legal basis. It is necessary for the e-government center to coordinate the related ministries and collaborate with a wider range of participants. This is essential as a coordination body of this kind of large-scale system. And the center must actively share opinions, feedback, etc., with the civil society, especially academia, in a format that is as open as possible.

I did focus on the empirical study to get the required data for this study due to the limited source of research material and quality reports about the e-government projects in Laos. In the survey, I could not get enough size of respondents and the answer quality was not reaching the expected level, but it does not mean that the result is not holding any value within. It was worthy as a guiding material for the initial draft of interview questionnaire while providing up to date live

information of e-government system awareness and usage in normal daily working environment, from the central offices in Vientiane to the provincial offices of government agencies, and also provided several interesting ideas answering the questions arose from the document review.

And the interviews were meaningful. I could conclude that the expected issues are actually existing at the field. The issues found in the empirical study were described and I suggested feasible recommendation for the GOL based on the proven resolutions from the case of the other developing countries.

In short, and again, the GOL needs the clear, focused, long term sustainable national e-government plan. On top of that, the e-government center is required to be restructured to more powerful handling organization and they need some expert pool for making a fail-safe action plan supporting the national long-term plan. Legal sectors should support them while providing the supportive legal base in timely manners. Education sector needs to establish a quality engineering school for IT education and the IT market in the country needs intensive support from the GOL until they can reach the tipping point. ODA should be used to fill the finance gap for better implementation but their role needs to be a supportive one. In other words, seeing the overall development scene as a complex multisided platform which needs a sensitive controlling would be the way to go for the country.

Overall, I would say that the e-government of Laos is at a very basic stage of its transition to e-governance. However, I am sure that there is a great possibility of growing as well if they can properly research the relevant issues in depth and work on identifying and solving the problems raised in the previous experience. Quicker growth could be possible using the wisdom came from the cases of the other developing countries' trials and practices around the world.

Meaningful progress on the overall participation can be made through encouraging public awareness and promoting public participation in the upcoming national e-government project.

6.2 Limitation

In Laos, there has been no nation-wide informatization project since the last Chinese loan project, and it is the moment when the next project is being planned. At present, number of individual ministry-level projects are building their own systems for their service delivery. It was difficult to find a reliable data source, such as the central government publication/data/statistics, that is needed to grasp the overall situation at present. Moreover, Laos is one of the countries that have not been actively researched, especially in IT sector. Therefore, there was a very limited number of publications about the overall e-government system of Laos at nation level.

The Empirical study was prepared in a short time. Because the overall understanding of the IT among the local staff is generally low, the questionnaire should have provided sufficient preliminary training/information session to explain the concept of the technology, but due to the time constraints, only a general explanation was given to the personnel came for the survey. In the surveying process, there were many employees who did not understand the concept of e-government or groupware itself. For example, among the people who answered as a user of the e-government related software in the office, I could find a lot of subjective/irrelevant answers based on their understanding of e-government programs/policy. For the question of program type, many of them misunderstood the question and wrote the name of the ISP they use, personal internet package name, or just simply wrote general terms such as office, computer, and email.

In addition, there was some level of inconsistency in responses. Some staffs in the same institution replied in very different ways when answering the question of e-government software and groupware.

Moreover, there is a limitation on the quality of the survey results in the perspective of the respondent pool configuration. We tried to conduct the survey with as various hierarchical employees targeting the wider institutions but it was just impossible in that short time.

For the research scope, it was difficult to draw the overall situation covering whole fields and was not easy to say which projects were undertaken by which ministries/departments and the project detail. Because, after the completion of the national plan, the communication among the ministries was not active and most of the programs were not in the domain of cooperative, inter-departmental one. The new datacenters would be a good example telling us the situation.

Nevertheless, this study would have a value as an early attempt to approach the current state of e-government development status in Laos with a broad perspective. While looking back the achievements from the past national/intergovernmental level e-government projects, I tried to deliver somewhat meaningful and applicable implications came from the past.

It is confirmed that the problems that have been seen in other developing countries' informatization have a lot of common aspects in Laos. Therefore, it can be said that it provided some valuable suggestions and transferrable knowledge that could be helpful in the process of infrastructure restructuring, legislative reorganization and national level master plan planning for the country.

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Annex 1.

Interview Questions

Questions for the MPT, E-government center, Data Center staffs

1. What do you think about the development of national e-government plan? Does your organization make the plan? Are there any other cooperative forces around your agency?

2. What's your opinion on the cloud system application?

3. What is the current set up for the network among the major public agencies in VTE? Was there any change in the backbone? Does the MOD line still in operation for the purpose? How the provincial/district offices connect to the offices in VTE?

4. What's the current status of making the national standard regarding the e-government services? Are there national standards for the document and the other file types?

5. What're the major difficulties in the implementation step?

6. Is there ongoing discussion about the framework type? What do you think about the modular type framework, or Spring itself(used in Tax RIS)?

7. There are several national data centers in VTE. Is there any specific reason for choosing the container type DC? What is the plan for securing the interoperability and scalability?

8. What do you think about the level of cooperation among the participants in the national IT projects?

9. What's the major change within the organization, e.g., decision structure, reporting hierarchy, etc., along with the constant reshaping of the ministries till now?

10. What do you think about the IT education system in Laos?

Questions for the other participating ministries

1. What is the role of your office in the current national E-government plan?

2. How often do you use the E-government services now? Describe the type of services. Is the service system connected with the regional offices? What would be the main issue during the daily usage?

3. Describe the infrastructure in your office to connect the services. Are you satisfied with the connection?

4. Does your organization have own groupware or software? How did you make/manage it? If it is available, show me the system.

5. What would be the major concern using the electronic system/transaction for work? Do you think that the transition to e-governance will go smooth?

6. Does your office have an IT department? What is their main role in your office?

7. Tell me about the legal preparation status for the e-government and the other type of electronic transactions in the country. (for MOJ, SC, OSPP only)

Interview schedule

4/3 Tue	4/4 Wed	4/5 Thu	4/6 Fri	4/9 Mon
1. OSPP-IT	1. MPT-E-gov. Center 2. MOHA-IT E-registration	1. SC-IT Dept. 2. OSPP-Finance Dept. 3. MPI-IT Dept.	1. National DC, MOST 2. MOH, Public hospital(Children's hospital, Mahosot)	Canceled UNICEF

Annex 2.

A Proposed Stakeholder Engagement Plan for the MPT

Stakeholders Meeting on the National E-Government Plan of Lao PDR

#/1/201#~#/31/201#

E-Government Center, Ministry of Posts and Telecommunications

CONTEXT

In 2006, the Government of Laos(GOL) made its first national level e-government action plan through the Chinese government's aid project. However, all the major programs from the plan and the deployed infrastructure including the national fiber optics network and the wireless network for rural areas, WiMAX, are no longer in use, partially due to failed stakeholder engagement.

According to the United Nations Department of Economic and Social Affair(UNDESA)'s E-government Development Index(EGDI), the well-known bi-annual index of the global scale e-government evaluation, current status of the nation's e-government system can be described as an initial stage of its development as the system is ranked at 148th of 193. Most of Government-to-Government(G2G) services are still under construction and it would be not easy to find out the cases of Government-to-Citizen(G2C) and Government-to-Business(G2B) in fully interactive format. In this context, extended service categories, such as Citizen-to-Citizen(C2C), Government to Individual as part of the Political process(G2IP), Government to Business as a Citizen(G2BC), are currently not functioning in Laos.

To solve the mentioned issues delaying the steps to e-governance, Ministry of Posts and Telecommunications(MPT), the ministry in charge of e-government development, will establish the second national e-government master plan in September 2018. With the 5-year plan, GOL will implement a better working, more efficient and transparent governance structure. GOL is expecting that the computerized system will bring a fresh innovation in the public sector.

To avoid a recurring failure in the future, MPT will hold a bi-weekly stakeholder meeting on the subject before making the final draft. During the three months of continuous meeting, MPT will try to discuss with the identified stakeholders including line ministries, international organizations, non-governmental organizations, academia, and selected focus groups covering private businesses and citizens.

MPT is expecting that the new plan will make a better efficacy than the former one through the active and sustaining effort on the stakeholder engagement. For the formulation of stakeholder list, we suggest using a modified/simplified typology proposed in the Jennifer Rowley's paper in 2011[1]. Limited stakeholder categories covering only G2G, G2B, and G2C will be used for the engagement plan. According to our proposed engagement plan, MPT will engage with:

[1] Jennifer Rowley. (2011). e-Government stakeholders—Who are they and what do they want?. *International Journal of Information Management*, Volume 31, Issue 1, Pages 53-62.

1. People as service users

2. People as citizens

3. E-government project managers

4. E-government related government agencies

5. Other government agencies-High level officers(Non-IT)

6. Other government agencies-High level officers(IT, Cabinet)

7. Other government agencies-General officers

8. E-government policy makers

9. Businesses-local(IT)

10. Businesses-local(Non-IT)

11. Businesses-foreign(ODA related)

12. Foreign ODA partners-GOs

13. Other foreign GOs

14. NGOs

15. Researchers, Academia

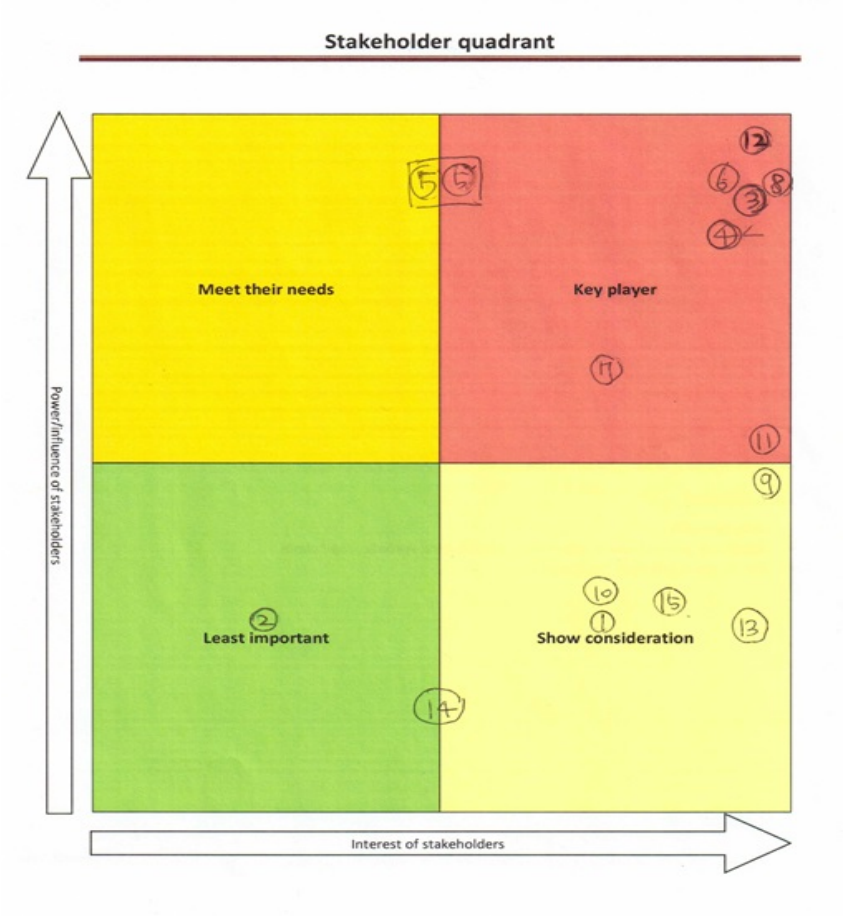
As the main project of the 5-year national development plan, it is a project for the public interest and is a national project based on proven effectiveness in many developing countries. Therefore, the current engagement situation for each group would be generally positive. However, there are many projects that have already been funded through external funding and many projects are already in progress. Considering these, the following group-specific risks can be considered. This will be explained using a more simplified category, a modified one from the categorization by Mete Yildiz[2]: Government, Citizen, and Business. The previous project has already ended a long time ago, more than 10 years ago, and the engagement attempt was very limited, so the previous engage efforts could be regarded as negligible.

Category	Risk	Previous effort
Government	- Balance problem in progress according to institutional resource asymmetry - Existing project effectiveness issues due to differences between the individual project and the MPT framework - equity issues in the allocation of additional budgets	Minimum

[2] Yildiz, M. (2007). E-government Research: Reviewing the literature, limitations and ways forward. *Government Information Quarterly*, 24, 646-655.

	- Complaints about increased workload due to new projects - Problems of rural office feedback	
Citizen	-Information disparity due to the difference in IT environment accessibility	N/A
Business	- Possibility to change existing market terrain when introducing a new system - Question about the possibility of equal participation - Additional response investment due to government service computerization - Consider SMEs based outside major cities	N/A

STAKEHOLDER MAP



(*Refer to the stakeholder list/numbering above)

ENGAGEMENT PROGRAM

OBJECTIVES

The overall objective of this stakeholder engagement plan is making a fitted strategy for effective stakeholder engagement in this specific situation and making a more feasible action plan for the initial phase. Desired outcomes from this plan are:

1. Establish a more effective SHE mechanism
2. Establish natural/self-empowered partnerships - Maximum transparency, strong communication channels
3. Establish a national plan with long-term effectiveness and investment efficiency - Exit from donor-driven strategy. actively reflect needs of each institution

ENGAGEMENT METHODS/EVENTS/TECHNIQUES

We will take a two-track approach. First, we will have an inclusive full-size regular meeting every two weeks at the MPT's main meeting room in Vientiane Capital. All the stakeholder representatives mentioned above will be present at the venue and the MPT and National e-Government Center will present their views as facilitator and principal. Second, we would like to encourage holding functional meetings. As the e-government project covers a very wide range of projects, we concluded that listening opinions from each expert group would be crucial for the successful preparation. By this time, MPT's proposed categories are: General Administration - Public Services, Health, Environment, Economics, Law, R & D /Education. Detail of each category meeting is at its discretion but will be obliged to meet at least once a month and submit reports to the MPT. The MPT representatives are required to participate as main facilitators at each meeting and to designate one representative of each stakeholder in each category as co-facilitator and main liaison.

In addition, as designated by the irregular meeting, awareness raising will be carried out by various designated educational institutions for the national framework and the national document standard to be legislated. We will make sure to open up the public participation channels through the Lao Gazette webpage so that citizens can continue to participate.

After all levels of engagement events, an e-government center representative from the MPT will organize and distribute the results report of the event so that it can be kept in a public document repository for maximum transparency. For the public document repository, we will discuss the detailed deployment method, the connection type, and the security level during the first meeting in June.

KEY MESSAGES/TALKING POINTS

In Laos, there has been no nation-wide informatization project since the last Chinese loan project, and this is the moment when the next project is being planned. At present, a number of individual ministry-level projects are building their own systems for their service delivery. As a ministry in charge of ICT policy and e-governance development of the country, The MPT wants to build a better inclusive action plan and that's the reason for holding this session with a wide range of stakeholders.

MPT expects that the first draft of the new e-government plan will be made in September. And the plan will be the fundamental basis for our effort to better e-governance. This is a very important plan for the

country's 8th national socio-economic development plan which is made for the exit from the Least Developed Countries(LDCs) before 2020.

In the first meeting, the MPT will address the problems from the last project and the discussion will be started from that.

The MPT concluded that we have 10 major issues to be discussed urgently:

1. A scattered development plan- emerging ministry-level applications

2. Urgent need of the legal/technical standard for E-document and E-signature services

3. Low level of technical/administrative cooperation among ministries

4. The need of infrastructure rebuilding, especially the last fiber network managed by the Ministry of Defense(MOD)

5. Weak legal preparation

6. Lack of financial capacity, Donor-driven implementation

7. Lack of human resource-education

8. Lack of public awareness

9. Legacy system utilization

10. Need of a strong control tower for the new project

From now on, we will focus on the top 5 issues in the morning session, and after the lunch break, we will back to the discussion for the rest 5 issues.

MONITORING EVALUATION ADJUSTMENT

The National E-government Center will take responsibility of drafting an annual stakeholder engagement evaluation report, which will be reported to the Prime Minister's Office and will be circulated within stakeholders by the end of the year. This report will examine the level of mutual understanding among stakeholders and aim to adjust the direction of SHE implementation if there is a communication issue. If each stakeholder has a position/role change in the next year's national e-government project implementation, reflect it and adjust the strategy so that effective response is possible.

To enable above, the detailed configuration of evaluation team will be inserted in the national e-government action plan 2018.