

Evaluation of National e-Government Development Levels in Thailand

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Abstract—More than 2,000 governmental agencies and public organizations in Thailand pose a challenge in conducting evaluation of e-government development levels, especially as to be assessed and monitored along with the National Information and Communication Technology Policy Directives (2011-2020). This paper presents a method of data collection along with two evaluation schemes, namely, the United Nations e-Government Online Service Index (OSI) and the e-Participation Index (EPI). The elaborated results, e.g. Mean OSI of 45%, led to the conclusions validated by the ongoing development along the OSI and EPI indicators of the governmental agencies and the current ASEAN ICT Master plan 2016-2020.

Keywords—e-Government; Evaluation; Online Service Index; e-Participation Index.

I. INTRODUCTION

The Royal Thai Government encompasses 2049 offices in 20 ministries. About a decade ago the Governmental Policy has empowered the Ministry of Information and Communication Technology (MICT) to develop and drive the implementation of the e-Government strategy and governance in Thailand [1]. In particular, the Thailand e-Government Interoperability Framework (TH e-GIF) [2] has been consecutively developed since 2006 to promote collaborative e-government development.

In the years 2009-2014, MICT focused its e-government strategies on the four e-government related areas: 1) interoperability for sharing of information and services across government organizations, helping to achieve integrated services to citizens and business; 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 sourcing and community sourcing 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 [3]. Additionally, the ICT strategies of the ASEAN Economic Community agreement impacted the governmental activities in the last five years, too.

To monitor and steer the progress of the e-government development at the national level, in particular in reference to the planned targets and goals, suitable monitoring and

evaluation mechanisms are to be developed. Several international e-Government development indicators, like e.g. the UN e-Government Development Index (EGDI) and e-Participation Index (EPI) are available. The EGDI is biannually updated by the United Nations Public Administration Programme (UNPAP) since its creation in 2003. It covers all member states of the UN. The EGDI looks at the most important dimensions of e-government: (i) scope and quality of online services (Online Service Index-OSI), (ii) telecommunication connectivity, and (iii) human capacity. Government’s efforts are ranked and the parameters such as the country size, infrastructure availability, ICT penetration, as well as the level of education and skill development, are taken into account. Further, the survey led UNPAP to produce the e-Participation Index (EPI).

Yet, the EGDI (including OSI) and EPI, compiled by the UNPAP, used the data collected from outside the country, which even though providing some good indicators. These indicators do not provide much insight on which agencies are evaluated and how and where the recommendations to improve shall be applied, since only the aggregated data are provided. Therefore, these improvements suggestions are not specific enough to allow any concrete actions. Further, the UNPAP scores do not reflect some complicated issues specific to a particular country or to any particular government agencies over the time. For example, the Government Information Network (GIN) project [3], endorsed in 2005 by the Thai Cabinet, faces several challenges that cannot be identified by just ranking. The issues include, for instance, 1) the structural complexity, resulting from the combinatorial number of interactions between the system components and 2) the dynamical complexity, as a result of continuous changes and concurrently running numerous projects [4].

Therefore, this paper proposes a systematic evaluation mechanism to measure the progress of e-government development for the whole country, to be deployed regularly by an authorized national-level agency within the country itself. Upon evaluation of various alternatives both the OSI and EPI indexes have been adopted. However, a specific method of exact data collection mechanisms and their aggregation, allowing for the backtracking and thus precise actions at the place of origin, has been developed and successfully proved in a pilot evaluation presented hereafter.

The paper is organized into five sections, including this introduction. The next section briefly outlines the research

objective. Section 3 discusses relevant literature on EGDI, EPI and other e-government evaluation and indicators. Section 4 describes the proposed methodology and the results of this research. Section 5 provides the conclusions.

II. RESEARCH OBJECTIVE

This paper presents the results of the research aimed to elaborate the assessment method for subject complexity evaluation from the point of view of the ICT-enabled public services and e-government utilization.

The technological infrastructure solutions in general, other e-government related organizational and human resource issues are beyond the scope of the research presented hereafter. The dynamical complexity is treated in a separate research.

III. BACKGROUND OF THE E-GOVERNMENT EVALUATION

The ASEAN Economic Community (AEC) will affect all South East Asian member countries to interoperate e-government applications and to provide seamlessly services to all ASEAN governments, businesses and citizens. ASEAN member countries 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) [5]. Key priority actions are 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; to activate the ASEAN e-Government forum to identify key public services for ICT applications, including capacity building activities; and to enable the interoperability of products/services, information systems and networks, in a convergent environment.

The ASEAN ICT Master Plan 2015 dedicated two initiatives related directly to the e-government implementation, namely, the Initiative 2.3: Ensuring affordable and seamless e-services, content and applications and Initiative 3.2: Promoting innovation and collaboration amongst government, businesses, citizens and other institutions [6]. Although the harmonization of the ICT regulations has been foreseen for 2011 and the identification of the e-services already in 2012, any common evaluation base has not been published so far. The 2013 midterm evaluation performed under grant from ASEAN by TRPC Pte Ltd did not revealed any evaluation methodology beyond identifying the leading activities [7,8].

The ASEAN ICT Master Plan 2016-2020 [9] was 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.

Several ASEAN member countries assessed their own readiness, yet the criteria remains unspecified or general [10,11,12]. In the study, reported in this paper, special attention is directed towards the usability among others of several interoperability levels, similar to the European Interoperability Framework (EIF) [13], and the Federal Enterprise Architecture of U.S. Government [14]. Whereas both frameworks provide useful hints on how to implement the specific practices, the e-government service evaluation criteria remains unspecified, too.

The IBM Institute Digital Economy Ranking (former e-readiness rankings) [15] and WEF Networked Readiness Index (NRI) [16] also provide general ICT rankings (e.g. Thailand WEF NRI 2014: 67 of 148) including the areas like mobile or social readiness, which indirectly impact the e-government assessment. In the process of the literature analysis compared were also criteria of the Gartner Survey [17], Waseda University International e-Government Ranking [18], and ITU e-Government Implementation Toolkit [19].

Upon the criterion of its usability for the evaluation of the Thailand e-Government policy implementation, the U.N. e-Government Survey Indexes has been chosen. Therefore, this research proposes to align the method with the United Nations e-Government Survey [20]. The United Nations e-Government Survey comprehensively measures the e-government initiatives and information and communication technologies applications for the people, undertaken by the countries, which target further enhancement of public sector efficiency and streamline the governance systems to support sustainable development. The overall general conclusion of the 2012 Survey was, that while it is important to continue with service delivery, governments must increasingly place greater emphasis on institutional linkages between and among the tiered government structures to create synergy for inclusive sustainable development. An important aspect of this approach is to widen the scope of e-government with a transformative role of the government towards cohesive, coordinated, and integrated processes and institutions for sustainable development. This underlines also the United Nations e-Government Survey 2014 [21], concluding that the holistic and multi-stakeholder approach is taking shape around the world.

Thailand, according to the U.N. e-Government Survey Report 2014, has been ranked 102 out of 193 countries for its advancement of e-government development, with the score of 0.4631 averaged from the three indices: Online Service Index, Telecommunication Index, and Human Capital Index. Table I (in Appendix) shows Thailand's e-Government Development Index and Rankings by U.N. during the years 2008 to 2014.

The online service index (OSI), adopted by the U.N. e-Government Survey Report, benchmarks the progresses of e-government online services by classifying this online service index into four development stages with their meaning descriptions, as follows:

Stage 1 - Emerging Information Services: Government websites provide basic information on public policy, governance, laws, regulations, relevant documentation and types of government services provided.

Stage 2 - Enhanced Information Services: Government websites deliver enhanced one-way or simple two-way e-communication between government and citizen.

Stage 3 - Transactional Services: Government websites engage in two-way communication and electronic transactions with their citizens.

Stage 4 - Connected Services: Government websites are proactive in communicating with their citizens. Governments have moved from a government-centric to a citizen-centric approach, where e-services are targeted to citizens through life cycle events and segmented groups to provide tailor-made services.

Table II shows Thailand's Online Service Index (OSI) according to the 2014 U.N. e-Government Survey Report.

Mathematically, the e-Government Development Index (EGDI) of U.N. is a weighted average of three normalized scores on the most important dimensions of e-government:

U.N. e-Government Development Index (EGDI)=

$$= (1/3 \times \text{Online Service Index}) + (1/3 \times \text{Telecommunication Infrastructure Index}) + (1/3 \times \text{Human Capital Index}) \quad (1)$$

The second relevant group of criteria in the above mentioned U.N. Report are citizen-centric e-services for public interaction with the Government. The e-Participation Index (EPI) is composed of the following three development stages:

Stage 1 - e-Information: providing general information e.g. government structure, policies, contact points, laws, and regulations;

Stage 2 - e-Consultation: providing online polls, online survey, feedback forms, chat rooms, instant messaging, and blogs; and

Stage 3 - e-Decision Making: providing services for people engagement in decision making process, and online petition.

Thailand's e-Participation index is given in Table III.

The research methodology chosen for the elaboration of the degree of the e-government implementation in Thailand aligns further with the UN Survey criteria.

IV. RESEARCH METHODOLOGY

This research conducted a survey of e-Government services in Thailand during the month of January-March 2013 taking under considerations the indexes used by the UN e-Government Survey 2012. This survey explored the e-government online services, i.e. OSI, offered on 1,200 web sites of all 303 government units in all 20 ministries ranging from the Ministries, Departments, Divisions, Section or Unit levels. The survey includes all independent public agencies, state enterprises, and other concerned agencies. However, due

to the time constraint the public agencies at the provincial and district areas were not considered. The vast number of already analysed cases allowed sufficient proof of concept in a pilot evaluation conducted in this research.

The data obtained from the survey contain the basic information and the services of public organizations. It is further matched against the data of inter-agency interoperability acquired from the survey on data standardization for cross-agency interoperability in the project of Thailand e-Government Interoperability Framework (TH e-GIF). In the following step the aggregated data are analysed using search engines and manual examination to assess the development stages of existing e-government services provided by each government unit under investigation. The method of data calculation is described below.

The evaluation methodology based on the mean value of evaluated units per stage has been conducted on all public online services provided by each and every government unit of each ministry. Best practices have been used to evaluate the units. The overall score for each ministry is evaluated for each stage separately, as a weighted result, achieved in each of the above defined stages by the scrutinized units.

A. DATA PREPARATION

In the data collection process, we define constraints/criteria based on the four stage as suggested by the UN Online Service Index (OSI).

Stage 1 - Emerging Information Services: Government websites provide basic information on public policy, governance, laws, regulations, relevant documentation and types of government services provided. The weight, as agreed with the MICT, is set to 7%.

Stage 2 - Enhanced Information Services: Government websites deliver enhanced one-way or simple two-way e-communication between government and citizen. This stage is divided into four sub-criteria below.

- 1) downloadable forms/e-form
- 2) audio-visual capabilities
- 3) multi-lingual
- 4) two-way communication (select one or more)
 - (1) web board
 - (2) online feedback
 - (3) social media
 - (4) e-mail contact or online Q & A

If the agency fulfils all criteria, obtains 100% score. The weight of this stage is 24%.

Stage 3 - Transactional Services: Government websites engage in two-way communication and electronic transaction with their citizens. This stage is divided into four sub-criteria below.

- 1) e-voting/e-poll

- 2) online application
- 3) online payment transaction
- 4) transaction with their citizens
 - (1) end-to-end online transaction
 - (2) e-certification
 - (3) digital signature for transaction

Also here if an agency fulfils all criteria, it obtains 100% score. The weight of this stage is 30%.

Stage 4 - Connected Services: Government websites are proactive in communicating with their citizens. This stage is divided into two sub-criteria below.

- 1) Connected e-Government
- 2) Citizen Centric Services

Meeting all the criteria results in 100% score. The weight of this stage is 39%.

The example data of e-Government Online Services survey shown in Figure 1. The office of the Permanent Secretary, the Prime Minister's Office reaches 100% for Stage 1, gets all criteria for Stage 2 (reaches 100% of Stage 2), gets criteria 1 and 2 for Stage 3 (reaches 50% of Stage 3) and gets all criteria for Stage 4 (reaches 100% of Stage 4).

B. METHOD OF CALCULATION

The formula to mathematically calculate the percentage of each development stage for each individual ministry is as shown below:

$$\% \text{stage}_{(1,2,3,4)} \text{ of Ministry}_A = (\% \text{stage}_{(1,2,3,4)} \text{ of agency}_a + \% \text{stage}_{(1,2,3,4)} \text{ of agency}_b + \dots + \% \text{stage}_{(1,2,3,4)} \text{ of agency}_n) / \text{Number agencies of Ministry} \quad (3)$$

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

$$\% \text{Total E-Services Value of Ministry}_A = (\% \text{stage}_1 \times \text{weighted score } 7\%) + (\% \text{stage}_2 \times 24\%) + (\% \text{stage}_3 \times 30\%) + (\% \text{stage}_4 \times 39\%) \quad (4)$$

C. RESEARCH RESULTS

The overall evaluation of the e-serviceability (OSI) conducted in the year 2013 produced the following results:

Stage 1 - All Ministries reached 100% capabilities in providing one-way online information services.

Stage 2 - Development levels ranged between 52% and 92% with the average of 82%.

Stage 3 - Development at the average of 33%.

Stage 4 - Development levels ranged between 6% and 40%, with an average of 22%.

With the general result for all 20 Ministries, the overall average score of e-government Online Service Index (OSI) in Thailand is 45%, as illustrated in Table IV, Figure 2 and Figure 3.

The evaluation of the EPI brought the following results:

Stage 1 - e-Information: The government web sites contain information about the government structure, policies & programs, laws, regulations and other information - all units 100%, point of contact and e-mails lists 89%; community networks 59%; blogs, web fora, newsgroup 61%. The results are summarized in Figure 4.

Stage 2 - e-Consultation: The government web sites activate online pools and surveys, feedbacks 49%; chat rooms, messaging and blogs 61%. The results are summarized in Figure 5.

Stage 3 - e-Decision Making: The government officials responding to citizens 45%; online petition 90%. The results are summarized in Figure 6.

V. CONCLUSIONS

The adopted subject complexity evaluation criteria matches the UN Survey Criteria allowing the Government to take the necessary steps in assuring the national sustainable development paired with the ASEAN adopted master plan 2016-2020. The compatibility with the periodically performed surveys by the UN assures cost efficient tool for national governance assessment and implementation.

Various improvements and specific actions in each stage of government online services and each level of e-participation enhancing the capabilities in a gradual and target oriented way are on the way in Thailand. In view of the presented above results and the governmental priorities the particular actions within the area of the national security and justice related systems development are considered as strategically relevant. In the e-participation area, the recommendation of online election feasibility development has been formulated.

In procedural areas the conclusions include:

1) MICT should strengthen e-government leadership by establishing the policy coordinating unit (like Swiss ISB).

2) Enterprise architecture design units responsible for coordinated ICT development across all governmental agencies must be established.

3) A unified governmental project management approach shall be developed and mandated.

4) Unified supplier management guidelines for all governmental agencies should be adopted.

5) Centralized procurement organization (like BBL in Switzerland) is recommended.

In organizational area the recommendations include that roles enhancements of ministers, permanent secretaries, CIOs, Department Directors, Operational and ICT directors should be revisited.

Other detailed improvement recommendations after the evaluation are not the scope of this paper but discussed further in [3].

Acknowledgements: Authors express their gratitude to the Office of the Permanent Secretary, Ministry of Information

and Communication Technology of Thailand, under Ms.Methini Thepmani, for their supportive contributions of this research and indispensable collaboration in elaborating the achieved results.

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Appendix

TABLE I. THAILAND'S E-GOVERNMENT DEVELOPMENT INDEX EGDI AND RANKINGS (2008-2014) BY U.N.

Year	Rank	Index Value	Online Service Index	Telecommunication Infrastructure Index	Human Capital Index	Total Countries
2014	102	0.4631	0.1322	0.0853	0.2178	193
2012	92	0.5093	0.1699	0.0787	0.2606	193
2010	76	0.4653	0.1133	0.0576	0.2943	192
2008	64	0.5031	0.1683	0.0503	0.2843	192

TABLE II: THAILAND'S E-GOVERNMENT ONLINE SERVICE INDEX 2014 BY U.N.

Year	OSI	Stage 1	Stage 2	Stage 3	Stage 4	Total
2014	0.4409	94	34	14	35	41

TABLE III: THAILAND'S E-GOVERNMENT E-PARTICIPATION INDEX EPI 2014 BY U.N.

Year	Rank	EPI	Stage 1	Stage 2	Stage 3	Total
2014	54	0.5490	85.19	27.27	0.0	50

Table IV: Results of E-Government Services Survey in Thailand (January-March 2013)

No.	Government Agencies	Development Stage (%)				Total (%)
		1	2	3	4	
		Weighted score				
		7%	24%	30%	39%	100%
1	Office of the Prime Minister	100	74	18	20	38
2	Ministry of Defense	100	78	17	6	33
3	Ministry of Finance	100	87	37	27	49
4	Ministry of Foreign Affairs	100	52	6	12	26
5	Ministry of Tourism and Sports	100	92	38	8	44
6	Ministry of Social Dev. and Human Security	100	78	25	6	36
7	Ministry of Agriculture and Cooperatives	100	82	35	18	44
8	Ministry of Transport	100	76	36	28	47
9	Ministry of Natural Resources and Environment	100	78	35	15	42
10	Ministry of Information and Com. Technology	100	89	50	28	54
11	Ministry of Energy	100	86	33	22	46
12	Ministry of Commerce	100	85	50	38	57
13	Ministry of Interior	100	81	48	25	51
14	Ministry of Justice	100	75	27	29	45
15	Ministry of Labor	100	85	40	40	55
16	Ministry of Culture	100	78	33	6	38
17	Ministry of Science and Technology	100	88	30	17	44
18	Ministry of Education	100	80	27	23	43
19	Ministry of Public Health	100	90	43	40	57
20	Ministry of Industry	100	84	33	26	47
21	Group of Independent Public Agencies	100	82	22	22	42
Average		100	82	33	22	45

ชื่อหน่วยงาน (Names of Public Agencies)		Stage 2							Stage 3						Stage 4		Stage 2 (%)	Stage 3 (%)	Stage 4 (%)
		a	b	c	d				a	b	c	d			a	b			
					1	2	3	4				1	2	3					
1. สำนักงานนายกรัฐมนตรี (Office of the Prime Minister)																			
1.1	Office of the Permanent Secretary, The Prime Minister's Office	✓	✓	✓	✓	✓		✓	✓	✓					✓	✓	100	50	100
1.2	The Public Relations Department		✓	✓			✓	✓		✓							75	25	0
1.3	Office of the Consumer Protection Board	✓			✓	✓	✓	✓	✓	✓					✓	✓	50	50	100
1.4	The Secretariat of the Cabinet	✓		✓				✓									75	0	0
1.5	The Secretariat of the Prime Minister	✓		✓	✓			✓	✓								75	25	0
1.6	National Intelligence Agency	✓						✓									50	0	0
1.7	The Bureau of the Budget	✓		✓	✓	✓			✓	✓							75	50	0
1.8	Office of the National Security Council	✓	✓				✓	✓									75	0	0
1.9	Office of the Council of State	✓	✓	✓	✓	✓	✓										100	0	0
1.10	Office of the Civil Service Commission	✓		✓	✓	✓			✓	✓					✓	✓	75	50	100
1.11	Office of the Public Sector Development Commission	✓		✓	✓	✓	✓	✓	✓	✓							75	50	0
1.12	Office of the National Economic and Social Development Board	✓	✓	✓	✓			✓		✓					✓		100	25	50

Figure 1. Data of e-Government Online Service in Thailand (January-March, 2013).
Surveyed by KU-INOVA

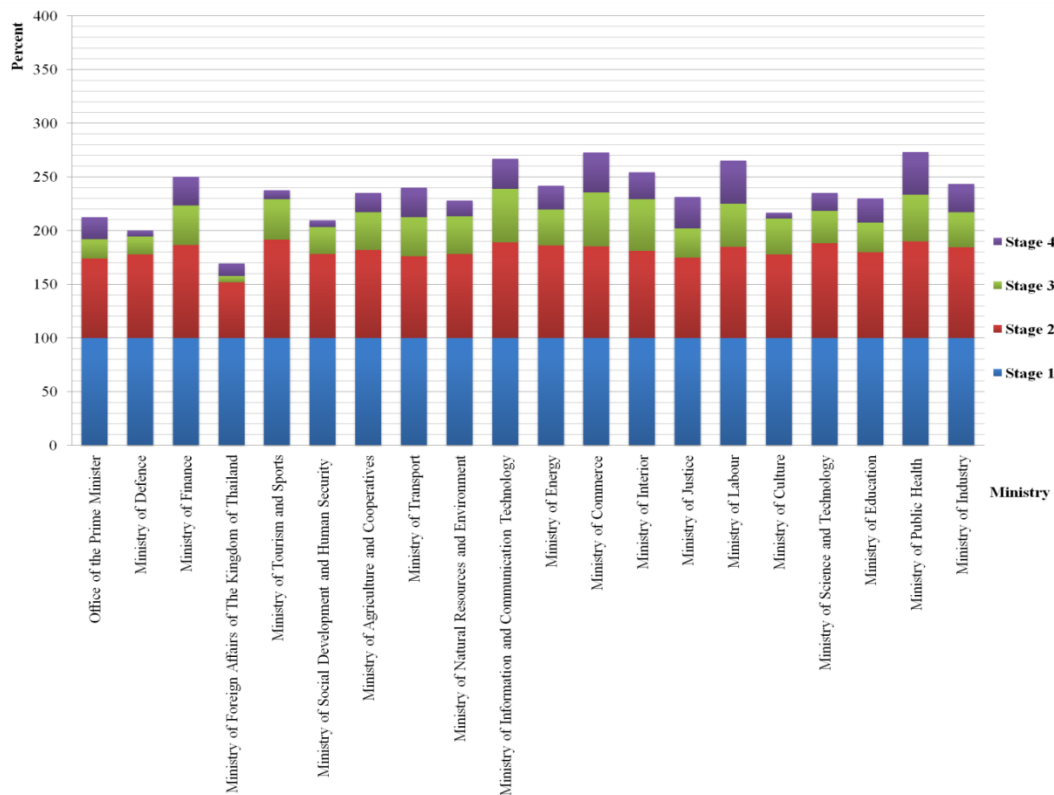


Figure 2. E-Government Online Services Levels in Thailand
(surveyed in January-March 2013)

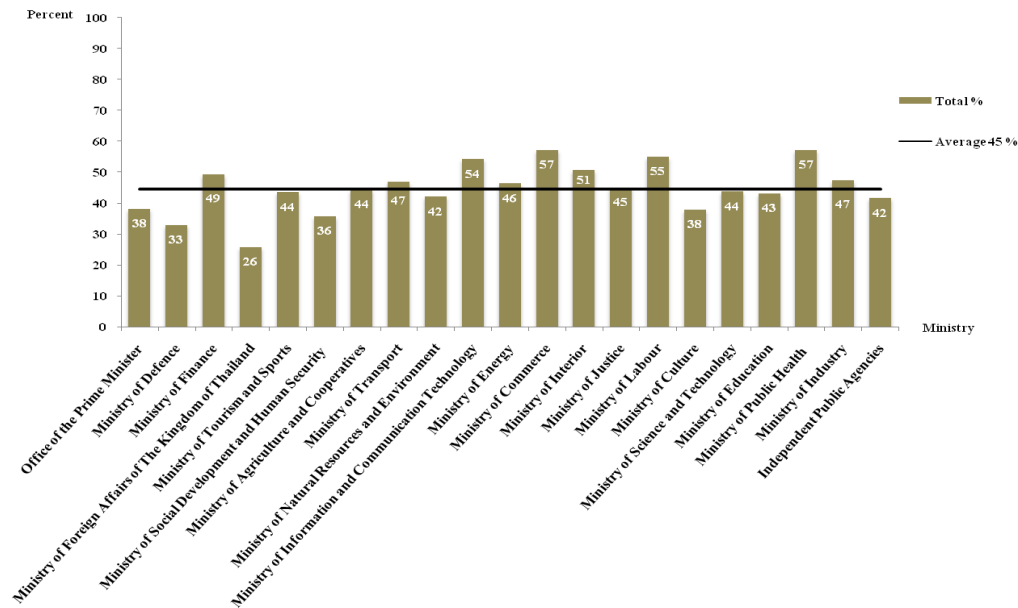


Figure 3. E-Government Services Development Stages in Thailand
(surveyed in January-March 2013)

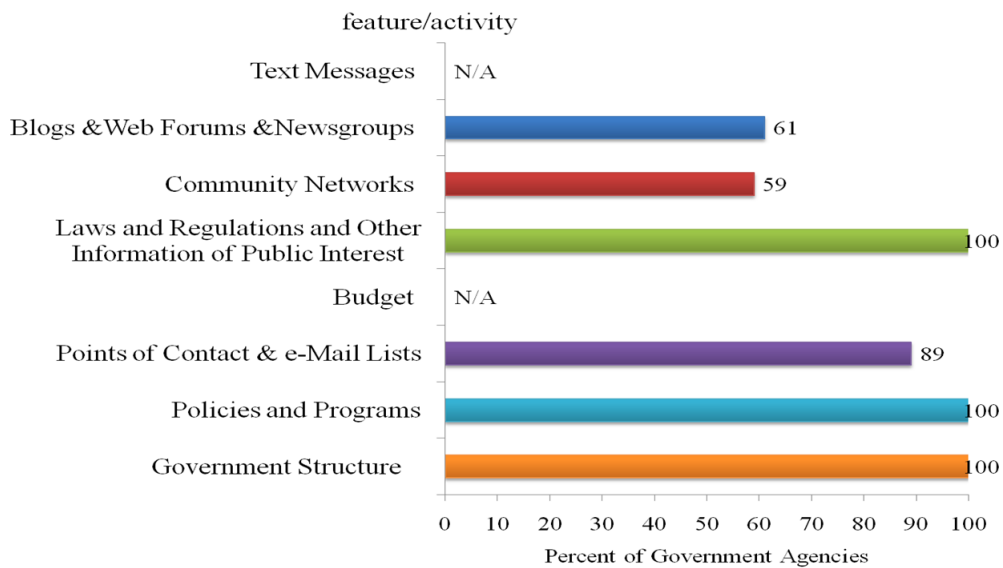


Figure 4. E-Information Activities/Tools to Enhance E-Participation in Thailand
(January-April 2013)

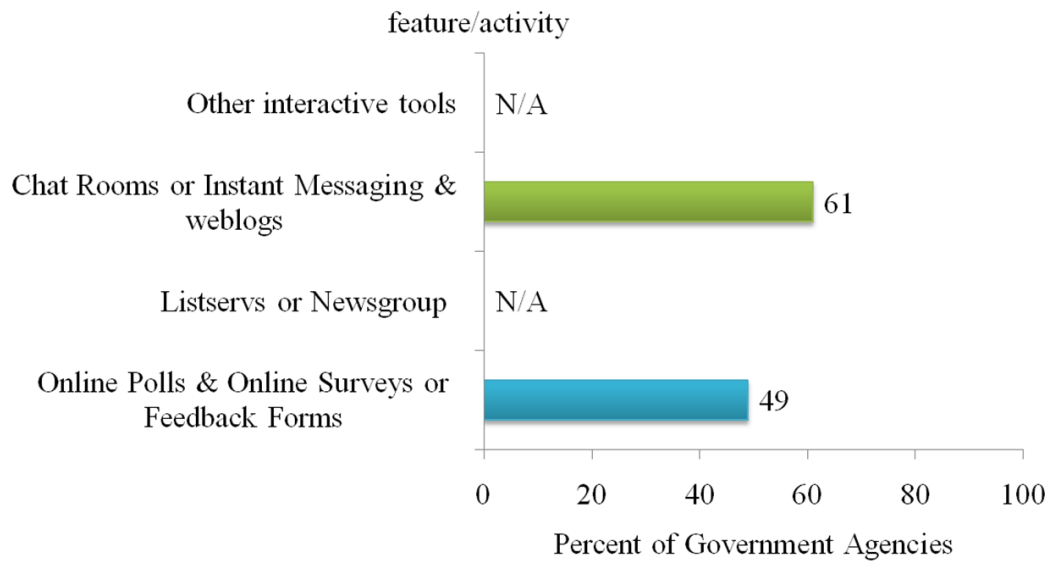


Figure 5. E-Consultation Activities/Tools to Enhance E-Participation in Thailand (January-April 2013)

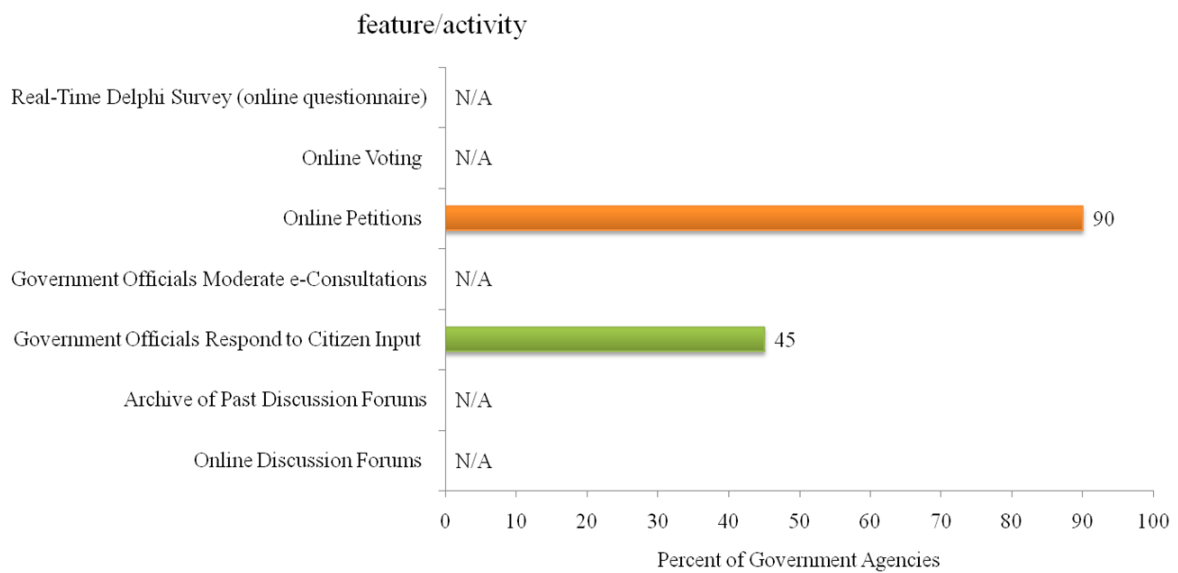


Figure 6. E-Decision Making Activities/Tools to Enhance E-Participation in Thailand (January-April 2013)