Final Report

For the Consulting Services of

Report on Design and Implementation of e-Government (CS-01)

Institutional Capacity Building on ICT Policies in Thailand
Grant No.: TF097929

Submitted to
Office of the Permanent Secretary
Ministry of Information and Communication Technology

By
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Table of Contents

List of Figures

Executive Summary

The Report on Design and Implementation of e-Government has the objective to help the Royal Thai Government to progress along the 'Roadmap for the Advancement of the e-Government for the year 2009 to 2014' by focusing on four key areas to move the development of integrated e-government services and interchanged transaction. The four focused areas are 1) *Interoperability* for sharing of data/information and services across government organizations, helping to achieve integrated services development; 2) *Institutional structures and governance mechanisms* for establishing high-level management oversight and supervision in the implementation of e-government programs; 3) *Innovation in public services* for embedding innovation in the design and delivery of government services including the use of open source, crowd source and community source approaches; and 4) *Radical/frugal reengineering with a view to "doing more with less for more"*, combining better services and lower costs while impacting more people. The additional related tasks including international study visits, workshop arrangements, and recommendations on Thailand's directions for e-government development to align with related directions of the Roadmap for an ASEAN Community (2009-2015) are also conducted and reported.

In achieving the assignment, the methodologies of as-is analysis, best practice benchmarking, and to-be proposal are undertaken. The as-is analysis and best practice benchmarking are conducted to understand the existing situations and problems of e-government development in Thailand and to learn effective implementation of others around the world for proper application to Thailand's cases. Then, the synthesis of findings is done for the future state of e-government development suitable for Thailand context to be consequently proposed.

Interoperability Thailand e-Government Interoperability Framework (TH e-GIF) has been developed since 2006, containing six necessary elements: 1) political will; 2) inter-agency collaboration and social/cultural change; 3) legal power; 4) process agreement; 5) meaning exchange agreement; and 6) technical development, to facilitate "connected government" for delivery of e-government services. In achieving interoperability, Thai government agencies develop their e-government services in four maturity stages: information, interaction, transaction, and connection. The recommendations, including the two business cases of connected e-government for homeland security and for justice process, are proposed for further development. The new Thailand's strategy for e-government integration to develop the country on a sustainable basis has an emphasis on standardizing information links and exchange among government agencies and on information security. Draft data privacy and data sharing policy, supplier management guidelines, project management approach, and channel integration framework for ensuring e-government interoperability are explored and presented.

Institutional structures and governance Thailand has adopted the policy and investment coordination model (led by the Ministry of Finance to enforce policies and priorities through the budget process) in combination with the technical coordination model (led by the Ministry of Information and Communication Technology (MICT) to govern and coordinate e-government activities) to establish the institutional structure to lead the e-government agenda and fulfill the key functions of governance and inter-agency coordination. MICT has established the e-Government Integration and Development Committee as a governance mechanism for management and control of national e-government implementation. The roles of Ministers, Permanent Secretaries, CIOs, Departmental General Directors, Operational Directors, and ICT-related Directors as part of the institutional structures and governance arrangements for promoting e-government are defined. Some selected mechanisms for cross-agency collaboration and collaboration with the private sector, collaboration tools for better management of e-government (i.e. dashboard, National Collaboration Framework), and recommendations on e-government-related capacity building and training are proposed.

Innovation in public services Some government business applications in specific domains have been developed by leveraging open source components and leveraging cloud-based infrastructure for both development and operation (e.g. strategic monitoring system for water management project, EduStore under the One Tablet per Child Project, ICT Care) The website is developed for providing information related to Cloud Computing-based services (http://cloud.ega.or.th/index.php) for government agencies (presently 33 agencies and 58 systems). The responsible government agency (e.g. MICT) has started to pursue "open government" initiatives with a focus on transparency, easy access to public information, and new means for citizen participation. Recommendations on fostering innovation in delivery of public services in Thailand, especially the enabling structure for fostering innovation in public services; approaches on sustaining innovation labs; innovation online public services using crowdsourcing ideas; strategy on use of open source; Open Government Data Initiative, are proposed.

Radical/frugal reengineering with a view to "doing more with less for more" Strategies with recommendations on implementing concepts of radical/frugal re-engineering and radical cost reductions in the investment and use of IT (i.e. ICT spend control; Shared ICT infrastructure program; Centralized ICT procurement; Managing suppliers as a single customer; Making government contracts more accessible to SMEs) are proposed, based on the international practices. In identifying the priority services that demonstrate such concept, the analysis approach of "Resources and Impact Assessment for e-Government Services" is used to assess the amount/value of resources (e.g. time, cost) spent on development of government services against how much impact they set to the general public. The recommendation is then made on the one (s) that uses low resources while impacting widely the economics and society in overall. A list of four priority services to demonstrate the radical re-engineering/IT cost reduction concept is presented.

Assignment Overview

About the Assignment

The Ministry of Information and Communication Technology (MICT) of Thailand has received financial support from the International Bank for Reconstruction and Development (IBRD) toward the cost of Institutional Capacity Building on ICT Policies in Thailand. The purpose of this technical assistance project is to support Thailand's Ministry of ICT by providing actionable advice for developing the ICT sector as a tool for national competitiveness, duly leveraging international best practice in the design of policy initiatives with the objective to create strategies, design policies and implement programs to grow the ICT sector. In this regard, MICT has selected the Institute for Information Technology Innovation (INOVA), which is the ICT research and development institute under the Faculty of Engineering of Kasetsart University, to provide the consulting services, especially on 'Report on Design and Implementation of e-Government', during the assignment period of 17 December 2012 – 13 August 2013.

Scope of Work

The objective of this assignment is to help the Royal Government of Thailand to progress along the 'Roadmap for the Advancement of the e-Government' for the Years 2009 to 2014, by focusing on four key areas that can potentially have game changing impact. Those four areas intended to transform Thailand's government are: 1) *Interoperability* for sharing of data/information and services across government organizations, helping to achieve integrated services development; 2) *Institutional structures and governance mechanisms* for establishing high-level management oversight and supervision in the implementation of e-government programs; 3) *Innovation in public services* for fostering innovation in the delivery of government services in Thailand; and 4) Reengineering with a view to "*doing more with less for more"* for combining better services and lower costs while impacting more people.

Conceptual Framework of the Assignment

The conceptual framework of those four focused areas of the assignment are based on the Roadmap for Advancement of e-Government (2009-2014) aiming to move the development of integrated e-government services and interchanged transaction. In keeping with the Roadmap, the designs of the four areas take into account the development maturity levels of government agencies in terms of e-government services and base on the following procedures for completion:

1. *As-Is Analysis*: The study and analysis of existing e-Government-related work processes are conducted to understand the present work situations, problems, and obstacles and to figure their possible solutions.

2. *Best Practices Benchmarking*: The comparative study with selected success cases in e-Government development around the world is done to learn their effective e-Government implementation for proper application to Thailand's case.

3. *To-Be Proposal*: Upon completion of as-is analysis and best practice benchmarking and also synthesis of findings, the future state of e-Government development suitable for Thailand context is proposed.

Methodologies

To achieve the project objectives of the e-Government study with the focus on the four key areas, the project are operated into four main task clusters plus one cluster of other related tasks. Those tasks have been performed using the approaches and methodologies as follows: desk researches, web site survey (approx. 1,000 Thai government web sites of 303 government units in all 20 ministries during January-March 2013), web links collection, automatic search engine, focus group meeting, and coordination/consultation with foreign experts.

Deliverables

The deliverables of the assignment include an Inception Report, an Interim Report, a Draft Final Report, a Final Report, and conduct of workshops to present the project deliverables, as follows:

- *Inception Report* (by 15 January 2013): Conceptual framework, methodology, and work plan
- *Interim Report* (by 11 April 2013): A study report of existing Thailand e-Government Development and Implementation (in both English and Thai) consisting of sections on Interoperability, Institutional structures and governance, Innovation in public services, and Doing more with less for more
- *Draft Final Report* (by 14 June 2013): A draft consolidated report (in both English and Thai) consisting of sections on Interoperability, Institutional structures and governance, Innovation in public services, and Doing more with less for more; and the travel itinerary for an international study tour for senior officials from the Government of Thailand
- *Final Report* (by 13 August 2013): A consolidated report (in both English and Thai) consisting of sections with recommendation on Interoperability; Institutional structures and governance; Innovation in public services, and Doing more with less for more; and the recommendations on Thailand's directions for the development of e- Government to align with related directions of the Roadmap for an ASEAN Community (2009-2015)

- *Conduct of workshops* to present the deliverables (i.e. Interim Report, Draft Final Report, and Final Report) as a PowerPoint (in both English and Thai) to MICT high-level Executives and to government officials of MICT and other Ministries
- *Publishing of those deliverables* and the workshop presentation on a website arranged by MICT

1 - Inception Report

The 'Inception Report' is the first deliverable under the consulting services of 'Report on Design and Implementation of e-Government', providing a clear way forward for execution of the assignment, particularly of the detailed work during the assignment period. The Inception Report contains the conceptual framework, methodology, and work plan for the assignment.

2 - Interim Report

This 'Interim Report' is the second deliverable of the consulting services of 'Report on Design and Implementation of e-Government', providing the study results of existing e-Government-related work processes in selected foreign countries as the case studies and in Thailand so as to understand the present work situations, problems, and obstacles and to figure their possible solutions.

- *Section 1 Introduction* summarizes the project tasks/activities and results
- *Section 2 Interoperability* presents the study results on existing e-government services and infrastructure in Thailand. The study reveals the current status of e-government online services and infrastructure in Thailand. The assessment has been done based on the principles used in the United Nations e-Government Survey 2012 to allow us to learn its development gaps and how to fulfill citizen-centric e-Services and online-service integration or interoperability in the public services in Thailand. The comparative study describes and compares how connected e-government services have been promoted in many countries through national interoperability and policy frameworks. Thailand e-Government interoperability framework (TH e-GIF) with its actual applications and lessons learn are analyzed and reported in this section.
- *Section 3 Institutional Structures and Governance* reports the e-government institutional structures and governance available in the public sectors of other foreign countries around the world and Thailand. It includes the descriptive roles and responsibilities of government officials and some mechanisms for cross agency collaboration and coordination for effective management and oversight of e-government programs and initiatives in those countries.
- *Section 4 Innovation in Public Services* explores and presents the strategies and approaches of fostering innovation in the delivery of public services in foreign countries. The study has been made specially on how those countries pursue open

government initiatives with a focus on transparency and citizen participation and how they develop government business applications using open source components and cloud-based infrastructure so that we learn more how these developments help to structure an approach to embedding innovation in public services.

- *Section 5 Doing More with Less for More* presents the strategies and implementation concepts of radical re-engineering/reform and radical cost reduction in the use of and investment in IT that have been best practiced in foreign countries. The study reveals that the re-engineering/reform ideas for cost reduction are possible in many areas such as sourcing, e-procurement, ICT data center consolidation especially with cloud computing platforms and e-government integration.
- *Section 6 Other Related Tasks* proposes details of alternative designs of international study visit on e-government for Thai government officials for further consideration and arrangement. The designs have been made through coordination with the representatives of proposed organizations and by desk researches. The status of workshop arrangement is also reported.
- *Appendix A*: *Data of e-Government Online Services in Thailand (January-March 2013)* Surveyed by KU-INOVA

3 - Draft Final Report

The 'Draft Final Report' is the third deliverable of the consulting service of 'Report on Design and Implementation of e-Government', providing the study results of existing e-government –related work of Thailand, especially for some parts that are not achieved yet in the Interim Report. The best practices benchmarking with other selected countries have been made and analyzed to find proper application of effective e-government implementation to Thailand.

- *Section 1 Introduction* summarizes the project tasks and activities and progress.
- *Section 2 Interoperability* reports the analysis of e-services development and e-participation development in Thailand, which have been fulfilled by searching into the Government web sites and analyzing their content components using the principles of UN e-Government Survey 2012. This helps us learn how to fill the gap of public e-services and e-participation development in Thailand. The section presents the topics of draft privacy and data sharing policy to highlight the issues that need consideration when sharing information whether internally (between different departments) or with external organizations based on relevant legislation. The draft supplier management guidelines for ensuring interoperability and the channel integration framework are presented. A consolidated list of reference models and resources available internationally are also provided in this section of the report.
- *Section 3 Institutional Structures and Governance* presents the topics of respective roles of ministers, permanent secretaries, CIOs, departmental director generals,

operational directors, and ICT-related directors for implementation of e-government programs; mechanisms for cross agency collaboration and collaboration with the private sector; collaboration tools/dashboards for management of e-government program; and capacity building and training. Those are mainly based on the study results of desk researches into many report papers of foreign governments such as the U.S. Government and Australian Government. Moreover, this section contains, as well, the Thailand's experience of inter-agency collaboration directly gained from the implementation of the large-scale e-government project, so called National Single Window.

- *Section 4 Innovation in Public Services* presents the topics of enabling structures for fostering innovation in public services; source of funding for innovation in the public sector; approaches on sustaining the Innovation Labs; innovative online public services using crowd sourcing ideas; strategy on use of open source; and Open Government Data Initiative; and some recommendations. Those contents are based on desk researches to learn best practices of other countries.
- *Section 5 Doing More with Less for More* presents the study results of strategy on implementing concepts of radical/frugal re-engineering and radical cost reductions in the use and investment of IT and identify service (s) that could be taken up on priority to demonstrate that concept based on the resources and impact assessment approach. The studies on radical cost reductions have been made through desk researches.
- *Section 6 Other Related Tasks* reports the progress of tasks operation, which are 1) Design of international study visit on e-government; 2) Workshop arrangement; and 3) Recommendations on Thailand's direction for the development of e-government to align with related directions of the Roadmap for an ASEAN Community (2009-2015).
- *Appendix A: Examples of Thailand e-Government Services (January - March 2013)* surveyed by Institute for Information Technology Innovation, Kasetsart University
- *Appendix B: List of Reference Models of e-Government Interoperability Framework*

4 – Final Report

The 'Final Report' is the final deliverable of the consulting service of 'Report on Design and Implementation of e-Government'. It provides the summary of research analysis and findings from the Interim and Draft Final Reports and proposes the recommendations on Interoperability, Institutional structures and governance, Innovation in public services, and Doing more with less for more, and the recommendations on Thailand's directions for the development of e- Government to align with related directions of the Roadmap for an ASEAN Community (2009-2015). It also reports the conduct of two workshops to present the deliverables (i.e. Interim Report, Draft Final Report, and Final Report) as a PowerPoint (in both English and Thai) to MICT high-level Executives and to government officials of MICT and other Ministries. Those deliverables and the workshop presentation are initially

published on a website namely http://goo.gl/R493dx The Final Report contains the following contents:

- *Executive Summary* presents a brief statement of background information, methodology of work and results of the assignment.
- *Assignment Overview* summarizes the execution of the assignment, scope and conceptual framework of the assignment, methodologies, and the final results.
- *Section 1 Interoperability* presents the research analysis and findings of E-Government Interoperability (definition, strategy); E-Government-Related Infrastructure in Thailand (GIN, Cloud Computing Services); E-Government Services in Thailand; Citizen Inclusion and E-Participation in Thailand; Thailand's Business Cases of Interoperability; Thailand E-Government Interoperability Strategy and Framework; Governance Model for Ensuring Interoperability and Data Sharing; Supplier Management Guidelines for Ensuring Interoperability; and Channel Integration Framework. Then, these recommendations are proposed: Recommendations to Advance Thailand E-Government Services; Recommendations for Further Development of Thailand e-Government Interoperability Projects; Recommendations to Advance Thailand E-Participation; Recommendations on Data Privacy and Data Sharing Policy; Recommendations on Project Management for E-Government Interoperability; Recommendations on Supplier Management Guidelines; and Recommendations for Government Service Channel Integration
- *Section 2 Institutional Structures and Governance* presents the research analysis and findings of Existing Thailand's e-government institutional structure; Government mechanism: Establishment of e-Government Integration and Development Committee ; Respective roles of Ministers, Permanent Secretaries, CIOs, Departmental Director Generals, Operational Directors, and ICT-related Directors, for implementation of e-government programs; Effective interagency collaborative platform; Integrated instruments for evaluation and improvement of e-government applications are needed for management of e-government programs (e.g. dashboard, National Collaboration Framework); and E-government capacity building and training programs. The recommendations are made on the following areas: Recommendations on Respective Roles of Ministers, Permanent Secretaries, CIOs, Departmental Director Generals, Operational Directors, and ICT Related Directors for Implementation of E-Government Programs; Recommendations on Mechanisms for Cross-Agency Collaboration and Collaboration with the Private Sector; Recommendations on Collaboration Tools/Dashboards for Better Management of E-Government Program; and Recommendations on Capacity Building and Training for E-Government in Thailand.
- *Section 3 Innovation In Public Services* presents the research analysis and findings of Tendency of innovation public service (cloud-based government services, deploying

mobile technology, user-centric approaches, multichannel services delivery features, Government Sector Outsourcing model, use of open source); Organizations involved in promoting innovation in online public services in Thailand; Encouraging innovation in public service continuously (e.g. supporting the creation and on-going work of some e-government innovation centers and laboratories). The following recommendations are proposed: Recommendations on Enabling Structure for Fostering Innovation in Public Services; Recommendations for Establishing Innovation Labs; Recommendations on Sources of Funding for Innovation in the Public Sector; Recommendations on Strategy for Sustaining Public Innovation; Recommendations for Fostering Innovation in Online Public Services Using Crowd Sourcing Ideas; Recommendations on Use of Open Source; Recommendation on Open Government Initiative.

- *Section 4 Doing More with Less for More* presents the research analysis and findings regarding the Strategies and implementing concepts of radical/frugal re-engineering and radical cost reductions and initiatives taken up by governments in foreign countries; Strategic IT cost reduction; and Priority services demonstrating the concept of radical cost reductions in IT investment and use. The Recommendations on Strategies for Implementing Concepts of Radical Cost Reductions in the Investment and Use of IT in Public Sector and the Recommendations on Identification of Priority Services to Demonstrate the Concept of Radical Cost Reductions in IT Investment and Use are proposed in this section.
- *Section 5 Other Related Tasks* presents the Summary of Proposed International Study Visits; the Conduct of Workshops; the Publishing of project deliverables and presentation on the web site; and the Recommendation on Thailand's Direction for the Development of e-Government to Align with Related Directions of the Roadmap for an ASEAN Community (2009-2015).
- *Appendix A: Summary of the Focus Group Meeting on "Design and Implementation of e- Government in Thailand"*
- *Appendix B: Summary of Comments/Opinions/Selected Recommendations from the Seminar on "Towards SMART Government: Thailand e-Government Readiness Framework"* by Electronic Government Agency (Public Organization) (EGA)
- *Appendix C: Comparative Study of e-Government Interoperability Frameworks*

Section 1. Interoperability

1.1. Summary of Research Analysis and Findings

1) E-Government Interoperability

- Interoperability in the public sector is defined as the ability of government organizations to share and integrate information by using common standards.
- In achieving e-government interoperability strategy, countries are generally motivated to integrate services and information as much as possible. And its achievement is measured, based on the UN E-Government Survey 2012, using some indicators to assess the followings:
    - the degree to which countries have implemented systems that can seamlessly exchange information (*i.e. stages of e-government services development*)
    - how many government websites provide information and services in key government portfolios covering citizens' basic needs
    - the number of government websites linking to the national page or one-stop portal. Such links and one-stop portals enabled by back-office interoperability will offer a single point of entry for citizens and businesses to all relevant government services
- Relevant issues in infrastructure development, promoting design of citizen-centric services, and privacy and security matters are challenges and opportunities of e-government interoperability and integration of various public organizations.
- Citizen inclusion and e-participation engaging citizens as active partners to interact with governments is a trend on e-service provision to contribute to sustainable development. It is being seen in the broader context of innovation and the "co-creation" of services.

2) E-Government-Related Infrastructure in Thailand

a. Government Information Network (GIN) is developed as a national information network for government to connect all public administrative agencies and to enhance online communication and e-services in the government sector. It connects all 20 ministries (about 2,049 offices) electronically and is expanding the connectivity to district administrative agencies in the provinces by 2013.

b. Cloud Computing Service for Government Agency is introduced for use by Electronic Government Agency (EGA) to enable government agencies to optimize available resources and achieve high efficiency. EGA develops the website http://cloud.ega.or.th/index.php to provide information related to cloud computing-base services and arrange

trainings for interested organizations. At present, 33 Government agencies are using cloud computing services

3) E-Government Services in Thailand

With reference to the methodologies used by the U.N. e-Government Survey 2012, KU-INOVA consultant team conducts the survey to explore the online services of 303 government units in all 20 ministries ranging from the ministries, departments, divisions downward to section or unit levels. The survey includes a group of several independent public agencies, state enterprises, and other concerned agencies. The overall average score of e-services development in Thailand is 45%. The formula to mathematically calculate for the percentage of each development stage in each individual ministry is:

$$\%stage_{(2,3,4)} \text{ of } Ministry_A =$$
$$(\%stage_{(2,3,4)} \text{ of } agency_a + \%\ stage_{(2,3,4)} \text{ of } agency_b + \ldots + \%\ stage_{(2,3,4)} \text{ of } agency_n) /$$
$$\text{Number agencies of } Ministry_A$$

The calculation for total e-services value in each individual ministry is based on the following formula:

$$\%\text{Total E-Services Value of } Ministry_A =$$
$$(\%stage_1 \text{ x weighted score } 7\%) + (\%stage_2 \text{ x } 24\%) + (\%stage_3 \text{ x } 30\%) + (\%stage_4 \text{ x } 39\%)$$

Thailand's progress on e-service development based on the four development stages set out by the U.N. are as follows:

***Stage 1 - Emerging Information Services*:** All 20 ministries have achieved full development (100%) of their web sites to provide basic and necessary information as per the U.N.'s guide

***Stage 2 - Enhanced Information Services*:** The progress of web site development by government agencies at stage 2 for delivering simple two-way communication between government and citizen is at the average of 82%. The range of development of all ministries is 52-92%.

***Stage 3 - Transactional Services*:** The progress of web site development by government agencies for providing e-transaction services at stage 3 is at the average of 33%. Some government agencies have no transactional services due to their natures of work with not much direct relation to citizens.

***Stage 4 - Connected Services*:** The progress of web site development by government agencies for providing connected services at stage 4 is at the

average of 22%. The range of development of all ministries is between 6-40%. The survey found that all government agencies have already had at least one cross-agency interoperability system in place. However, it is quite evident that the overall public services are not citizen-centric yet. Some government agencies implement their internal interoperability systems specifically applicable for their scope of work only.

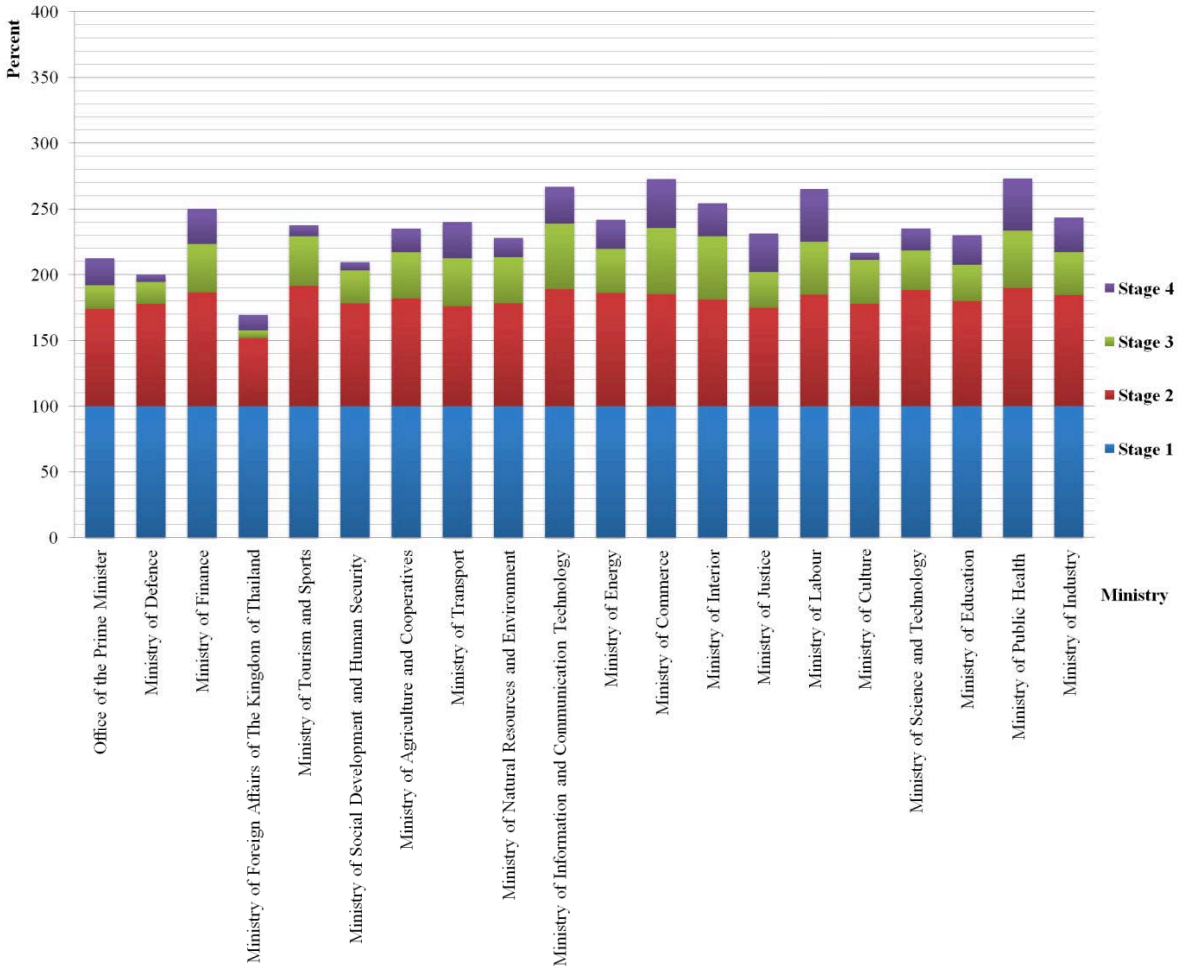


Figure 1-1: E-Government Services Development in Thailand (January-March 2013)

Thailand e-Government Portal[1] has been developed to offer one-stop e-services to the public. The system serves as an efficient tool for the government to communicate with various government agencies, the business sector and the general public. There are presently 25 systems of government agencies linked to the e-Government Portal through the single sign-on system to enhance e-services.

[1] www.egov.go.th

4) Citizen Inclusion and E-Participation in Thailand

The Thai Government has adopted citizen inclusion/e-participation as a key in providing citizen-centric services and tried many ways to improve it to the maximal level. Thailand's progress on implementation of e-participation based on the U.N.'s three levels of e-participation is as follows:

Level 1 - E-Information: The government websites contains these information: government structure 100%; policies & programs 100%; points of contact and e-mail lists 89%; laws/regulations/other information of public interest 100%; community networks 59%; blogs & web forums & newsgroup 61%

Level 2 - E-Consultation: The government websites activate the followings: online polls and online surveys or feedback forms 49%; chat rooms/instant messaging/blogs 61%.

Level 3 - E-Decision Making: The government websites use these tools for people engagement in decision making processes: government officials responding to citizen input 45% and online petition 90%.

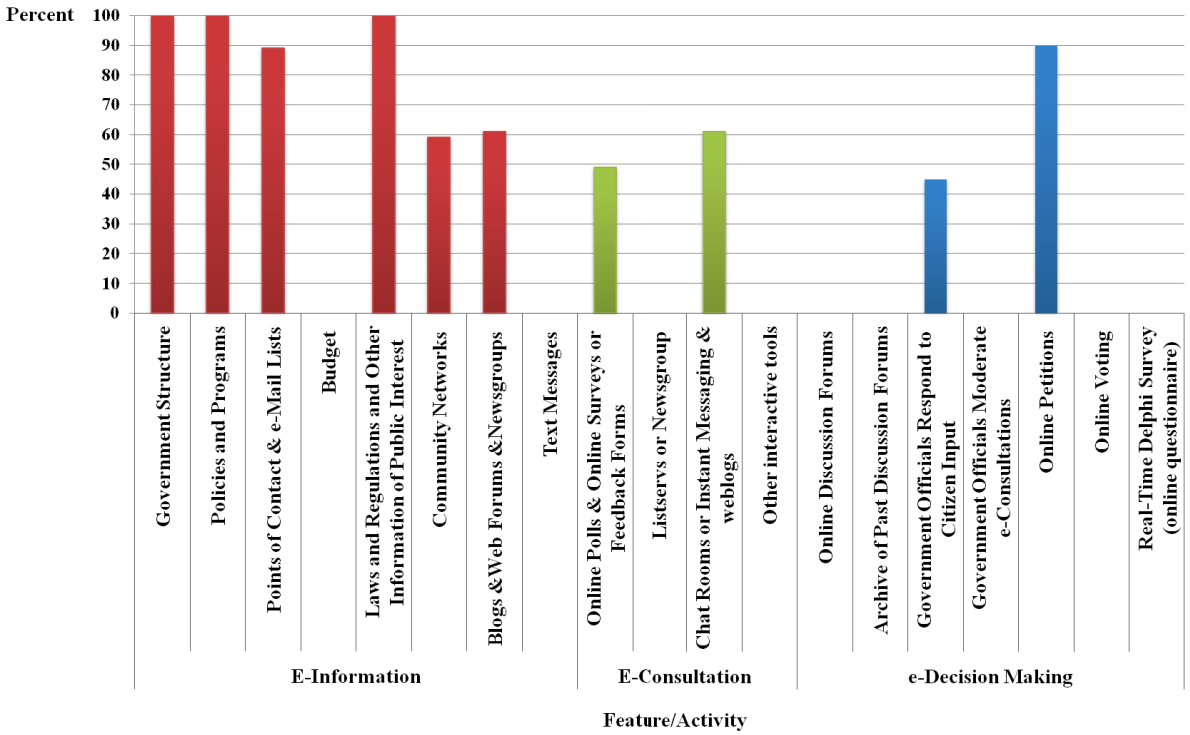


Figure 1-2: E-Participation Development in Thailand (January-March 2013)

5) Thailand's Business Cases of Interoperability

a. ***Existing and Ongoing Cases***

- ***Thailand National Single Window (TH-NSW)*** has been developed to facilitate trade transaction and streamline import and export processes with

estimated logistic cost savings of 1.5 billion USD/year. The project has involved 36 government agencies for implementation.

- ***Agriculture Disaster Relief Information System (Aggie DRIS)*** has been developed to enable data interoperability of 7 public agencies to streamline the process for suffering farmers to receive financial assistance from the government more speedily and precisely.
- ***e-Saraban or e-Document*** has been developed as the government information and document exchange system for the benefits of time and cost reduction.
- ***E-Filing for Tax Payment Service*** is initiated by the Revenue Department, Ministry of Finance, for citizens to pay taxes via their mobile phones or smart phones well-equipped with application without cost.
- ***National Research Indexing Hub*** is an activity under the National Research Council of Thailand to promote integration of national research information to enhance research data interoperability across agencies in accordance with TH e-GIF strategic agenda and public opinions on research system reform.

b. ***Cases for Further Development***: The two projects/scenarios of e-government interoperability proposed for further development to achieve connected e-government services are especially the followings:
   - ***Connected e-Government for Homeland Security*** - to improve government operations for the homeland security, especially those related to the unrest in the three southern border provinces (Pattani, Yala and Narathiwat).
   - ***Connected e-Government for Justice Process -*** to improve the justice operations, e.g. those processes and information flow related to notification to the policies, recordings of criminal cases, information gathering for primary investigation, consideration and the issues of prosecution orders by prosecutors, and court investigation.

6) Thailand E-Government Interoperability Strategy and Framework

- Many countries are moving toward an integrated unified whole-of-government model aimed at centralizing the entry point of service delivery to single portal where citizens can access all government-supplied services, regardless of which government authority provides them. Thailand has adopted the e-government interoperability model based on goals and levels of interoperability as follows for development:
  - Technical Interoperability for *data exchange*
  - Semantic Interoperability for *meaning exchange*
  - Organizational Interoperability for the goal of *process agreement*

- *Thailand e-Government Interoperability Framework (TH e-GIF)* has been developed since 2006. It contains all elements necessary for effective development and implementation of e-government interoperability system to provide efficient and effective public service delivery. Those six elements of TH e-GIF are: 1) Political Will; 2) Inter-Agency Collaboration and Social/Cultural Change; 3) Legal Power; 4) Process Agreement; 5) Meaning Exchange Agreement; and 6) Technical Development
- The legal, political, and socio-cultural factors are considered as influencing factors for Thailand's e-government interoperability development.
- Thailand's E-Government Interoperability Roadmap
    - Phase 1 by the year 2010: Connected Government (C-Government) that links government agencies in providing e-services
    - Phase 2-3 by the year 2011-2012: Mobile Government (m-Government) that links government agencies through mobile phones and other mobile computing devices in providing e-services
    - Phase 4 by the year 2013: Ubiquitous Government (u-Government) that links government agencies through multiple channels in providing e-services at any time (a 24x7 service)
    - Phase 5 by the year 2016: Transformed Government (T-Government) that links government agencies in providing e-government services as a one-stop service through an integrated back office for about 200 government agencies
- A new strategy for e-government integration has been recently approved in June 2013 by the Thai Cabinet to develop the country on a sustainable basis through the use of information technology. The strategy has an emphasis on standardizing information links and exchange among government agencies and on information security. Ministry of Information and Communication Technology (MICT) was assigned as the core agency in implementing this strategy. The strategy for e-government integration seeks to develop both ICT network infrastructure and information infrastructure in order to reduce duplication of work and investment in ICT development by various government agencies. It will also develop e-government services in the form of integrated e-services. The G-Cloud system has been developed to increase the efficiency in ICT management and the Government Information Network.

7) Governance Model for Ensuring Interoperability and Data Sharing

The governance model based on a project management principle that divides a project into 5 phases is the suggested reference model mostly accepted by government agencies in Thailand:

Phase 1 - Inception Phase: to conduct a preliminary study on the possibility, business cases and benefits of the connected e-government scenarios of interest. In general, this inception or initial feasibility study may be requested by the policy decision makers, by some national policy strategy, public sentiments, or public problems.

Phase 2 - Elaboration Phase: to conduct detailed analysis and design of the proposed connected e-government information system. The project management steering board must commission and support this detailed feasibility study and design to a working team which could be a consulting team but working closely with key representatives of stakeholders and agencies directly relevant to the project. The study should revisit and obtain the political agreement on the scope of the study, and at least general ideas on the framework, possible source of budget, risks and any time constraints for the whole development.

Phase 3 - Planning Phase: to develop the master development plans and also action plans such that the designed conditions and all to-be architectures should be decomposed into sub projects, tasks, schedules with timelines, more detailed estimated budget, and any other management concerns. The overall master plan and action plans shall be used as a mechanism to coordinate the work, guide and monitor the implementation progress of the project.

Phase 4 - Implementation Phase: to develop the IT systems, capacity building, interagency collaboration and coordination, and change management. This phase should contain mechanism of effective coordination with the contractor, monitoring mechanism and provision for project progress tracking and management of any project issues.

Phase 5 - Adoption Phase: to have the target users both internally and externally deploy the system. Awareness creation and training should be provided to the public at large. This phase requires a lot of change management at the organization level and user levels. The adjustments of regulation and operations should be established, announced and enforced. The requirements depend also on time, resources and continuous future supports. The analysis, deployment and adoption may concern with again all the ten critical components.

8) Supplier Management Guidelines for Ensuring Interoperability

Ministry of Information and Communication Technology takes initiative to develop the supplier management guidelines to be used as a reference of government agencies when outsourcing external organizations to operate IT and

e-government interoperability projects. The guidelines are based on the standards of Capability Maturity Model Integration (CMMI) and ISO 29110 Part5 (Systems and Software Life Cycle Profiles and Guidelines for Very Small Entities).

9) Channel Integration Framework

The Royal Thai Government has continuously improved infrastructure access for the general public nationwide so that it can exploit all possible delivery channels to provide services/e-services and information to as many people as possible, particularly the disadvantaged and vulnerable groups. The e-service provision through multi-channels is expected to respond to diverse needs and demands of citizens. The Government of Thailand has initiated the projects to enhance public access to government services through many channels such as ICT Community Learning Center, Universal Service Obligation (USO), SchoolNet Thailand, University Network (UniNet), One Tablet Per Child (OTPC), Wi-Fi Network for OTPC, e-filing system for tax payment via mobile phone, traffic voice information service via mobile phone, Thailand Government hot line service, smart province, etc.

1.2. Recommendations for Ensuring Interoperability across the Government

1.2.1. *Recommendations to Advance Thailand E-Government Services*

1) It is recommended that government agencies develop and implement e-government services systems in four stages (Emerging Information Services; Enhanced Information Services; Online Transactional Services; and Connected Services) to ultimately reach the degree of seamless information and transaction exchange for e-government interoperability.
2) For *Stage 1 - Emerging Information Services*, all government agencies must put the policy and adequate resources in place to continuously sustain their websites with updated and useful information and services to the citizen and business users.
3) For *Stage 2 - Enhanced Information Services*, all government agencies which haven't provided any one way or simple two-way e-communication should improve their services as follows:
   - *Downloadable forms*: The policy decision maker(s) of the agencies should provide resources and mandate their staffs to provide any application forms to be electronically downloadable, especially those forms that are needed by the citizens and business entities to interact with the agencies.
   - *Audio and video:* Government agencies must provide audio and video information on their web sites for conveying the messages about their the organizations and their work, their service procedures and regulation, and knowledge or news about some specific areas.

- *Multi-lingual website:* All government agencies should continuously update the information on their websites, and must provide more than one language, i.e. Thai and English. English information and services should be provided online due to many reasons including the ASEAN Economic Community (AEC) agreement 2015.
- *Interaction with citizen:* All government agencies should promote other communication channels that seen as appropriate to organizational contexts, e.g. social media and online newsgroups as well as sending text messages through mobile phones and smart phone applications (so called M-Government, or Mobile Government online services).

4) For *Stage 3 - Online Transactional Services*, all government agencies which haven't provided any electronic transaction and services online should provide their services with the citizens (if any) with electronic application submissions and transactions (such as polls/online voting, online-application submission, fee payment e-services, status e-monitoring, online transaction and electronic document approvals, etc.). However, development of those public online services requires continuous support from the highest policy decision makers as possible as the mandate by the Government Cabinet.
5) For *Stage 4 - Connected Services*, Ministry of Information and Communication Technology (MICT) should spearhead and collaborate with relevant agencies to develop connected e-government services especially the followings:
   - *Connected e-government for homeland security*: Relevant agencies are e.g. Ministry of ICT, Internal Security Operations Command (ISOC), Ministry of Transport (Department of Land Transport), Ministry of Defense, and The Royal Thai Police.
   - *Connected e-government for justice process*: Relevant agencies are e.g. The Royal Thai Police, Department of Special Investigation, Office of the Attorney General, Courts, Department of Probation, Department of Juvenile Observation and Protection, and Department of Corrections.
   - *One-stop online services for health services*: Relevant agencies are e.g. Ministry of Public Health, Ministry of Social Development and Human Security.
   - *One-stop online services for businesses*: Relevant agencies are e.g. Revenue Department, Department of Business Development, Ministry of Commerce, Social Security Office, Ministry of Labour, Customs Department, Ministry of Finance, Ministry of Industry, etc.
   - *One-stop online services for daily livings of citizens* in mobile applications or portal platform: Relevant agencies are e.g. Ministry of Transport and Ministry of Interior.

1.2.2. *Recommendations for Further Development of Thailand e-Government Interoperability Projects*

1) It is recommended that high-level policy decision makers promote and support the two sectors of connected e-government services with interoperability features for further development as they are the foundation of any country, particularly for Thailand at the current situation. Those two sectors include one in the national security area and, the other one, the justice-related sectors. The connected e-government services for those two sectors should be seriously considered and mandated for actual implementation.
2) It is recommended that MICT takes a role with Internal Security Operations Command (ISOC) to lead the development of a collaboration and information exchange platform to improve government operations for the homeland security, especially those related to the unrest in the three southern border provinces (Pattani, Yala and Narathiwat, and four districts of Song Khla which are Jana, Na Thawi, Tepa and Saba Yoi districts. The "*Connected e-Government for Homeland Security*" Project based on TH e-GIF guideline and an information exchange platform so called "National Security Single Window (NSSW)" system, which includes, at least, the following supporting tools and technologies, is proposed for development to improve government operations.
    - Optical Character Recognition (OCR) for recognizing vehicle licenses from images
    - Radio-Frequency Identification (RFID) tags for vehicle identification
    - Citizen/ identification card readers
    - Efficient and Intelligent Search Engine System
    - Finger print reading and checking
3) It is recommended that MICT takes a role to lead the development of a collaboration and information exchange platform to improve the justice operations, e.g. those processes and information flow related to notification to the polices, recordings of criminal cases, information gathering for primary investigation, consideration and the issues of prosecution orders by prosecutors, and court investigation. The "*Connected e-Government for Justice Process*" Project based on TH e-GIF guideline and an information and transaction exchange platform so called "Justice Single Window (JSW)" to improve government operations among different justice-related agencies is proposed for development.

1.2.3. *Recommendations to Advance Thailand E-Participation*

1) It is recommended that government agencies implement e-participation system in 3 levels (e-Information; e-Consultation; and e-Decision Making) to provide citizen-centric services.
2) For *Level 1 - e-Information*,
   - the Government should develop a central or portal web site enabling public access to e-services and also develop interactive tools to enhance public e-participation.
   - Ministry of ICT should engage actively and provide information with the U.N. e-Government Survey directly to be able to supply correct and full information for their questionnaires so they can receive the accurate and full information for their assessment.
3) For *Level 2 - e-Consultation,*
   - all agencies should improve interactive tools (e.g. online polls, online surveys or feedback forms and web blogs, chat rooms or instant messaging and social media/facebook), and
   - these agencies should allocate sufficient resources on both people and budgets for implementation.
4) For *Level 3 - e-Decision Making*,
   - all government agencies shall allow the citizen to engage in the process of policy and decision making through such channels as online voting/election and online discussion forums.
   - all government agencies should develop interactive tools (e.g. online voting/online election tools, online discussion forums) to enable public e-participation in e-decision making on public/government policies.
   - Office of the Election Commission of Thailand, Ministry of Information and Communication Technology should prepare an online election project for the Bangkok governor election for the next term.

1.2.4. *Recommendation on Data Privacy and Data Sharing Policy*

All government agencies must establish and maintain personal data protection policy and procedures with reference on the policies and practices of government agencies for personal information protection B.E. 2553 (2010)[2], and provide adequate resources to compile with that policy and procedures.

1.2.5. *Recommendations on Project Management for E-Government Interoperability*

1) All Government agencies with any large scale e-Government Project (e.g. more than 10 million baths) especially Connected e-Government must

[2] http://www.etda.or.th/etda_website/app/webroot/files/1/files/12.pdf

conduct the "enterprise architecture design" project before the "implementation" project.

2) Government agencies should follow the 5-phase project management approach, as follows:

- ***Phase 1 - Inception Phase:*** to conduct a preliminary study on the possibility, business cases and benefits of the connected e-government scenarios of interest. In general, this inception or initial feasibility study may be requested by the policy decision makers, by some national policy strategy, public sentiments, or public problems.

- ***Phase 2 - Elaboration Phase:*** to conduct detailed analysis and design of the proposed connected e-government information system. The project management steering board must commission and support this detailed feasibility study and design to a working team which could be a consulting team but working closely with key representatives of stakeholders and agencies directly relevant to the project. The study should revisit and obtain the political agreement on the scope of the study, and at least general ideas on the framework, possible source of budget, risks and any time constraints for the whole development.

- ***Phase 3 - Planning Phase:*** to develop the master development plans and also action plans such that the designed conditions and all to-be architectures should be decomposed into sub projects, tasks, schedules with timelines, more detailed estimated budget, and any other management concerns. The overall master plan and action plans shall be used as a mechanism to coordinate the work, guide and monitor the implementation progress of the project.

- ***Phase 4 - Implementation Phase:*** to develop the IT systems, capacity building, interagency collaboration and coordination, and change management. This phase should contain mechanism of effective coordination with the contractor, monitoring mechanism and provision for project progress tracking and management of any project issues.

- ***Phase 5 - Adoption Phase:*** to drive the target users both internally and externally to deploy the system. Awareness creation and training should be provided to the public at large. This phase requires a lot of change management at the organization level and user levels. The adjustments of regulation and operations should be established, announced and enforced. The requirements depend also on time, resources and continuous future supports. The analysis, deployment and adoption may concern with again all the ten critical components.

3) During each of the 5 phases of e-government project management, the following 10 critical success components for connected and interoperable e-government development must be addressed:
   - Component 1 Stakeholders' Requirements Management
   - Component 2 Vision Articulation for E-Government Interoperability
   - Component 3 Stakeholders Collaboration
   - Component 4 Design of Business Architecture
   - Component 5 Design of Data Architecture
   - Component 6 Design of Application Architecture
   - Component 7 Technical Interoperability and Standards
   - Component 8 Legal Infrastructure
   - Component 9 Finance and Governance
   - Component 10 IT Infrastructure and Solutions
4) Government agencies should manage e-government projects in the framework of development of an international standard by considering the organizational business processes and regulatory mechanisms using the principles of Enterprise Architecture.

1.2.6. *Recommendations on Supplier Management Guidelines*

1) It is recommended that government agencies use the supplier management guidelines, developed by MICT based on the standards of Capability Maturity Model Integration (CMMI) and ISO 29110 Part5 (Systems and Software Life Cycle Profiles and Guidelines for Very Small Entities), as a reference to undertake outsourcing of external organizations to operate IT and e-government interoperability projects.
2) Government agencies should use the supplier management guidelines as a reference to operate IT and e-government interoperability projects, in particular for phase 4 of the 5-phase project management approach.

1.2.7. *Recommendations for Government Service Channel Integration*

1) Government agencies that have already operated their information websites should improve their websites with the options for presenting some of their important information suitable for smart mobile phones or internet-accessible mobile devices.
2) Ministry of Information and Communication Technology should expand the nation-wide network infrastructure and Free Wi-Fi access points to cover areas that are significant to most citizens, e.g. internet free Wi-Fi within all train and bus stations around the country, government building and service areas for citizens, hospital and public areas across the country. This is to increase chances and access channels to access into government service any time and ways as many areas as possible.

3) Government agencies should collect statistics related to online usages and services for further analysis and improvement and create database for citizen services improvement to provide information and certain statistics for improvement suggestions, e.g., history of types and frequency of services. This information could help suggesting continuous refinement, improvement and change of the services.
4) Ministry of Information and Communication Technology and all relevant government agencies should mandate and provide resource support for creating more electronic transaction services accessible through smart mobile phones, e.g., electronic form filling, online status tracking, and online approvals.
5) Ministry of Information and Communication Technology and concerned agency should develop, guide and publish security user guidelines and manuals. There are some certain good and bad practices that citizens should be aware of, e.g., the users should not record any of their passwords within their mobile phones.
6) Ministry of Information and Communication Technology and relevant agencies should invest and established telecommunication infrastructure and ICT access points to bridge the digital divide gap, e.g. those in the rural areas, those with disables and senior people. More "physical/hardware" ICT community centers to cover all last kilometers, e.g. in the remote areas, should be invested along with any projects to support and implement more "software/content/e-services" suitable for the community, disables, seniors, farmers, or people in the rural areas.

Section 2. Institutional Structures and Governance

2.1. Summary of Research Analysis and Findings

1) The *existing Thailand's e-government institutional structure* is found to base on the policy and investment coordination model led by the Ministry of Finance to enforce policies and priorities through the budget process with decentralization of implementation, and also the technical coordination model led by the Ministry of Information and Communication Technology (MICT) to govern and coordinate e-government activities, with the establishment of Government CIO in all ministries.
2) MICT has taken the lead to develop *governance mechanisms* to establish the high-level management control and supervision in the implementation of e-government programs and for cross-agency collaboration and coordination with the private sector. The mechanism is the establishment of an Inter-agency Committee for management and control.
3) The *e-Government Integration and Development Committee* was established by MICT in 2011 to be responsible for directing the e-government implementation and integration and for controlling and supervising e-government management. The Committee is chaired by the Minister of MICT. The compositions of the Committee are 12 CIOs from 12 government agencies, 2 representatives from Electronic Transactions Development Agency (Public Organization), and Electronic Government Agency (Public Organization), 2 representatives from E-Government Promotion and Development Bureau under the Office of the Permanent Secretary of MICT, and 3 experts of computer and IT from outside agencies.
4) *Respective roles of ministers, permanent secretaries, CIOs, departmental director generals, operational directors, and ICT-related directors for implementation of e-government programs* are not particularly and clearly defined. They are mostly adapted and extended based on the existing roles of those positions but are applied properly to suit specific mandates of each ministries and departments, as well as their e-government priorities, objectives and requirements.
5) The cross-agency nature of the e-government implementation requires extensive engagement of stakeholders from both public and private sectors. Effective coordination of stakeholders is a key precondition for successful e-government implementation. Factors that are critical to ensure the *effectiveness of the interagency collaborative platform* include perception of collective needs for the common good; official mandate and legitimacy; formal and informal communication; hiring a third-party professional as one of the collaboration driving forces; use of standards and communication-enabled technology to support collaboration and information exchange and sharing; and establishment of a lead

agency, membership, effective interagency collaborative platform and participation of the business community.

6) *Integrated instruments for evaluation and improvement of e-government applications are needed for management of e-government programs*. A dashboard becomes an effective and efficient electronic instrument for it. A conceptual framework of e-government dashboard helps to form the overall structure in which the data of the dashboard are embedded. Dashboards provide an instant view of organization's performance metrics on selected dimensions. They are used to monitor internal organizational performance and management and also make available performance information to the public for transparency and accountability.

7) In addition to the dashboards, a National Collaboration Framework (NCF) is the other agreement-making mechanism for collaborative service delivery within and across jurisdictions typically using a memorandum of understanding for e-government management. It provides a tiered approach for agencies to follow when seeking to collaborate and reduces costs, time and risk associated with program or project development and delivery. The focus of the NCF is on collaboration within and between government at all levels for projects.

8) The major challenge that remains to be addressed *in e-government capacity building and training* endeavors is the determination of who required training and establishment of what content must be delivered to which group and with what workload. Designing e-government capacity building and training programs and models needs to take into account the diversity of hierarchical and professional profiles within public administration.

2.2. Recommendations for Effective Management Oversight and Coordination of E-Government Programs and Initiatives

2.2.1. *Recommendations on Respective Roles of Ministers, Permanent Secretaries, CIOs, Departmental Director Generals, Operational Directors, and ICT-Related Directors for Implementation of E-Government Programs*

The roles of these positions for e-government implementation should be adapted and extended based on the existing duties of each position, taking into account the e-government nature. The roles are necessarily defined based on the e-government characteristics and scope of work, which are mainly interconnection, integration, innovation, coordination and collaboration, in complement with regular portfolio and roles of each specific position. For effective use, the defined roles shall be applied properly to suit specific mandates of each ministry and department, as well as their e-government priorities, objectives and requirements.

2.2.1.1. *Recommended Roles of Ministers*

1) Direct and approve e-government policies and strategies of their ministries
2) Direct and approve e-government priorities, objectives, and requirements of their ministries
3) Promote the significance of e-government and innovations for social and economic development of the country

2.2.1.2. *Recommended Roles of Permanent Secretaries*

1) Manage to ensure the achievement of e-government policies and strategies for efficiency of e-government services delivery and administration
2) Drive the e-government agenda across their ministries
3) Approve e-government implementation plans of their ministries
4) Drive and oversee e-governance
5) Provide high-level advice on innovation in e-government services

2.2.1.3. *Recommended Roles of CIOs*[3]

1) Involve in e-government policy and strategy formulation
2) Provide advice and assistance on e-government management
3) Promote effective and efficient design and operation of all major e-government processes for ministries
4) Oversee and support interagency partnerships and innovation in implementing e-government
5) Involve and direct the activities of the CIO Council
6) Provide consultancy and direction on ICT innovation for online services development
7) Approve the ICT investments
8) Identify opportunities for joint and government-wide ICT projects with other agencies
9) Promote and institutionalize enterprise architecture capability within their ministries
10) Oversee specific IT reform initiatives and activities

[3]Thailand's e-government has two levels of CIOs. One is assigned to Deputy Permanent Secretaries as CIOs at the ministerial level while the other is assigned to Deputy Director General of Departments (or Vice President of State Enterprises) as CIOs at the departmental level. However, their scope of work is rather similar.

2.2.1.4. *Recommended Roles of Departmental Director Generals*

1) Direct the development of e-government implementation plans for effectiveness and efficiency of e-government services delivery and administration
2) Strategically manage and evaluate e-government implementation to ensure its alignment with organizational goals and priorities
3) Create aligned and uniform institutional mechanisms for supervision
4) Strategically oversee e-government security policy, standards, and contingency plans for critical national infrastructures
5) Strategically monitor major e-government projects and give advice on major investment decisions
6) Mandate the roles and responsibilities of ministerial staff with respect to e-government
7) Establish effective coordination and collaboration among ministerial staff both within and across ministries
8) Assign adequate resources on capacity building and training for effective e-government implementation

2.2.1.5. *Recommended Roles of Operational Directors*

1) Provide advice and guidance for effective implementation of e-government (based on specific mandates of specific departments)
2) Facilitate implementation of all e-government aspects
3) Address issues of e-government integration/ interoperability with other levels of management
4) Manage to deliver citizen-centric online services
5) Identify and communicate key trends, opportunities, threats and risks of e-government
6) Manage top-level relationship with strategic suppliers to their ministries
7) Participate actively in the planning, coordination, collaboration, and implementation of e-government, including the use of new technologies
8) Promote best practices of e-government across departments
9) Establish collaborative relationships (both internal and external relationships)

2.2.1.6. *Respective Roles of ICT-Related Directors*

1) Manage necessary information and communication technology and infrastructures significant to the success of e-government systems and implementation
2) Lead and monitor implementation of ICT/e-government standards, including common standards for interconnectivity and interoperability, categorization of government electronic information, and computer system efficiency and security
3) Leverage enterprise architecture as the enabler of continual transformation
4) Lead IT reform initiatives and activities relating to:
    a. budget planning and investment control for IT
    b. development of enterprise architectures
    c. information security
    d. privacy
    e. access to, dissemination and preservation of government information
    f. accessibility of ICT for persons with disabilities
5) Establish collaborative relationships (both internal and external relationships)

2.2.2. *Recommendations on Mechanisms for Cross-Agency Collaboration and Collaboration with the Private Sector*

1) Government agencies should use these selected mechanisms to facilitate cross-agency collaboration among government agencies and with the private sector:
    a. Establish collaboration structures within the Ministries (permanent or temporary groups e.g. task forces, commissions, committees, working groups)
    b. Formulate national collaboration strategies and initiatives as a broad framework for addressing issues in a national scope
    c. Designate leadership to be accountable for an interagency initiative requiring efforts of different agencies
    d. Create a special interagency office with responsibility to cover a policy area that crosses a number of separate agencies
    e. Sign an interagency agreements or Memorandum of Understanding for cross-agency collaboration
    f. Use collaboration technologies or tools (e.g. shared databases and web portals to facilitate collaboration)
2) Government agencies should use the following framework to establish a linkage team as a platform for interagency collaboration:

a. (Stakeholders) perceiving needs and climate for interagency partnership
b. Identifying stakeholders for the linkage team
c. Forming a cross-agency team
d. Establishing a collaborative relationship to be enhanced by
    i. regular contact through purposeful meetings
    ii. frequent communications through phones and e-mails
    iii. a client-centered focus
e. Designating a lead agency that helps develop and maintain a shared vision and to be accountable for an initiative

3) Government agencies should undertake these key practices to enhance and sustain cross-agency collaboration:
    a. Define and articulate a common outcome
    b. Establish mutually reinforcing or joint strategies
    c. Identify and address needs by leveraging resources
    d. Agree mutually on roles and responsibilities
    e. Establish compatible policies, procedures, and other means to operate across agency boundaries
    f. Develop mechanisms to monitor, evaluate, and report on the results
    g. Reinforce agency accountability for collaborative efforts
    h. Reinforce individual accountability for collaborative efforts
4) Government agencies should take into account the following critical factors to ensure the effectiveness of the interagency collaborative platform:
    a. Collective needs for the common good: *The perceived needs for a project represent the collective action that is conducted on behalf of collective needs for the common good*.
    b. Official mandate and legitimacy: *At the strategic level, high-level policymakers could use their authorities to establish, legitimize, and guide collaborative alliances. Mandate designation is used as means to identify and induce stakeholders to collaborate.*
    c. Formal and informal aspects of communication: *Through formal and informal communications, stakeholders learn about mandate and benefits of the project that will help to increase their motivation to participate.*
    d. Expert/Consultant as one of the collaboration driving forces: *The diplomatic quality of a lead consultant is another critical factor that help enlist commitment and participation from independent agencies.*
    e. Use of standards and communication-enabled technology in collaboration: *The use of standards and technology as a medium to communicate with relevant stakeholders to ensure accuracy and*

completeness of the information will ease negotiation processes and enable agencies to rationalize requirements from stakeholders.

f. Stakeholder collaborative platform establishment: *A lead agency, inclusive participation and effective interagency collaborative platform and participation of the business community is essential.*

2.2.3. *Recommendations on Collaboration Tools/Dashboards for Better Management of E-Government Program*

1) It is recommended that an integrated instrument for evaluation and improvement of the performance of e-government applications is developed to be used for managing an e-government program.
2) Dashboard (application) should be developed and introduced for use to follow up the progress of ICT projects and e-government implementation, based on Departmental Operation Center (DOC), Ministry Operation Center (MOC) and Prime Minister Operation Center (PMOC) respectively.
3) MICT should develop a dashboard for monitoring the progress of Thailand's e-government implementation.
4) National Economic and Social Development Board and MICT should jointly lead the development and use of National Collaboration Framework (NCF) for management of e-government program in Thailand.

2.2.4. *Recommendations on Capacity Building and Training for E-Government in Thailand*

1) Government agencies need to take into account the diversity of specific hierarchical and professional profiles within public administration for establishing an e-government-related capacity building and training program.
2) Government agencies need to link all aspects involved in e-government training efforts to make a single integrated framework.
3) The training scope needs to cover both technical and managerial issues (e.g. organizational design, change management, process management, project management, citizen/customer relationship management, knowledge management, negotiation, legal and context-based issues, and context analysis).

Section 3. Innovation in Public Services

3.1. Summary of Research Analysis and Findings

1) Innovation public services in several countries have the tendency of *cloud-based government services, deploying mobile technology* for bridging the digital divide to access public services. They have reoriented their public sector governance systems towards *user-centric approaches* visible on their websites through *multichannel services delivery features*. Process improvement to combines the use of technology with technical expertise in *Government Sector Outsourcing model* and strategies to support the *use of open source* development projects and government agencies, including using crowdsourcing ideas to develop solutions or government services.
2) There are many organizations involved in the promoting innovation in online public in Thailand. They are responsible for driving and promoting e-government development in various fields. Such as providing national ICT infrastructures, formulating Thailand Electronic Government Interoperability Frameworks (TH e-GIF), driving the implementation of electronic government activities, encouraging the implementation of public online services and electronic transaction services, coordinating, networking, fostering, partnering different organization and driving towards an increasingly competitive economy.
3) To encourage innovation in public service continuously, *many countries have established agencies for research and promotion of the implementation of various forms of innovation, e.g. supporting the creation and on-going work of some e-government innovation centers and laboratories.*

3.2. Recommendations on Fostering Innovation in Delivery of Public Services in Thailand

3.2.1. *Recommendations on Enabling Structure for Fostering Innovation in Public Services*

1) Government must play a role to facilitate the innovation process especially for creating better public services to citizens, at least the followings:
    a. supporting innovators through appropriate incentives and mechanisms,
    b. removing obstacles to innovative initiatives,
    c. establishing responsive research structures, and
    d. forming a creative and receptive population through appropriate educational systems.
2) Government agencies should establish innovation labs for e-government.

3.2.2. *Recommendations for Establishing Innovation Labs*

To encourage innovation in public service continuously, *many countries have established agencies for research and promotion of the implementation of various forms of innovation, e.g. supporting the creation and on-going work of some e-government innovation centers and laboratories.*

1) Innovation labs for e-government should be established under collaboration of public sector, educational institutions and private sector.
2) Initial budgets should be allocated from the government with human resources (staff, specialists, researchers) from the educational institutions.
3) To increase the diversity and broad development, some funding schemes, e.g. government funding, university matching funding, and joint venture capital, should be established to encourage and assist the private sector in a joint venture to develop and produce innovation in the public services.

3.2.3. *Recommendations on Sources of Funding for Innovation in the Public Sector*

1) ***Top slicing*** government or departmental budgets is recommended.
2) Establishment of specialized innovation funds and/or internal public venture funds is recommended as a source of funding for innovation in public services.

3.2.4. *Recommendations on Strategy for Sustaining Public Innovation*

1) The strategy of "change (a strategic agenda for change to increase innovation impact)" and "think (to identify and develop new findings on important and new policy trends)" is recommended for government agencies to adopt for implementing sustainable innovation in public services and for innovation labs.
2) Based on the strategy of "change" and "think", government agencies should consider these elements as key factors for evolution and sustainability of innovation labs:
   - Process focus: insights to drive innovation
   - People: user and organization centric
   - Capacity focus: core business transformation
   - Tools: co-creation with users, professional empathy, rehearsing futures
   - Management: management actively involved
   - Main role of design: plus systems design, organization design, managing as designing
   - Key challenge: adopting new narrative in the organization
3) Government agencies should consider these elements as key factors for evolution and sustainability of public innovation:

- A *business model* that runs parallel to the core idea of the venture.
- A *governance model* that provides a clear map of control and accountability.
- *Sources of finance*, both start-up capitals in the short term and income streams over the longer term.
- A network and communications model to develop what we refer to as the venture's 'relational capital', including the relationship between the people in the organization, Customer relations or a related business to help collaboration in innovation.
- A staffing model including the role of volunteers.
- A *development plan* for operational systems – including management information, reporting and financial systems, IT, supply chain systems and systems for risk management.

3.2.5. *Recommendations for Fostering Innovation in Online Public Services Using Crowd Sourcing Ideas*

Government agencies should consider to use crowdsourcing ideas to provide innovation for online public services with its online platform for solving the following problems, using low cost, with easy execution and most popularity:

- *To recruit and retain users*: Crowdsourcing helps to motivate and engage the target users to participate, provides some certain incentives to users, and can request for volunteers to participate.
- *To make contribution*: Crowdsourcing helps users to evaluate, share, and add with ideas or items to a central web site, and to network by linking to other users.
- *To combine user contributions*: Crowdsourcing helps to merge user contributions and edits automatically.
- *To evaluate users and contributions*: Crowdsourcing helps to manage malicious users by blocking, detecting and deterring techniques.

3.2.6. *Recommendations on Use of Open Source*

The strategic recommendations for the use of Open Source Software (OSS) for government agencies are as follows:

- Encourage all IT projects to support well-established standards and consistent with open technical specification, especially those recommended within TH e-GIF
- Encourage the OSS as an alternative within the e-government term of reference (TOR)
- Facilitate and encourage the creation of communities for OSS products.

- Promote activities by allocation of the fund for conference to share knowledge between experts and the users
- Provide training to stakeholders that participate with the use and development of OSS
- Store the information on well-known online repositories or government interoperability repositories

3.2.7. *Recommendation on Open Government Initiative*

Government agencies are recommended to implement and advance an open government initiative with the following approaches:

- **Open Data,** which is about offering government data in a more useful format to enable citizens, the private sector and non-government organizations to leverage it in innovative and value-added ways.
- **Open Information,** which is about proactively releasing information, including on government activities, to citizens on an ongoing basis to increase the transparency of government.
- **Open Dialogue,** which is about giving citizens a stronger say in government policies and priorities.

Section 4. Radical Re-Engineering and Radical Cost Reduction in the Investment and Use of IT with a View to "Doing More with Less for More"

4.1. Summary of Research Analysis and Findings

1) The *strategies and implementing concepts of radical/frugal re-engineering and radical cost reductions* and initiatives having been taken up by governments in foreign countries are found to commonly put into practice through these approaches and activities:
    - Reform/Implementation plan
    - Information sharing and integrated customer services
    - Shared services/operations
    - Business process improvement
    - Procurement reform/increased use of common procurement frameworks
    - External service delivery as alternative models for delivery of non-core services
    - Rationalization and reorganization to deliver streamlined public services
2) The *strategic IT cost reduction* needs organizations to examine all sources of IT spend and prioritize the sustainable IT cost reduction opportunities. It is critical for organizations to have visibility into investments and expenses associated with assets and IT capability because it helps prioritize realistic IT cost reduction opportunities. Organizations need to understand fixed and variable costs of their IT supply and invest in appropriate capabilities. Typically, organizations can reduce the IT costs of a business process by consolidating IT solutions supporting common business processes. IT cost reduction efforts must be aligned with business priorities. However, establishing measures of success and the time frame are vital to achieve the cost reduction goals.
3) To identify the *priority services demonstrating the concept of radical cost reductions in IT investment and use*, the analysis is done by assessing the amount/value of resources (e.g. time, cost) spent on development of government services against the impact they set to the general public. The public service (s) that uses low resources while impacting highly and widely the economics and society in overall is judged to be the highly potential service(s) with IT cost reduction concept.

4.2. Recommendations on Implementing Concepts of Radical Re-engineering and Radical Cost Reductions in the Investment and Use of IT in the Public Sector of Thailand

4.2.1. *Recommendations on Strategies for Implementing Concepts of Radical Cost Reductions in the Investment and Use of IT in Public Sector*

1) The following strategies are recommended for government agencies to use for cost reduction in the investment and use of IT:
    a. ICT spend control: *reusing and sharing existing ICT assets, not buying new ICT unnecessarily*
    b. Shared ICT infrastructure program: *reducing the over-provision of ICT by adopting common technical standards and sharing ICT assets*
    c. Centralized ICT procurement: *negotiating procurement frameworks for the best price of ICT*
    d. Managing suppliers as a single customer: *assigning gov. representatives as a focus point for cross-cutting supplier-related issues*
    e. Making government contracts more accessible to SMEs: *by simplifying contract opportunities*
2) Government agencies should work on ICT cost reduction program taking into account the following types of costs:
    - hard costs – direct spend on tangible items
    - soft costs – indirect spend (e.g. for training, customization, process change)
    - managerial costs – accumulated costs from management, overhead costs
    - program costs – costs of running ICT programs beyond the costs accounted for in the cost allocation systems
3) Government agencies may take into consideration a 3-tiered cost reduction strategy based on a business perspective, as follows:
    - Minimize (hard costs) e.g. by consolidating data centers
    - Optimize (soft & program costs) e.g. by detailed cost/spend analysis
    - Re-design (program & managerial costs) e.g. by implementing shared services and re-usable components

4.2.2. *Recommendations on Identification of Priority Services to Demonstrate the Concept of Radical Cost Reductions in IT Investment and Use*

1) To identify priority services for re-engineering or reducing IT costs radically, government agencies should use the analysis approach of

assessing an amount/ value of resources (e.g. time, cost) spent on development of government services against an amount of impact they set to the general public. The one (s) that uses low resources while impacting widely the economics and society in overall tends to be the highly potential service(s) with IT cost reduction concept.

2) Based on the above-mentioned analysis approach, the priority services that demonstrate the concept of radical cost reduction in IT investment and use in Thailand are proposed as follows:
    - Data Center Consolidation on ICT infrastructure i.e. gradually migrating physical data centers to the central Government cloud infrastructure as those provided by EGA
    - Cloud horizontal applications on EGA e.g. the national common e-mail system for all governments, common e-calendars, central e-Saraban etc.
    - Cloud vertical applications on EGA e.g. e-Procurement, common but customizable platforms for e-Permit/e-Licensing/e-Certificates, common GIS systems
    - More mobile government applications e.g. mobile e-tax filing
    - Business intelligence and monitoring systems e.g. common interoperable GIS platform, GIS for monitoring buses movement & safety around the country
    - Common online public applications on central clouds e.g. common e-permits, e-certificates, e-licenses w/ digital signatures at the user level
    - Government e-procurement for end-to-end procurement operation
    - Common HR systems, office automation e.g. Google-like calendar systems on national cloud computing systems

Section 5. Other Related Tasks

5.1. International Study Visits

The proposed destination countries and some specific interested target initiatives and benefits are summarized as shown below.

Proposed Countries	Specific Interested Initiatives/Topics	Benefits
Switzerland	e-government strategy (principle of "develop once, use many times"); e-government architecture; open government data	for designing enterprise architecture of e-government interoperability, with potentiality for innovation and greater transparency
Austria	innovative e-government platform; Pan-European Public Procurement Online; e-Health Directory Service	for developing innovative e-government platform to foster interoperability for synergy effect
Poland	e-government security; innovative regional solution to e-government; reform of organizational structure of public administration	for planning systems to enforce security and data protection and to enhance connected government
Republic of Korea	m-government; broadband policy; uTradeHub/NSW for paperless trade	for developing smart government and broadband infrastructure to provide smart e-services
Singapore	whole-of-government enterprise architecture; collaborative social-networking platform for public offices	for developing e-government interoperability systems that will enhance e-services and e-participation
U.S.A.	open government; cyber security; data privacy	for designing e-government interoperability systems with greater transparency and security

5.2. Workshop Arrangements

5.2.1. *Focus Group Meeting*

The focus group meeting was arranged on 19 July 2013 at the conference room of MICT with the objectives to discuss and brainstorm concerned parties from public and private sectors for their opinions, comments and recommendations on Thailand's e-government development and implementation focusing on four areas: interoperability; institutional structures and governance; innovation in public services; and re-engineering with a view to 'doing more with less for more'. There are totally 60 participants in this meeting. The detail of the focus group meeting is appeared in Appendix A.

5.2.2. *Workshop to Present the Project Results to the High-Level Executives of MICT*

The workshop for the high-level Executives of MICT was arranged on 7 August 2013 at the conference room of MICT with the objective to present the final project results for their acknowledgement and adoption. There are totally 36 executives from internal offices and bureaus of MICT attending the workshop.

5.2.3. *Workshop to Present the Project Deliverables to Government Officials of MICT and Other Ministries*

The workshop for government officials of MICT and other Ministries was arranged on 8 August 2013 at the conference room of MICT with the objective to present the final project results for their acknowledgement and adoption. There are totally 21 delegates from MICT and other 14 Ministries (i.e. Ministries of Finance, Tourism and Sports, Transport, Nature and Environment, Energy, Interior, Justice, Labour, Culture, Science and Technology, Education, Industry, Foreign Affairs, and Commerce) having attended the workshop.

5.3. Thailand's Direction for the Development of e-Government to Align with Related Directions of the Roadmap for an ASEAN Community (2009-2015)

5.3.1. *Summary of Research Analysis and Findings*

1) ASEAN Economic Community (AEC) will affect all ASEAN member countries to interoperate e-government applications to provide seamlessly services to all ASEAN Governments, businesses and citizens. ASEAN member countries, therefore, signed the Declaration on the ASEAN Economic Community Blueprint and adopted the ASEAN Economic Community Blueprint in 2007, as part of the Roadmap for an ASEAN Community (2009-2015). One priority action is to develop a general framework or guidelines for coordinated ASEAN e-government programs for efficient delivery of public services and to facilitate regional trade, investment and other business activities; activating the ASEAN e-Government Forum to identify key public services for ICT applications, including capacity building activities; and enabling the interoperability of products/services, information systems and networks, in a convergence environment.

2) To achieve their e-government interoperability, ASEAN member countries need the common architectural model and framework. A holistic e-government interoperability model and framework is an approach to systematically address the challenges relating to not only the technical aspect but also the organizational, inter-organizational, managerial, political, legal, national and international settings. It will also support the

delivery of ASEAN public services by fostering cross-border and cross-sectoral interoperability and tie together the various national e-government interoperability frameworks at ASEAN level.

3) ASEAN e-Government Strategic Plan 2020[4] is being developed as an initiative for development of common e-government services among ASEAN member countries and also as a guideline for e-government development in each member country regardless of its individual development status and requirement basis. Its vision is "Empowering collaborated e-government to support economic sustainability, growth and integration of ASEAN". The e-Government Strategic Plan 2020 focuses on the development of mutual 'shared services' to facilitate cross-border people and goods movement activities.

4) Thailand has developed the Thailand e-Government Interoperability Framework (TH e-GIF) since 2006 to promote automatic interoperability between different public agencies and to achieve the target of a one-stop service electronic business process between e-government information systems. TH e-GIF contains all essential elements which are political will; inter-agency collaboration and social/cultural change; legal power; process agreement; meaning exchange agreement; and technical development, necessary for effective implementation of e-government interoperability to drive an integrated whole-of-government model aimed at centralizing the entry point of service delivery to single portal where citizens can access all government-supplied services, regardless of which government authority provides them. TH e-GIF suggests ways to develop integrated e-government systems for effective online services to consequently achieve SMART Collaborative e-Government.

5.3.2. *Recommendations*

1) Government agencies of Thailand and/or the lead agency of Thailand's e-government development should be aware of ASEAN e-Government Strategic Plan 2020 for their national e-government development to achieve the regional vision of "Empowering collaborated e-government to support economic sustainability, growth and integration of ASEAN" for the outcome of ASEAN connected e-government services.

2) Since ASEAN e-Government Strategic Plan 2020 is aimed for development of common e-government services among ASEAN member countries and is established as a guideline for e-government development in each member country regardless of its individual development status and requirement basis, government agencies of Thailand and/or the lead agency of Thailand's e-government development should; therefore,

[4] ASEAN e-Government Strategic Plan 2020 (Draft) developed by ASEAN

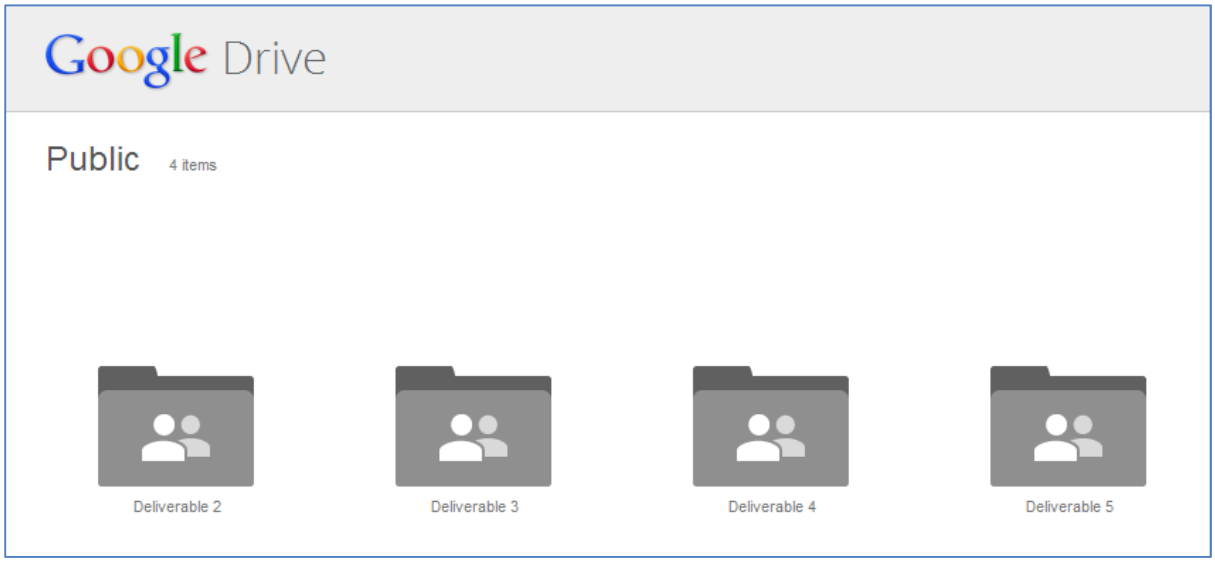
develop and implement their national e-government based on ASEAN e-Government Strategic Plan 2020, which will consequently enhance facilitation of cross-border movement and activities.

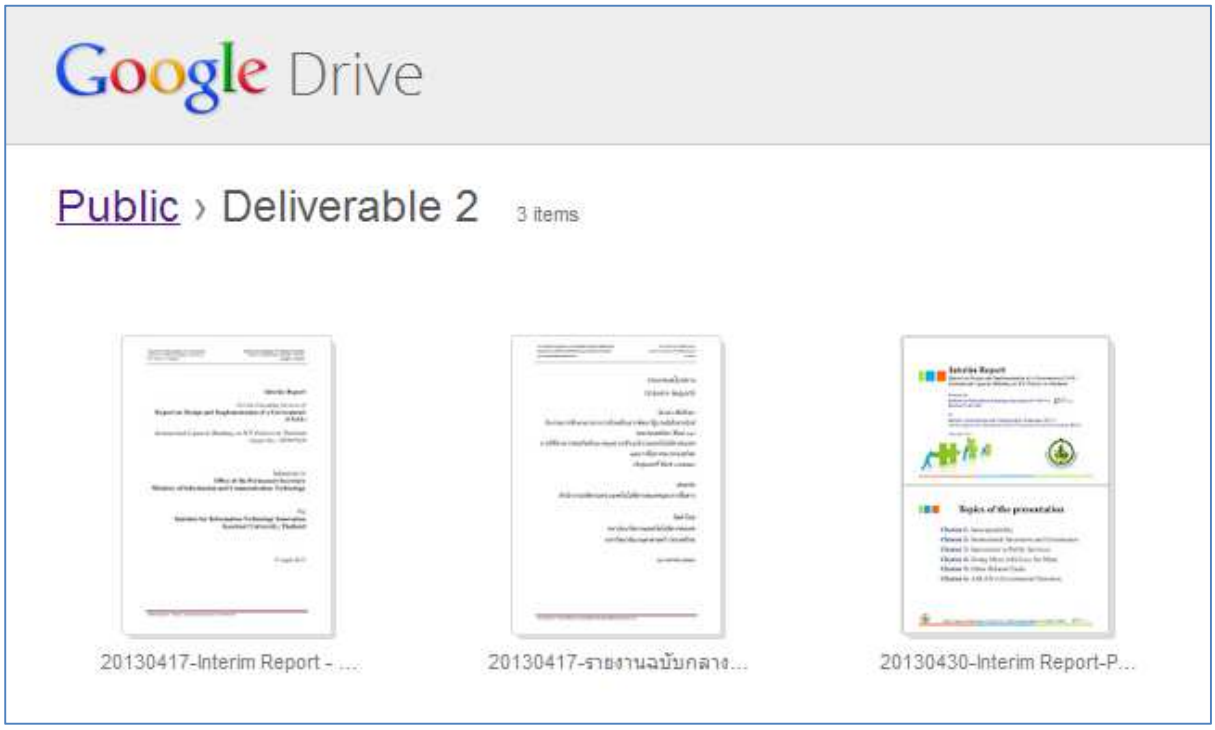
3) Government agencies of Thailand and/or the lead agency of Thailand's e-government development should adopt ASEAN e-Government Strategy and Recommendation and apply the suitable action steps to reach each strategic target. The three e-government development strategies are: 1) Define e-government provision plan; 2) Develop online services component; and 3) Strengthen ICT infrastructure. The two recommendations for e-government development are: 1) Enhance laws and regulation to support e-government and 2) Develop ICT human capital

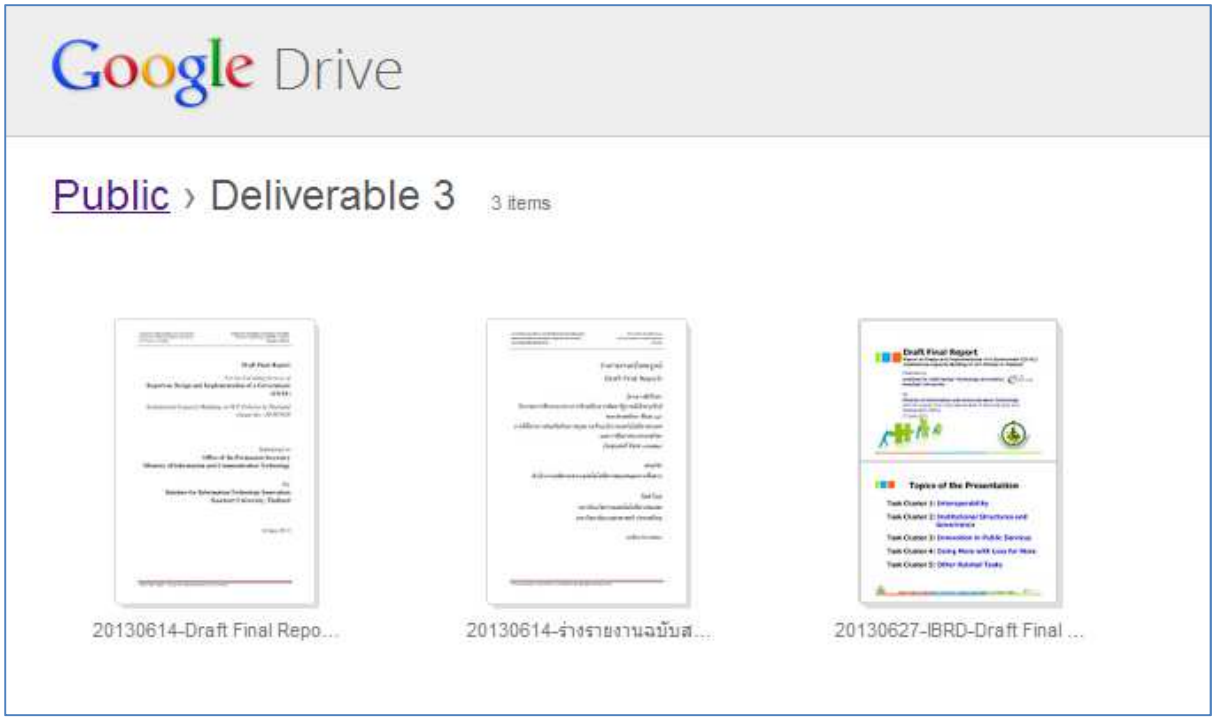
http://goo.gl/R493dx

Website for published project deliverables

arranged by Ministry of Information and Communication Technology



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Appendix A
Summary of the Focus Group Meeting
"Design and Implementation of e-Government in Thailand"
19 July 2013 (09.00 – 15.30 hours)

at MICT Conference Room, Ministry of Information and Communication Technology.

The Government Complex Commemorating His Majesty the King's 80th Birthday Anniversary, 5th December, B.E. 2550 (2007), Chaengwattana Rd., Laksi, Bangkok, Thailand

1. The Focus Group Meeting was arranged with the aim to collect public opinions and comments on e-government development and implementation to be included in the Final Report.
2. There are totally 60 participants from 28 agencies of public and private sectors having attended the focus group meeting:
    - 8 lead discussants
        - Expert Attorney from the Office of Attorney for Special Cases, the Office of the Attorney General
        - IT Expert from the Internal Security Operations Command
        - Director of Information Systems Development from Electronic Government Agency (Public Organization) (EGA)
        - Manager of Policy and Strategy Division from Electronic Government Agency (Public Organization) (EGA).
        - Director of ICT Center from Ministry of Transport
        - Assistant to the President of Sustainability Company
        - Chairman of the East Software Park Thailand, Burapha University and Vice Chairman of The Association of Thailand Open Source Federation
        - Director of Institute for Information Technology Innovation from Kasetsart University
    - 47 representatives from government agencies (academics, specialists, experts, special experts and representatives from the Ministries)
        - Consultant to the Institutional Capacity Building on ICT Policies in Thailand Project (funded by the World Bank)
        - Computer Special Expert and Computer Operation Academic from the Office of the Prime Minister
        - Computer Specialists from the Ministry of Finance

- Head of Strategy and Standards Section from the Office of the Permanent Secretary, Ministry of Tourism and Sports
- Computer Specialist from the Office of the Permanent Secretary, Ministry of Agriculture and Cooperatives
- Director of the ICT Center from the Office of the Permanent Secretary, Ministry of Natural Resources and Environment
- Computer Specialists from the Office of the Permanent Secretary, Ministry of Justice
- Director of Computer Management and Networks Group and Policy and Plan Analyst from the Office of the Permanent Secretary, Ministry of Labour
- Operating Computer Academic from the office of Permanent Secretary, Ministry of Culture
- Computer Academic from the Office of the Permanent Secretary, Ministry of Science and Technology
- Computer Specialist from the Office of the Permanent Secretary, Ministry of Education
- Senior Researcher and Departmental Director from National Electronics and Computer Technology Center (NECTEC)
- Bureaucratic System Development Special Expert from the Office of the Public Sector Development Commission (OPDC)
- Information Analyst from Electronic Government Agency (Public Organization)
- Deputy Director of Policy Department from Electronic Transactions Development Agency (Public Organization) (ETDA)
- Representatives from MICT (Office of the Permanent Secretary, E-Government Promotion Bureau, Policy and Strategy Bureau, Electronic Transaction Commission, Geo-Informatics and Space Technology Development Agency (Public Organization), and ICT Industry Promotion Bureau)

- 3 representatives from the private sector i.e. Vice-President of Bangkok Rubber Co. Ltd., expert representative from CIO 16 Group, representative from the Association of Thailand Open Source Federation, and Managing Director of Nysiis Solutions Co. Ltd.

3. Summary of the Focus Group Meeting

3.1 This focus group meeting has received well cooperation from participants of all sectors to express their opinions, comments, feedbacks and recommendations on the

design and implementation of Thailand's e-government. The meeting sessions has been conducted as in sequence as follows:

- The session started by the introductory remark by the Director of E-Government Promotion and Development Bureau (Ms. Athitaya Suthatham), MICT
- The opening remark has been done by the Deputy Permanent Secretary of MICT (Mr. Somboon Mekpaiboonwattana)
- The presentation of the project work and progress has been done by the Project Director (Assist. Prof. Dr. Somnuk Keretho - Director of Institute for Information Technology Innovation, Kasetsart University, as a project consultant)
- The 1st session of brainstorming and recommendations on the topic of "Interoperability" has been introduced by the Project Director (Assist. Prof. Dr. Somnuk Keretho) with the active contribution of the 3 invited lead discussants: Mr. Chainarong Sangthong-ararm (Expert Attorney from the Office of the Attorney General), Gp.Capt. Saharat Netprapha (IT Expert from the Internal Security Operations Command), Dr. Arsit Unyapho (Director of Information Systems Development from Electronic Government Agency (Public Organization))
- The 2nd session of brainstorming and recommendations on the topic of "Institutional Structures and Governance" has been introduced by the Project Director (Assist. Prof. Dr. Somnuk Keretho) with the great contribution of the 3 invited lead discussants: Mr. Angsumal Sunalai (CIO16), Ms. Maneerat Phalipat (Vice-President of Bangkok Rubber Co. Ltd.), and Ms. Amporn Chartbussayamars (Director of the ICT from Ministry of Transport)
- The 3rd session of brainstorming and recommendations on the topic of "Innovation in Public Services" has been introduced by the Project Director (Assist. Prof. Dr. Somnuk Keretho) with the contribution of the 2 invited lead discussants: Mr. Chaijaroen Atipat (Vice President of Sustainability Company) and Mr. Thawatchai Aiempiroj (Chairman of the East Software Park Thailand, Burapha University and Vice Chairman of The Association of Thailand Open Source Federation)
- The 4th session of brainstorming and recommendations on the topic of "Re-engineering for IT cost reduction with a view of 'Doing more with less for more'" has been introduced by the Project Director (Assist. Prof. Dr. Somnuk Keretho) with the contribution of the 2 invited lead discussants: Mr. Chaijaroen Atipat (Vice President of Sustainability Company) and Mr. Phalakorn Buppharthanakorn (Manager of Policy and Strategy Division from Electronic Government Agency (Public Organization)
- Summary and Closing of the meeting

3.2 Opinions and comments and suggestions from the meeting are summarized and consolidated as recommendations as appeared in each section of the final report.

Focus Group Meeting

Appendix B
Summary of Comments/Opinions/Selected Recommendations
From the Seminar on
"Towards SMART Government: Thailand e-Government Readiness Framework"
By Electronic Government Agency (Public Organization) (EGA)
As of 23 April 2013
.....

1. Please prioritize the topics from their most to least importance (5 = the most…1 = the least importance)

Topics	Priority of Importance						
	1 (least) (%)	2 (%)	3 (%)	4 (%)	5 (most) (%)	Average (%)	Total (%)
Government Policy and Vision	33 (21.02)	10 (6.37)	11 (7.01)	14 (8.92)	89 (56.69)	3.74 (74.80)	157 (100.00)
Government Infrastructure/ Network	12 (7.64)	34 (21.66)	30 (19.11)	64 (40.76)	17 (10.83)	3.25 (65.00)	157 (100.00)
Government Public Service	12 (7.64)	30 (21.66)	61 (19.11)	38 (24.40)	16 (10.19)	3.10 (62.00)	157 (100.00)
Back Office/e-Governance	12 (7.64)	64 (40.76)	33 (21.02)	33 (21.02)	15 (9.55)	2.85 (56.80)	157 (100.00)
Trends/Emerging Issue	80 (50.96)	13 (8.28)	16 (10.19)	16 (10.19)	32 (20.38)	2.41 (48.20)	157 (100.00)

2. Your opinions on Thailand e- Government Readiness Framework

2.1. Government Policy and Vision

Topics	Agree (no. of persons)	%
Government Policy and Vision		
Strategic – Business – IT alignment	149	94.90
Budget Viability	142	90.45
Customer/Citizen centric	146	92.99
Laws and regulations compliance	144	91.72
e- Leader	141	89.81

Selected Recommendations

1. Management/EA/PDCA
   - Brainstorming from all sectors to establish the strategy is recommended.
   - Policies are useful and necessary for organizational IT management
2. Budget
   - The government IT budget should be properly prepared and allocated.

- The Budget Bureau should jointly work with the government agencies to allocate the proper budget for the maximum benefit of the public. A specific R&D agency may be established to provide policy consultancy and advice for the Budget Bureau.
- The budget should be fairly allocated for development of citizen-centric government services.
- The IT budget is not sufficient for government agencies to achieve the established policy.

3. Laws and regulations
   - Agencies must comply strictly with the IT laws.
   - Related laws should be improved to fully cover related issues.
4. CIO (e-Leader)
   - There should be Government CIOs election.
   - IT trainings and IT leadership should be promoted and provided for Government CIOs.
5. Human Resources
   - Human resources of all levels should be well-prepared/well-trained.
   - IT staff should have good IT knowledge and applicable skills.
   - IT staff should have their career paths and promotion upward to the CIO level to drive e-government efficiently.
6. In overall
   - Focus on the keywords of worth, transparency, redundancy reduction
   - Policy is a key mechanism to drive e-Government
   - Lack of integration of all parts in all aspects
   - Lack of IT security and change management
   - Many organizations still have internal issues, especially issues about staff
   - There should be a standard for government data interoperability.
   - There should be a standard template for government agencies.
   - Policies must be clear and easy to understand and should be promoted among all concerned agencies.
   - Each strategic team should be established for work particularly on each government strategy and all strategies should be ultimately integrated.

2.2. Government Infrastructure/ Network

Topics	Agree (no. of persons)	%
Government Infrastructure/ Network		
Broadband	146	92.99
Security	148	94.27
Backup	147	93.63

Selected recommendations

- Standards should be clearly established.
- Networks should cover all areas nationwide.
- Central government services should be ready and sufficient to respond to public needs timely and properly.
- EGA has to manage and maintain networks for best quality and ability to respond immediately to public needs
- There should be a central office performing as a Government Center responsible to provide network infrastructures, security, and data privacy for all government agencies to reduce wok redundancy and to optimize the use of resources
- Government agencies should share/consolidate resources to reduce government budget.
- IT education/learning should be provided to concerned parties and people.
- Channels of government network services should be expanded along with the security policy.
- Government agencies should pay attention to data backup and data retrieval.

2.3. Government Public Service

Topics	Agree (no. of persons)	%
Government Public Service		
Accessibility	139	88.54
Usability	137	87.26
One Stop Service/Portal	144	91.72
Continuous improvement with innovation	141	89.81

Selected recommendations

- Government public services are essential.
- Government services should be monitored/evaluated/improved to meet public requirements.
- One Stop Service should be developed to integrate personal data of people from birth and so on.
- Government agencies should include the private sector in the development and service delivery.
- Evaluation of government services should be continuously done.
- It is necessary for government agencies to establish good attitude towards people.

2.4. Back Office/e-Governance

Topics	Agree (no. of persons)	%
Back Office/e-Governance		
Governability	136	86.62
Interoperability	142	90.45
Efficiency for IT Structural Reform	137	87.26

Selected recommendations

- Government agencies lack mechanisms of data sharing among them.
- Government agencies should give importance to Government License Software.
- Government agencies should establish standards and provide knowledge among them.
- Data security should be seriously taken into consideration.
- Government officials lack IT knowledge due to its irrelevance to their work.

2.5. Trend/Emerging Issue

Topics	Agree (no. of persons)	%
Trend/Emerging Issue		
BCP	135	85.99
Information Security	142	90.45
Smart card	134	85.35
Cloud Computing	139	88.54
Big data	136	86.62
Open government	135	82.99

Selected recommendations

- Development trend should be followed up but it needs to consider its value.
- Smart cards should include all necessary personal data and base on ID number for updating data.
- Green ICT
- Office Automation
- Trend awareness should be created for high-level executives.
- ASEAN Community
- IT laws should be integrated and improved.
- Level Of Maturity Model should be complied when implementation
- Cloud government will help to reduce costs of hardware and application
- Some government agencies do not provide and share confidential data to others.

3. Additional Comments/Opinions on Thailand e-Government Readiness Framework

- New government services should be widely publicized.
- Lack of clear policy, lack of good ICT budget allocation, lack of ICT staff recognition
- All government agencies have to establish good databases to be effectively used for decision and other works
- Basic services should be able to be further developed and contain sufficient service data.
- Continuity and sustainability of activities as per the Framework. Including budget support, to achieve the goal within the given time are necessary.

- Technology having been worked by EGA should be introduced for using and supporting the Framework and gap analysis should be done to learn what should be further developed to achieve the Framework.
- Budget should be allocated to correct the weaknesses.
- Education/Learning should be provided to all people (especially the disadvantaged and senior citizens) for enhancing their capabilities to deploy technologies properly for the benefits of their daily lives and careers.
- ICT manpower planning and capacity building are not clear and not responding to needs of labor market in terms of scope, quality, quantity, and standard.
- Thailand's strength of Software (Based) or Application Level or device should be focused.
- Related laws should be approved by the Cabinet and be publicized and seriously enforced among all concerned government agencies for their collaboration and practices.
- Data sharing should be implemented for cost and time reduction. Information/data should be accurate, integral, and shared for mutual use by all government agencies and it should be led by an appointed agency.
- Development as per the Framework should be gradually conducted into 3 levels i.e. top level (being excellent and models) , middle level (developed as per models) and basic level (promoted for development)
- EGA finds ways to develop central or portal systems for supporting and driving other government agencies in development, especially human resource development.
- Because the Framework is quite in general, implementation guidelines should be, therefore, clearly established to spot collaboration specifically needed among concerned parties.
- Information should be accessible for all people at all times. People should be well equipped with knowledge, capabilities, and understanding to be able to access and use information effectively.
- Government agencies are urged to move towards one single national goal based on their mutual understanding of that goal.
- The Framework should be publicized and promoted for actual implementation among government agencies.
- Sustainable development should be prioritized to call attention for worthwhile IT investment and usage.
- IT staff should be motivated and promoted based on their clearly-established career paths.
- In providing online public services, government agencies should give importance to IT applications.
- E-government work processes and procedures should be clearly established so that IT staff could realize the ultimate goal of e-government system development.

- To achieve development of citizen-centric online public services, e-government development should especially focus on data standardization to reduce work and data redundancy.

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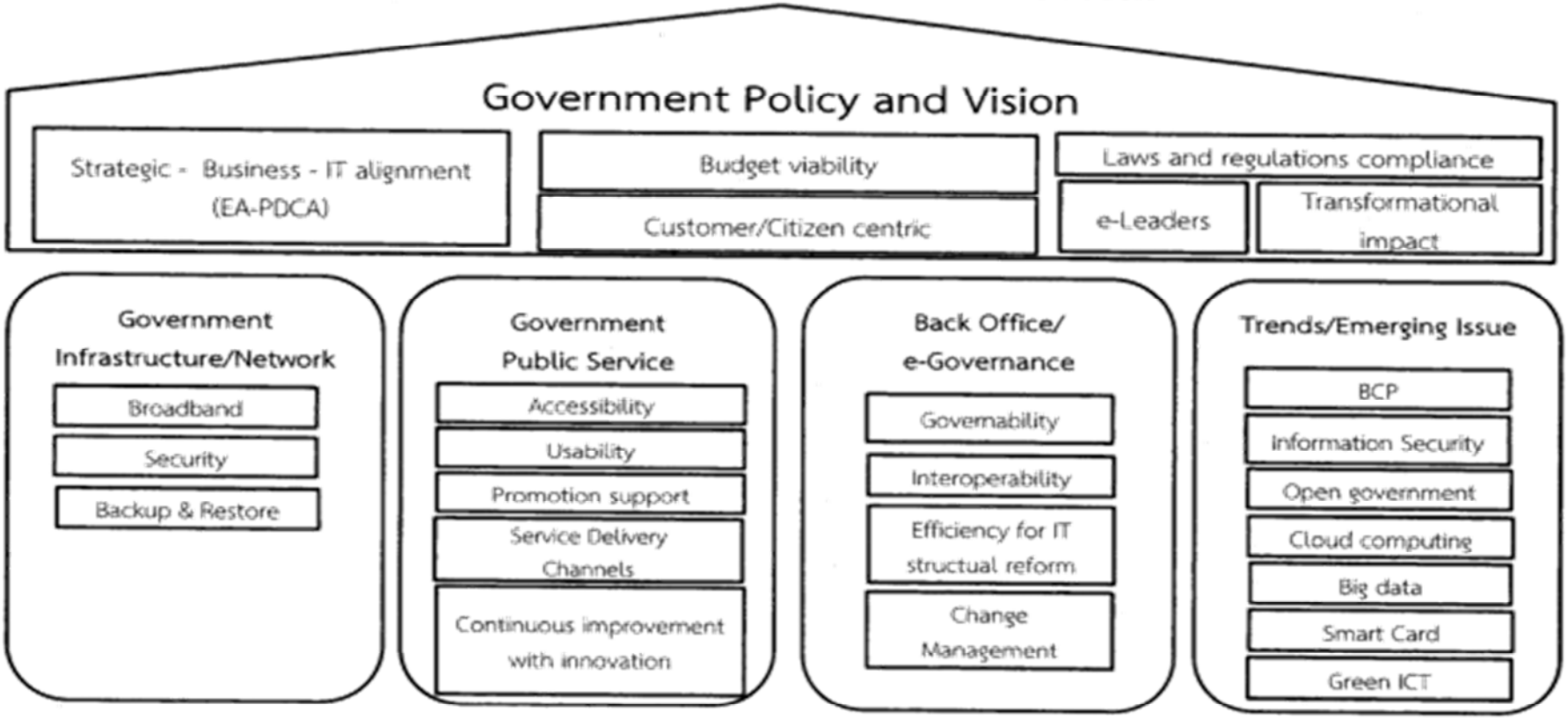
(Draft) Thailand e-Government Readiness Framework

Objective of framework: e-Government readiness for the nation



Reference:

Using the E-Government Assessment Questionnaire , Gartner 2008

The 2012 Waseda University International e-Government Ranking , Waseda 2012

United Nations E-Government Survey 2012 E-Government for the People : www.unpan.org/e-government

ITU e-Government Implementation Toolkit , ITU 2009

(Draft) Thailand e- Government Readiness Framework
Objective of framework e- Government readiness for the nation

No	Framework and Characteristic	Definition	Reference			
			Gartner	Waseda	ITU	UN
1	**Government Policy and Vision**	*Objective is to evaluate the plan and vision of IT management in order to improve business administration and achieve effective public service*				
	Strategic- Business- IT alignment (EA-PDCA)	The strategy of IT management in business administration and public service with the focus on value creation, reduction of repetitive process and meeting the departmental objectives.	✓			
	Budget viability	IT Budget is efficiently and effectively allocated to maximize the value and to align with the main mission of the department.	✓			
	Customer/Citizen centric	Government agencies have citizen-centric policies with a focus on customer satisfaction.	✓			
	Laws and regulations compliance	Government agencies are aware of the law and regulation of IT management.	✓			
	e-Leaders	The CIO is expected to align management strategy with ICT IT investment in order to achieve a balance between the business strategy, organizational reform, and management reform.		✓		
	Transformational Impact	Government agencies have to consider the outcome of e-Government development.	✓			
2	**Government Infrastructure/ Network**	*Government agencies have the Infrastructure and information technology to support service.*				
	Broadband	Availability of IT Infrastructure to support the business administration and public service.			✓	
	Security	Government agencies comply with policies or plan of IT Infrastructure security are define.			✓	
	Backup & Restore	Government agencies have backup system for IT system that will recover when the main system down.			✓	
3	**Government Public Service**	*Objective is to enable government agencies to improve* their IT management in order to meet the needs of the citizen/business and achieve better services.				
	Accessibility	Customer/ Citizen (the target group) are able to access a services of government information technology by quickly and easily.				✓

No	Framework and Characteristic	Definition	Reference			
			Gartner	Waseda	ITU	UN
	Usability	Usability of government agencies services citizen via electronic channel.				✓
	Promotion Support	Activities involved in supporting the implementation of e-Government in order to support the development of e-service.	✓	✓		✓
	Service Delivery Channels	The collaborative and Integrated service as a point to reinforce the potentiality of government agencies as a convenience of the citizen (customer) e.g. One Stop service, Portal.	✓	✓		✓
	Continuous improvement with innovation	Government agencies has develop and improve service to accordance with the requirements of the citizen (Customer).		✓		
4	**Back Office/e-Governance**	*Collaboration of government agencies to integrate and reduce the overlapping of work.*				
	Governability	The usage of IT for improving internal processes in order to achieve internal effectiveness and efficiency of resources as well as governability.		✓		
	Interoperability	Government agencies have data interoperability agencies				✓
	Efficiency for IT Structural Reform	Government needs structural reform to promote efficiency by IT utilization.		✓		
	Change Management	Government agencies undergo change caused by the program, it must be able to handle those from a process and an HR management perspective.	✓			
5	**Trend/Emerging Issue**	*Preparation for the new trends of e-Government development*				
	BCP	Direction of the government agencies to prepare information technology to support changes in the future such as BCP, Terrorism, Smart card, Cloud computing, Big data, Open government		✓		
	Information Security					
	Smart card					
	Cloud Computing					
	Big data					
	Open government					

No	Framework and Characteristic	Definition	Reference			
			Gartner	Waseda	ITU	UN
	Green ICT					

Reference:

Using the E- Government Assessment Questionnaire, Garner 2008

The 2012 Waseda University International e-Government Ranking, Waseda 2012 United Nation E-Government Survey 2012 E-Government for the People : www.unpan.org/e Government

ITU e-Government Implementation Toolkit, ITU 2009

Appendix C

Comparative Study of e-Government Interoperability Frameworks

Thailand has engaged actively in the development of interoperability with electronic data and transaction exchange between government agencies since 2007 through a policy framework called "Thailand Electronic Government Interoperability Framework (TH e-GIF)." This framework has been used to guide the development of more than 10 interoperable and collaborative e-government projects, such as the National Single Window (NSW) electronic platform for facilitating import and export procedures electronically connecting 36 government agencies, the Agriculture Disaster Relief Information System (Aggie DRIS) collaborating among 6 government departments under the Ministry of Agriculture and one bank to deliver better joint-up services to farmers encountering with natural disasters, and the research information exchange network connecting research databases and libraries of more than 30 universities and research agencies (www.vijai.net).

During the past six years, there were several analysis studies and improvement of TH e-GIF by comparing with other relevant e-government interoperability frameworks found around the world[1]. By the comparison with many world-wide best practices and approaches, the TH e-GIF framework and relevant policy approaches have been improved and developed to make them more effective and fruitful. The current improved version of Thailand interoperability framework, TH e-GIF, is of version 3.0.

However, this report reports another comparative attempt with an aim to further propose more opportunities for improvement. We choose to compare with three frameworks as we think are the best representatives of applying the concept of enterprise architectures. The first framework is the US Federal Enterprise Architecture (FEA) in which the government of the United States has adopted and used successfully since 1999. The second framework is the European Interoperability Framework (EIF) using among European Union member states since 2004. The third framework, one of the most-recent development, is the e-government framework of Malaysia called the "1GovEA" established in 2012.

The rational in choosing these three frameworks for comparisons with TH e-GIF is as following.

1. The United States is one of the most successful country in adopting the complete cycle of "Enterprise Architecture (EA)" concept in planning, budgeting, implementing, monitoring and measuring of the e-government development programmes. The framework called the Federal Enterprise Architecture Framework (FEAF or FEA) is mandated to be used by all federal governments for proposing for budget approval and implementation. The United States has enacted laws and regulations that also effectively enforce the operation of FEA. The main part of FEA is the Performance Reference Model (PRM). PRM serves the goals of FEA by

[1] http://www.cstransform.com/resources/white_papers/InteropAnalysisV2.0.pdf

establishing a common language to describe the outputs and measures used to achieve strategic objectives through coupled business services.

2. European Interoperability Framework (EIF) is a very useful case study which proposes quite complete dimensions (critical success factors) of interoperability. The objective of this framework is to promote the public service efficiency, define standards for information exchange and sharing among European countries. EIF also provides standards for linking data to solve the difference of language data formats and technologies.
3. Malaysia has economic, cultural and social context, though not exactly the same, but very similar to Thailand. Malaysia has just recently published an e-Government Interoperability framework called 1GovEA in 2012. The objective of this policy framework is to push the government to increase added values of business and opportunities, and improve government efficiency but with lower cost. The 1GovEA aims to increase the confidence of its citizens in utilizing public services. It advocates the development of IT skills for personnel in the public sectors to support the new technology that is emerging.

The purpose of this comparative study is to analyze and synthesize further recommendations for improvement in the TH e-GIF framework and better approaches to drive the development of smart and connected e-government in Thailand.

1. Comparison between US Federal Enterprise Architecture (FEA) and Thailand e-Government Interoperability Framework

This section presents a comparison between the United States Federal Enterprise Architecture Framework so called FEA[2] and Thailand e-Government Interoperability Framework, TH e-GIF. The purpose of this comparison is to identify opportunities for further improvement suggestions of the framework and approaches for Thailand. The reasons for choosing the FEA for comparison are because of the similarity in the concept of Enterprise Architecture (EA) and it has notable features which can generate ideas for further improvement for Thailand. For the comparative study and analysis of TH e-GIF with other similar e-Government interoperability frameworks, please refer to other reports such as the 30-models comparative report[3] and other TH e-GIF project reports (2007, 2009, and 2012).

The Federal Enterprise Architecture Framework is a conceptual model that begins to define a documented and coordinated structure for cross-cutting businesses. FEA is designed to support collaboration in the development of structural optimization and increase economies of scale. FEA provides an organized structure and a collection of common terms by which Federal segments can integrate their respective architectures into FEA. FEA consists of six major work process components. PRM is a performance-oriented reference model to support evaluation and measurement performance of work process. BRM is a transaction reference model that emphasizes collaboration and service both intra-agency and extra-agency. DRM is

[2] http://www.whitehouse.gov/sites/default/files/omb/assets/egov_docs/common_approach_to_federal_ea.pdf
[3] http://www.cstransform.com/resources/white_papers/InteropAnalysisV2.0.pdf

a data exchange and collaboration support model. ARM is a clustering of applications and systems in accordance with standards and technology support services and collaboration model. IRM is an administrative structure of the government to support collaboration and define technology standard. SRM is a security management model to define policy and security plan.

1.1. Overall comparison.

The six major components of FEA have the similar structure and concept as in the TH e-GIF framework which also declares six critical success factors. The comparison of TH e-GIF and the US FEA is as shown below in Table 1

Table 1: The comparison between US FEA and TH e-GIF

	FEA of USA	Six Critical Success Components in TH e–GIF
1. PRM	**<u>PRM Performance Reference Model(PRM)</u>:** - PRM supports architectural analysis and reporting in the strategy sub-architecture view of the overall EA. - PRM is both a taxonomy and a standard method for performance measurement. It provides for a common approach to performance and outcome measurements throughout the Executive Branch of the Federal Government, as is required by the Government Performance and Results Modernization Act of 2010 (Public Law 111-352). -PRM accomplishes these goals by establishing a common language to describe the outputs and measures used to achieve strategic objectives through coupled business services (mission and support). - PRM shows the linkage between internal business components and the achievement of business and customer-centric outputs and outcomes. - PRM helps to support planning and decision-making based on comparative determinations of which programs and services are more efficient and effective.	**Political Will:** The strong political will creation and the grant of resources support is spelled out the most important factor for implementing collaborative e-government projects. It must be ensured by the highest level possible policy decision makers related to those initiatives. Since these projects are normally involving with several cross-ministries government departments, therefore, in most cases the mandates must be secured at the Government Cabinet level, or at least the MOU agreement among all heads of Ministries or Departments involved. Based on the enterprise architecture concept, TH e-GIF suggests that the strategic directions should be articulated within the Architecture Vision and **Business Architecture (BA)**. **Process agreement as the key component in Business Architecture:** Executive officers, staffs and relevant stakeholders should be involved in the analysis of "as is" and "to be" business processes. As a result, all involved stakeholders should understand and agree on the new "to-be" processes and also work collaboratively on data semantics and harmonization. **Differences:**

	FEA of USA	Six Critical Success Components in TH e–GIF
		** FEA is mandatory by laws for all federal agencies to comply as the important condition for budget approval and implementation. The TH e-GIF, though mandated by the Cabinet but only as the suggested guidelines for government agencies and they are not forced to comply. Except the e-government projects with more than 100 million bath, those projects must develop the clear enterprise architecture design and blueprint before the budget approved as they are oversaw and approved by ICT Ministry. **** PRM has a clear guideline for performance measurement in which TH e-GIF is still lacking.
2. BRM	**<u>BRM Business Reference Model (BRM)</u>**: - BRM provides a functional view rather than a structural (organization chart) view of Federal Government organizations and their lines of business, including mission and support business services. - BRM describes an organization through a taxonomy of common (shared) mission and support service areas instead of through a stove-piped single organizational view. - BRM therefore promotes intra- and inter-agency collaboration and serves as the underlying foundation for sector and federal-wide shared services strategies	Business Architecture (BA) is one of the most important component as suggested in TH e-GIF. BA refers to the business strategies, governance, organizations and their structures, and key business processes. The "As-Is" and the "To-Be" of the strategies, governance, organizations and key business processes involved in the scope of connected e-government projects must be studied, analyzed and synthesized. The business process analysis (BPA) and its detailed methodology is distinctively recommended within TH e-GIF as the most crucial part since the "as-is" business process must be collected, described and analyzed to identify gaps, bottlenecks and opportunities for improvement, then the new, better, more, simplified more efficient, lower cost, and/or

	FEA of USA	Six Critical Success Components in TH e–GIF
		more compliance "To-Be" business processes must be synthesized and agreed among key stakeholders. These "To-Be" business processes can be enabled by just process simplification, new regulations/laws, and/or information and communication technology. **Inter-agency collaborative platform** is also emphasized as one the critical success factors in connected and interoperable e-government projects. **Differences:** * BRM has provided a clear taxonomy of common and shared mission and support service areas instead of through a stove-piped single organizational view. This taxonomy analyzes from all US federal agencies, and generated very clearly overall architectural blueprint of shared mission and service areas of the nation, thereby this national-level picture of all high-level collaborative e-government programmes guides the development roadmaps for the country. TH e-GIF has something similar but not the detailed analysis and alignment of mission and key business processes of all key Ministries and Departments. However, the high-level roadmap has been proposed spelling out key collaborative strategies for interoperability, e.g. connected e-government for health care, business facilitation, agriculture enhancement, logistics services, homeland security, disaster and risk management, justice procedures, and social welfares.

	FEA of USA	Six Critical Success Components in TH e–GIF
3. DRM	**DRM Data Reference Model (DRM)**: - DRM is designed to provide a flexible common framework for effective sharing of government information across organizational boundaries, increase integration and re-use opportunities, and support semantic interoperability while respecting security, privacy, and appropriate use of that information. It enables agencies to manage information as national assets to better serve the American public and meet mission needs. - DRM provides a standard means by which data may be described, categorized, and shared.	TH e-GIF proposes similar concept of "**Data Architecture (DA)**" based on the TOGAF standard. A specific methodology called "Data Harmonization" is emphasized as a mechanism and guideline for all key relevant stakeholders to discuss, describe, categorize, and harmonize their data elements, semantic and definitions. The common set of data elements, definitions, related codes must be commonly understood and agreed among key authorized stakeholders in the scope of the connected/interoperable e-government projects.
4. ARM	**ARM Application Reference Model (ARM)**: - ARM is a component-driven taxonomy that categorizes the system and application related standards and technologies that support and enable the delivery of service components and capabilities. -It also unifies existing agency application portfolios and guidance on standard desktop configurations by providing a foundation to advance the reuse and standardization of technology and service components from a Federal Government perspective.	The similar concept in TH e-GIF is the recommendation in developing clear and precise "**Application Architecture (AA),"** The application architecture describes the structure, its components (applications sub-systems) and behavior of applications used in a business. It focused on how agencies interact with each other and with users. It is specified on the basis of business requirements. This involves defining the interaction between application programs, databases, and systems. This helps identify any integration problems or gaps in functional coverage. **Difference :** ** The key concept is not much different.
5. IRM	**IRM Infrastructure Reference Model (IRM)**:	TH e-GIF recommends the design and development of

	FEA of USA	Six Critical Success Components in TH e–GIF
	- IRM is a component-driven taxonomy that categorizes the network/cloud related standards and technologies to support and enable the delivery of voice, data, video, and mobile service components and capabilities. - IRM also unifies existing agency infrastructure portfolios and guidance on standard desktop configurations by providing a foundation to advance the reuse and standardization of technology and service components from a Federal Government perspective	**Technology Architecture (or sometimes called Technical Architecture),** again based on the TOGAF standard. During the Technology Architecture stage in the TH e-GIF framework, it suggests the analysis of the "As-Is" and design of the "To-Be" technical infrastructure that are required to support the "To-Be" business, data, and application services (the above BA, DA and AA respectively). Technology architecture normally refers to the logical software and hardware capabilities that are required to support business strategies, organization, business process, data architecture and application architecture of the organizations involved. TH e-GIF also provides a set of technical open protocols and standards of 132 items classified within 7 categories such as data exchange standards, data formats, communication and secured protocols. However, all these are provided as the recommendations, and they must be chosen and "agreed" among each group of collaborative e-government projects, e.g. all stakeholders in the NSW project commonly agree to use the ebXML Messaging Service Protocol v2.0 as the secure messaging protocol for conducting electronic data and service exchange among different IT platforms.

	FEA of USA	Six Critical Success Components in TH e–GIF
		Difference : **IRM discusses more clearly about cloud-related common technology to support various data exchange and mobile services. **The recommended list of TH e-GIF suggests some technical protocols and standards for e-government related to networking, communication protocols, web technology, mobile services and security-related standards, but IRM does not bother to recommend such a list.
6. SRM	**SRM Security Reference Model (SRM)**: - SRM provides a roadmap that assists agencies in integrating IT security/privacy with EA. - SRM provides a mechanism for identifying security and privacy requirements. - SRM promotes inclusion of security and privacy in business activities and processes. - SRM integrates the NIST "Risk Management Framework" and the organization's system development life cycle processes to ensure that relevant security and privacy requirements are integrated and continuous monitoring is implemented. - SRM helps program executives understand how the Federal Information Processing Standards (FIPS) recommend about confidentiality, integrity, and availability and the eight privacy Fair Information Practice Principles (FIPPs) fit within enterprise architecture planning, while leveraging standards and services that are common to the enterprise and the government.	TH e-GIF provides a recommended list of standards related to security, e.g. technical standards for data encryption and public key infrastructure, digital signature, and secure communication protocols. **Differences:** TH e-GIF doesn't provide any detailed guideline on how to develop the secure ICT architecture and infrastructure. TH e-GIF doesn't spell out any suggestions on risk management. Approaches and recommendations about data security and privacy have not been elaborated in TH e-GIF.

1.2. The comparison of the methodology

FEA Method

FEA suggests an approach for overall development process and methodology called "The Collaborative Planning Methodology (CPM)[4], as shown in Figure 1. CPM is a simple, repeatable process that consists of integrated, multi-disciplinary analysis that results in recommendations formed in collaboration with leaders, stakeholders, planners, and implementers. The CPM consists of two main phases: (1) Organize and Plan and (2) Implement and Measure. Although the phases are shown as sequential, in fact there are frequent and important iterations within and between the phases. In the first phase, the architect serves a key role facilitating the collaboration between leadership and various stakeholders to clearly identify and prioritize needs, researches other organizations facing similar needs, and formulates the integrated set of plans to define the roadmap of changes that will address the stated needs. In the second phase, the architect shifts into a participatory role, supporting other key personnel working to implement and monitor change related activities. As part of the second phase of the methodology, the architect specifically supports investment, procurement, implementation, and performance measurement actions and decisions.

Development Methodology as suggested in TH e–GIF

TH e-GIF suggested a development methodology of five phases so called Inception Phase, Elaboration phase (Detailed EA Design), Planning phase, Execution/Construction Phase, and Change Adoption Phase. In each phase, it is suggested that ten key critical success components should be considered, these ten components are iteratively analyzed as similar to the TOGAF ADM (Architecture Development Cycle/Method). Each of these ten key components must be studied and analyzed to understand the “As is”, their gaps and improvement opportunities, and then synthesized to propose the new and better “To be” conditions. All these ten critical components should be revisited during the Inception Phase, Elaboration phase, Planning phase, Execution/Construction phase and Change Adoption Phase, but of course, with different levels of depths and perspectives. The looping of the development cycle be made until the "To-Be" of all these ten components are s accepted by all key parties.

[4] http://www.whitehouse.gov/sites/default/files/omb/assets/egov_docs/common_approach_to_federal_ea.pdf

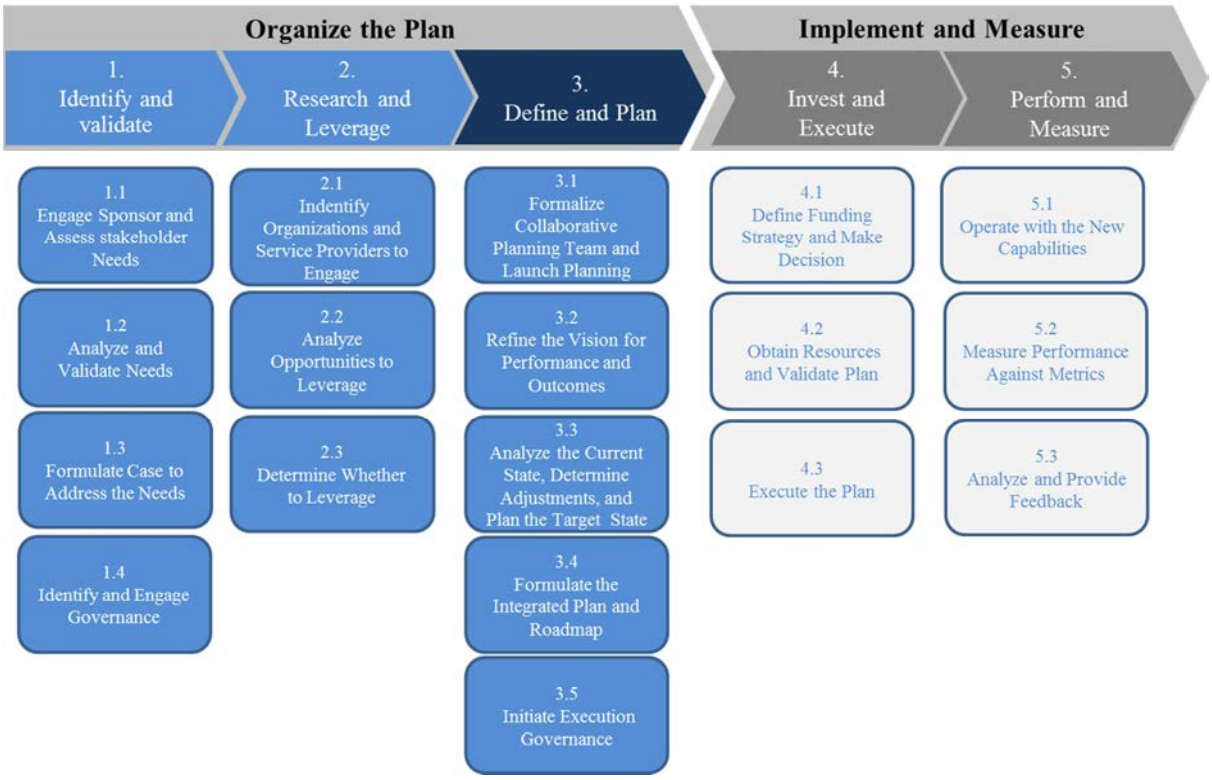


Figure 1: Collaborative Planning Methodology of FEA

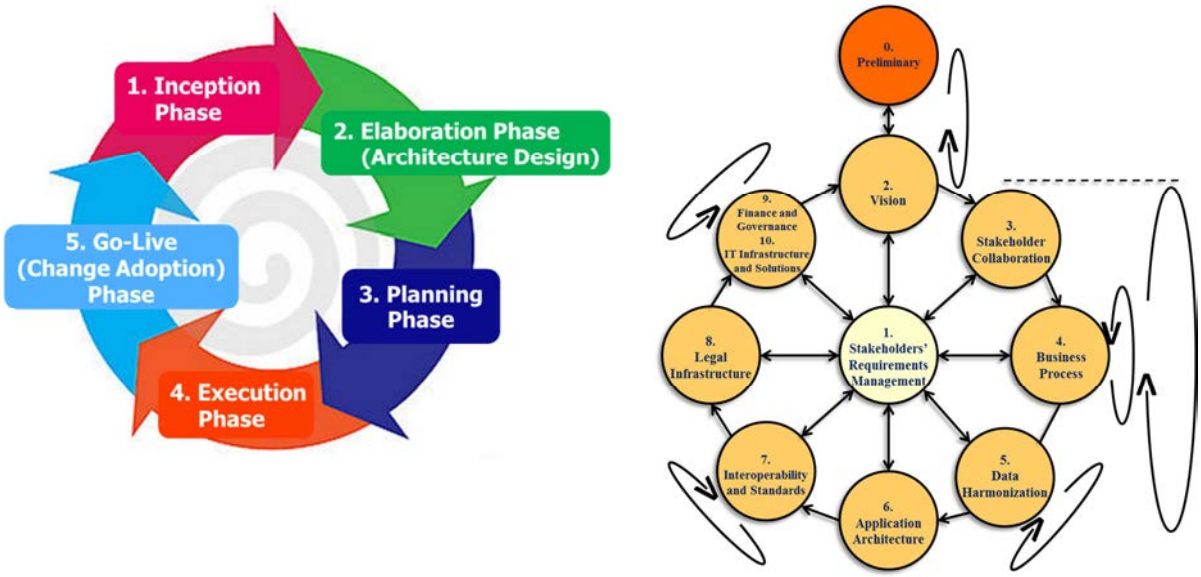


Figure 2: Five phases of development and all ten critical components must be considered in each phase but with different depths as suggested by TH e-GIF

Phase 1: Inception Phase (Preliminary Study) of TH e – GIF vs. Identify and Validation of FEA

This phase is similar to "Identify and Validation" of FEA, because it is an early state of operation. The objective is to find requirements and target, define stakeholders, leaders and operational staffs. In the inception phase, ideas and primary opinions among stakeholders, leaders and operational staffs are analyzed exchanged. Some quantitative and qualitative indicators for costs and benefits should be analyzed at least roughly for the viable of possible connected e-government projects. If the vision, possible benefits, future collaboration and at least some high-level enterprise architectures are analyzed and accepted among the initial and key stakeholders and sponsors, and they agree to work and link together, the next step should start. If they disagree, the next step should not start.

In Identify and Validation, it sets some necessary components to achieve such as factor and target coordination. Then they created Initial performance metrics for measure projects. It can be seen that the FEA supports the synchronization of the units, all units are linked to the mission, So in the first step it can be a factor, and goals of the agencies involved at all (no one will deny that the organization does not have a link) and FEA aims to the success of the work to achieve performance in line with the goals set forth since the first step of the work.

Phase 2: Elaboration (Detailed Architecture Design) Phase of TH e–GIF vs. Identify and Research and Leverage of FEA

The key concepts of Phase 2 Research and Leverage of FEA and Elaboration of TH e–GIF are quite similar even though the detailed suggested steps are different. The Elaboration phase focus on how to analyze the detailed "As-To" and design the "To-Be" environment of each of the ten critical components of the overall collaborative e-government projects. The process starts from the analysis of “As-is”, identify gaps and improvement opportunities, and then design the proposed “To be” to achieve the integration, electronic data and e-service exchange among government agencies.

While Research and Leverage emphasizes on the research of other organizations and service providers to assess whether they have similar needs and whether these organizations have already met these needs or are currently planning to meet these needs. The architects lead the assessment of the applicability of the other organizations’ experiences and results and help to determine whether there are opportunities to leverage or work together to plan. Once these organizations and their needs and experiences have been identified and assessed, the architect formulates a set of findings and recommendations detailing the applicability and opportunity for leverage.

Phase 3: Planning Phase of TH e – GIF and Identify and Define and Planning of FEA

In Phase 3 of FEA "Define and Planning Phase" and Planning Phase of TH e – GIF are also very similar in concept. However, FEA provides quite clear criteria for measuring the success of the work. The detailed architecture as developed and agreed among the key stakeholders and sponsors in the Elaboration (Design) Phase will be the basis for migration plan/development roadmap, for a long-term programmes, the development projects and their detailed term-of-references will be developed and funding (investment) should be secured in this phase, such that the procurement and construction of the projects will be carried out in the next phase.

Phase 4: Execution/Construction Phase of TH e – GIF and Identify and Invest and Execute of FEA

In step 4 of FEA "Invest and Execute" and Construction Phase of TH e – GIF are slightly different. Construction Phase is the further detailed design, development and installation of technical, software, network infrastructure software, system and application software.

While FEA Invest and Execute discusses finance, investment and construction/execution. If no investment, return to Phase 1. To modify the plan as in Step 3 and Step 4 based upon the types of changes, e.g. policy changes, organizational changes, technology changes, process changes, and skills changes.

Phase 5: Adoption (Change Management) Phase of TH e – GIF and Identify and Performance and Measurement of FEA

In Phase 5 of the FEA "Perform and Measure" Phase and Adoption Phase of TH e - GIF are again similar in concept but different in details. FEA provides better detailed guidance on performance and measurement of both outputs and outcomes (impacts) of the projects. While TH e-GIF emphasizes more on the change management and adoption approached for engaging both government staffs (internal users), and citizens/business entities (external users) to adopt to the new environments, new practices, and new systems. This is quite a challenge to most government staffs and citizens.

The Adoption Phase focuses on encouraging target users and relevant parties to be familiarize and adopt to the new applications such as training for new users, and piloting adoption. Thailand still needs a better approach for this endeavor.

While FEA Perform and Measure focuses more on the measurement of outputs and outcomes as defined in first phase (FEA Identify and validate). TH e-GIF should be improved in this perspective also such that the planned outputs/outcomes and return on

investment should be articulated and quantified, and can be measures and compared with the actual outputs/outcomes and return on investment.

2. Comparison between European Interoperability Framework (EIF) and Thailand e-Government Interoperability Framework

This section presents a comparative study between the European Interoperability Framework (EIF)[5] and Thailand e-Government Interoperability Framework (TH e-GIF). The purpose of this comparison is to identify opportunities to improve the TH e-GIF framework for Thailand.

The objectives of EIF in linking the countries in Europe are 1) to support and encourage public services of the European countries that have been linked with a cross border, 2) to serve as guidelines for the public groups such as organizations, non-government organizations, nonprofit organizations and the public, and 3) to complement and be rooted in a common framework linking national (NIFs) in Europe, that are linked together in Europe and to facilitate the delivery of low cost and efficient public services. As a result of collaboration, Information exchange, Information sharing. Information and shall be reused.

EIF suggests the four levels of interoperability. The first level is the Legal Interoperability that provide guidelines for legislation to allow the exchange of information in accordance with the appropriate legislation. The second level is the Organizational Interoperability to develop a process that works well in different organizations and achieve the agreed goals and mutual benefits. The third level is the "Semantic Interoperability." In this level, data used in the exchange must be accurate and all parties must understand the meaning of the corresponding data. The fourth level is the "Technical Interoperability" which involves planning techniques in linking computer systems and services. All levels of interoperability must work under the Political Context which in this case the group of European countries sharing common vision, priorities, proper and common objectives.

Each levels of interoperability deserves special attention when a new European public service is established. The practical implementation of the conceptual model for cross-border/cross-sectoral services requires each of these levels to be taken into account. The comparisons of these interoperability levels of EIF and the six critical success components suggested in TH e-GIF are shown in Table 2.

[5] European Interoperability Framework (EIF) for European public services, EUROPEAN COMMISSION Bruxelles, le 16.12.2010 COM(2010) 744 finalAnnex 2

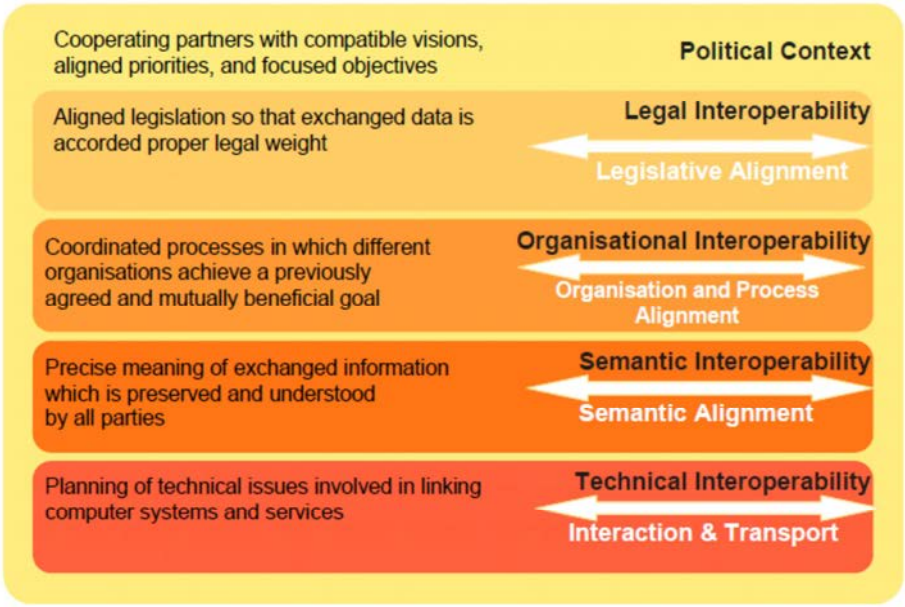


Figure 3: EIF four levels of interoperability

Table 2: The comparison of 4 levels of interoperability in EIF and the six critical success components of TH e–GIF

European Interoperability Framework (EIF)	Six Critical Success Components of TH e - GIF
Political Context: The establishment of a new European public service is the result of direct or indirect action at political level, i.e. new bilateral, multilateral or European agreements. If the establishment of a new service is the direct consequence of new EU legislation, the scope, priorities and resources needed to be established and the services should be defined when the legislation is adopted. Likewise, political support is also necessary for cross-border interoperability efforts to facilitate cooperation among public administrations. For effective cooperation, all stakeholders involved must share visions, agree on objectives and align priorities. Actions at cross-border level can only be successful if all Member States involved give sufficient priority and resources to their respective interoperability efforts towards agreed goals within agreed timeframes.	**Consistency with Political Will Creation:** The importance of political will creation and endorsement is considered the most important factor, such that the most-highest level political decision makers support and provide adequate mandates and resources. The political and strategic commitment are ensured in the national Information and Communication Technology Master Plan of Thailand 2009 – 2013. The inter-agency collaboration, e.g. in the form of national steering committees and working groups, is the key enabling mechanism to turn the policy decisions into routine management and implementation.
Legal Interoperability: Each public administration contributing to the provision of a European public service works within its own national legal framework. Sometimes, incompatibilities between legislation in different Member States make working together more complex or even impossible, even where such legislation is the result of transposing European directives into national law. Legal initiatives may be needed to remedy such situations. When information is exchanged between Member States to	**Consistency with Legal Power Establishment:** Consideration of amendments to regulations and laws to support operations and electronic information systems must be analyzed, improved, and enacted. Legal support, security practices, and data privacy practices must be established and enforced. However, TH e-GIF provides guidelines only at the national level, not the cross-border or regional level.

European Interoperability Framework (EIF)	Six Critical Success Components of TH e - GIF
provide European public services, the legal validity of such information must be maintained across borders and data protection legislation in both originating and receiving countries must be respected.	
Organizational interoperability: The partners need to reach detailed agreements on how their processes will interact (synchronize and cooperate) in order to deliver "public services where needed". 1) Alignment of Business Process The interacting entities (PA, MS-member states) participating in the alignment of business processes should achieve an alignment on the standard to be used to describe business processes. A repository of Business Process and best practices where the stakeholders can exchange information should then be established. This will also facilitate reuse of best practices among the MS. 2) Business Process Reengineering (BPR) Member State Administrations should work together to achieve cross-border integration of Business Processes by means of coordinated efforts at BPR. MS and more generally Public Administrations should adapt their business processes as required by the introduction of authentic sources. 3) Establishment of service level agreements (SLA) This involves the introduction of SLA-like instruments to formalize specific aspects of mutual assistance, joint activities,	**Consistency with Business Architecture and Process Agreement:** The concept of BA suggested in TH e-GIF covers the similar issues of organizational interoperability. Executive officers, staffs and stakeholders should be involved in the analysis the strategic directions, organizations and agencies involved, governance, and key business processes. The "as is" and "to be" processes must analyzed, synthesized and agreed. As a result, all involved stakeholder must understand the new "to-be" processes clearly and then work on data semantics and harmonization, and the information exchange requirements. This is similar to the idea of business process re-engineering as possibly enabled by ICT. However, the concept of SLA is not quite elaborated in TH e-GIF.

European Interoperability Framework (EIF)	Six Critical Success Components of TH e - GIF
and merged/coupled business processes in the scope of cross-border services provision; one means foreseen is via so-called "Memoranda of Understanding" (MoU's) between governments detailing bilateral agreements on joint actions and cooperation. 4) Assess and confront the gaps CAF (Common Assessment Framework) assessments should be performed on sectoral bases, in order to identify real deficiencies in the business processes so that needed improvements as well as alignments can be identified and implemented. The results of, these business process reengineering efforts should be applied within each member state to fill the sector gaps, the goal being to support efficient and harmonized Pan-European e-Government Services(PEGS). 5) Manage the changes These efforts at improvement should be continuous and subject to regular supervision and review. The Member States should establish a change management strategy at national level, integrated into the PEGS-specific roadmaps, and possibly at higher (national) planning levels as well. The specific aspect of interest here is the cross-border coordination of these various change management activities in order for the Member States to remain in sync.	
Semantics Interoperability: Semantic interoperability enables organizations to process information from external sources in a meaningful manner. It ensures that the	**Consistency with Data Harmonization for Meaning Exchange:** Data harmonization is the important methodology to collect, analyze, reconcile and harmonize such that a set of commonly agreed data

European Interoperability Framework (EIF)	Six Critical Success Components of TH e - GIF
precise meaning of exchanged information is understood and preserved throughout exchanges between parties. Achieving semantic interoperability in the EU context is a relatively new undertaking, not achieved before on this scale. However, a number of public administrations have recently acquired experience in this field. A starting point is to create sector-specific sets of data structures and data elements that can be referred to as semantic interoperability assets. Once these are created, the cooperating organizations will need to agree on the meaning of the information to be exchanged. Given the different linguistic, cultural, legal, and administrative environments in the Member States, this poses significant challenges. Multilingualism in the EU adds further complexity to the problem.	elements with common semantics/definitions and formats. This activity is very important to ensure the interoperability of data interchange between those different agencies. All agencies should understand the meaning of data that are used to exchange and brought this data for using in automatic operating processes. They specify data standards together to avoid misunderstanding or misinterpreting that effect the cross-agency co-operations.
Technical Interoperability: This covers the technical aspects of linking information systems. It includes aspects such as interface specifications, interconnection services, data integration services, data presentation and exchange, etc. Therefore, technical interoperability should be ensured, whenever possible, via the use of formalized specifications, either standards pursuant to EU Directive 98/34 or specifications issued by ICT Industry for and consortia.	**Consistency with Technical Architecture:** Technical architecture must be designed to support the proposed business architecture, data and application architectures. To ensure the interoperability at the technical, logical and physical systems, TH e-GIF also provides a recommended list of technical standards and protocols to be chosen such that different ICT platforms can be implement separately but then can be connected and electronically exchanged with these open interoperability protocols. TH e-GIF proposed the choices of technical standards in 132 items classified into 7 categories, such as data exchange standards, and secure communication protocols.

From the comparative analysis as summarized in Table 2, we note that the key concepts of EIF and TH e-GIF is very similarity, and the differences are mainly in the detailed descriptions. TH e-GIF has discussed the Inter–agency collaboration and social/cultural change which must be established and routinely managed, but EIF does not mention this importance but to a less extent. EIF doesn't explain much on the development process and methodology, while TH e-GIF clearly suggests its development methodology using the TOGAF ADM (with 10 components to be analyzed, designed and implemented) and the recommended 5 step-by-step approach.

3. Comparison between 1GovEA of Malaysia and TH e-GIF of Thailand

Developed in 2012, the original concept of the e-government enterprise architecture framework of Malaysia, so called 1GovEA[6], is to improve the organizational culture of the public sectors in Malaysia in order to increase productivity, creativity and innovation of the governments. The ultimate vision is to create new efficient and effective government processes such that the citizens gain more confidence in the online public services. The government online services must be effective, efficient and responsive to the needs of the citizens and enterprises.

The 1GovEA framework should provide diverse perspectives and initiatives for business functional innovations enabled by ICT. The key actions include

1) Determining the area of collaboration and shared process, systems or data.
2) Upgrading and expanding the use of shared processes, system and data to achieve results by State Development Plan.

Government Enterprise Architecture of Malaysia

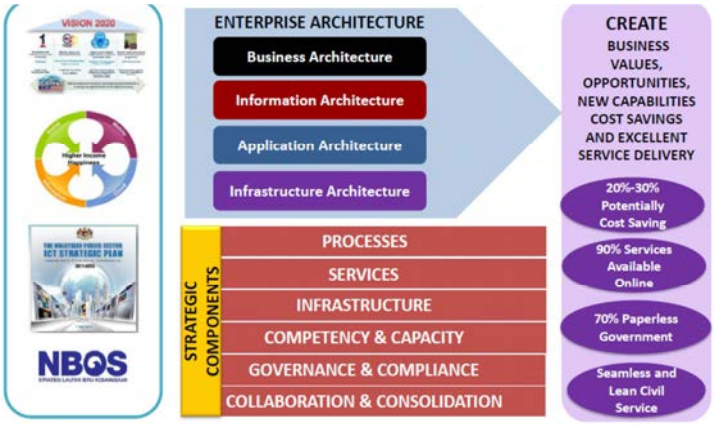


Figure 4: 1GovEA Framework

[6] Conference "Business IT Architecture Series or BITAS 2013" on May 16th,2013

Figure 4 illustrates the key components within the 1GovEA Framework. The concept of Enterprise Architecture has been adopted including 4 enterprise architecture domains namely Business, Information, Application and Infrastructure Architectures. The framework shall guide the creation of business value, opportunity, feasibility, economical price and efficient services. This concept is similar to TH e-GIF which is also based on the similar EA framework. .

The 1GovEA has suggested another 6 strategic components namely Processes, Services, Infrastructure, Competency & Capacity, Governance & Compliance, and Collaboration & Consolidation.

Figure 5 indicates other related and existing initiatives aligned with this 1GovEA framework as classified in Business Architecture, Application Architecture and Infrastructure Architecture. In 2013, more than 60% of Malaysia's services are available online.

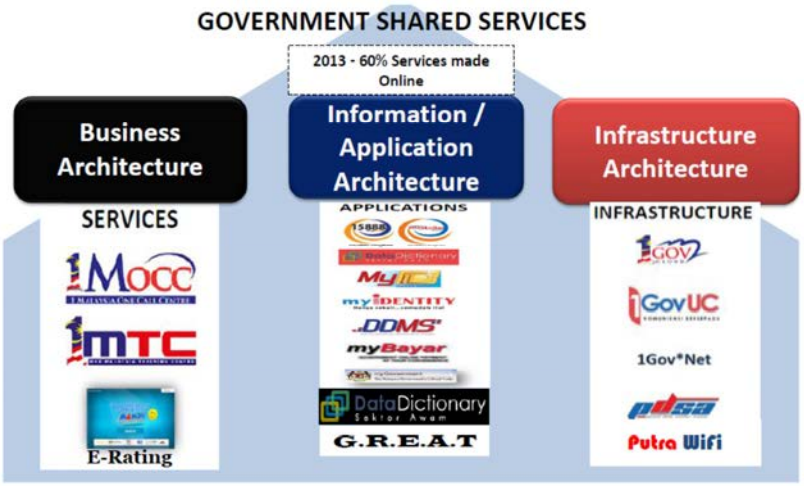


Figure 5: Governance Shared Services

Concerning the Competency & Capacity component of 1GovEA, the supporting skills are proposed for both core ICT and non-core ICT personnel as shown in Figure 6. The strategy and guidelines for 3R including Reskill, Replace, and Redeploy have been elaborated.

In this case, 1GovEA has provided a better and more elaboration than in the TH e-GIF.

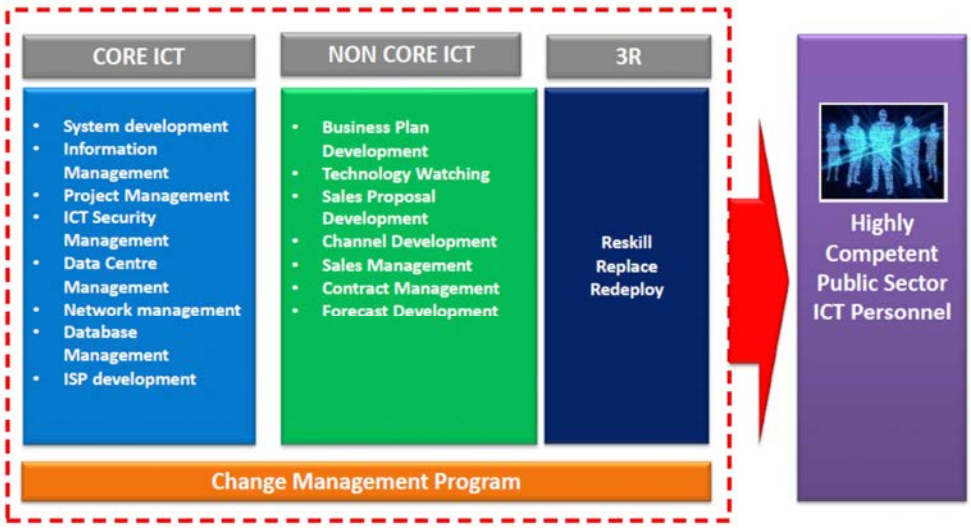


Figure 6: Competency & Capacity

1GovEA mentions the mechanisms, measurement, evaluation and monitoring of KPI from personnel, process and technology views. However, no specific and quantitative measures or clear indications have been mentioned, this is similar to TH e-GIF. This is an area for further improvement. The 1GovEA has a blueprint of shared service framework which covers a variety of government services that divided by 5 parts: Organization & Governance, Vision, Service Platform, Service Delivery and Continuous Service Improvement. This integrated concept is not clearly discussed in TH e-GIF.

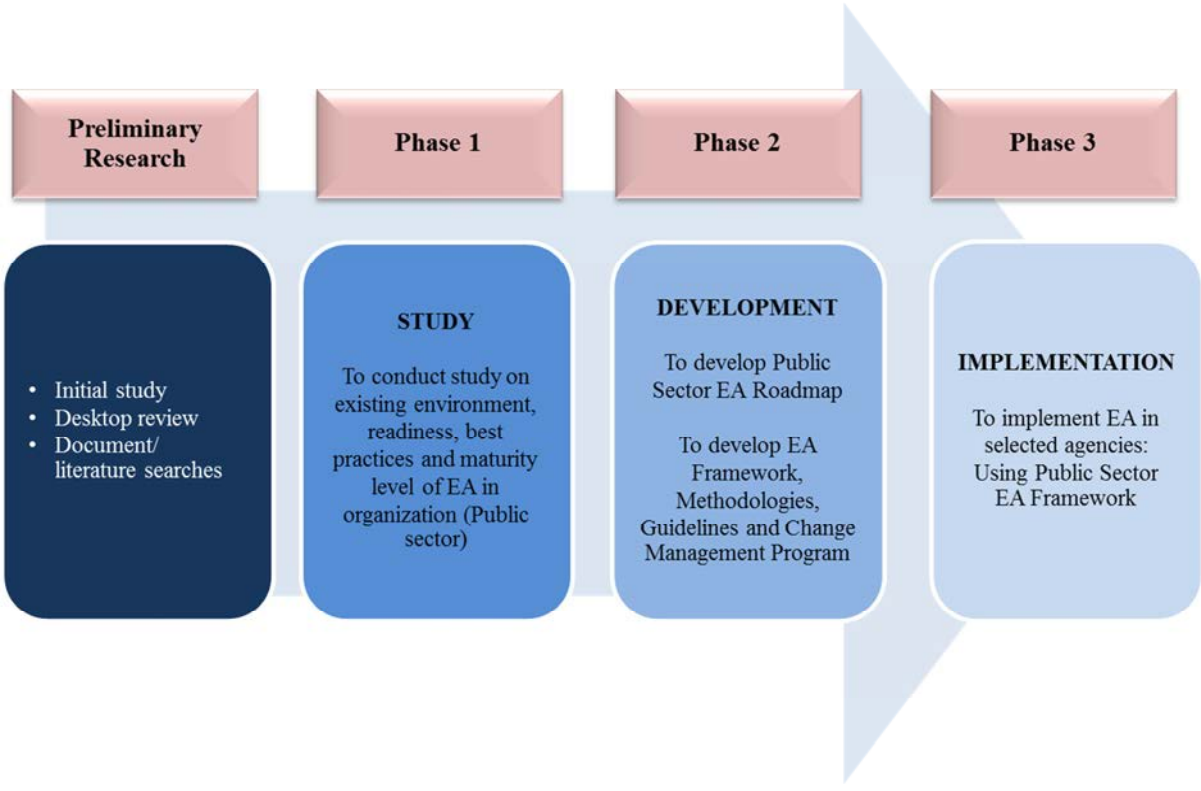


Figure 7: The 1GovEA Development Road Map

The 4 steps of the 1GovEA roadmap is similar to the TH e-GIF development methodology.

1. Preliminary Research: study basic documentation or relate work
2. Phase 1 Study: available resources, preparedness, best practices and EA level
3. Phase 2 Development: Public sector roadmap, EA Framework, Methodologies, Guidelines
4. Phase 3 Implementation: Implementation in organizations.

The current status of the 1GovEA framework is still at a very early state. The Malaysia government just announces this framework in early 2013. It still needs time for proof of effectiveness. The drive of this framework concept will take some more years ahead to put it into practices, actual implementation and realization.

4. The recommendation for TH e – GIF improvement

The study reports above compared the features of the US Federal Enterprise Architecture (FEA), 1GoveEA of Malaysia, and EU EIF with Thailand e-Government Interoperability Framework (TH e-GIF). The following points summarize the improvement opportunities for TH e-GIF.

4.1. Measurement of outputs and outcomes

The findings from FEA suggests that a good assessment and measurement framework should be established and utilized for e-government projects starting from the inception phase till the adoption phase. FEA provides a good performance reference model (PRM)[7] to suggest mechanisms and approaches to measure and monitor outputs and outcomes of the projects. PRM consist of measurement area, measurement categories, measurement groupings and measurement indicators. PRM accomplishes these goals by establishing a common language to describe the outputs and measures used to achieve strategic objectives through coupled business services (mission and support). PRM provides for a common approach to performance and outcome measurements throughout the executive branch of the government. This framework is strengthened by laws, i.e. the Government Performance and Results Modernization Act of 2010[8] (Public Law 111-352).

There is no clear measurement method or framework offered in TH e-GIF, therefore **measurement framework and methodology including risk management should be developed and utilized within the new version of TH e-GIF. The objectives of this measurement framework should include at least the followings.**

1) **Measure and evaluate the results which should be clearly the responsible goals of each agency (and/or key users, if relevant).**
2) **Reduce the risk and increase the chances of successful implementation of the planned target.**

[7] http://www.whitehouse.gov/sites/default/files/omb/assets/fea_docs/FEA_CRM_v23_Final_Oct_2007_Revised.pdf
[8] http://www.gpo.gov/fdsys/pkg/PLAW-111publ352/pdf/PLAW-111publ352.pdf

3) **The criteria to measure and evaluate the standards for the following links in the future.**

The first step of this improvement may be by starting a focus-group meeting with stakeholders to establish initial guidelines or procedures to measure and evaluate the results.

For possible effectiveness of TH e-GIF, the Cabinet should enact legislate or mandate a policy for all government agencies to adopt the Enterprise Architecture Concept and TH e-GIF for all e-government projects (also with the performance measurement) as parts of mandatory conditions for budget approval, architecture design, implementation, adoption, operations, progress reporting and output/outcome measurement.

4.2. Security Framework and related Methodology

The FEA security concern has been injected in all parts of the FEA models such that risk identification and management are applied throughout all phases in the development cycle. The risks will be monitored, controlled and mitigate accordingly.

1) Each agency approaches to prepare the technology standards of the enterprise architecture.
2) Create a mechanism to determine the procedures and security policies.
3) There are security procedures in the transaction and process-related information.
4) Cooperate with the security agencies of information.

In 1974, the Personal Data Protection Act sanctions provide the eight principles also known as the Fair Information Practice Principles (FIPPs)[9]. Privacy policies and procedures governing the use of personal information should cover the 8 following concepts:

1) The information is transparent and a report should be provided on the collection, dissemination and maintenance of personal information (Transparency).
2) The person must give his/her consent for the collection, maintenance, use and dissemination of information (Individual Participation).
3) There is a channel for the collection and use only for a specific purpose (Purpose Specification).
4) Personal data shall be collected only as necessary and relative to the desired objectives (Data Minimization).
5) Use the personal information only for purposes that are listed (Use Limitation).
6) Quality and integrity of data (Data Quality and Integrity).
7) With the appropriate protection of personal data (Security).

[9] http://www.dhs.gov/xlibrary/assets/privacy/privacy_policyguide_2008-01.pdf

8) There are responsible ones assigned for the implementation of these principles, and training to employees and the use of data shall be provided (Accountability and Auditing).

The detailed security framework and methodology including security policies, operational procedures, and Security ICT infrastructures, should be developed and improved within the TH e-GIF framework. Data privacy policy and operational procedures and guidelines shall also be included.

The SRM of US FEA could provide a starting point for Thailand.

The Change Adoption phase of TH e-GIF should be strengthened with more detailed guides on how to manage change, and people adoption of new environments. The mechanisms to establish and improve the Service level agreements (SLA) and Business Continuity of the systems in operation are very crucial for all critical-mission applications. These features should be improved and included in the TH e-GIF of Thailand.