Perspectives of citizens towards e-government in Thailand and Indonesia: A multigroup analysis

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Abstract Thailand and Indonesia are two developing countries still in the early stages of e-government implementation. An understanding of their citizens' perspectives can help the governments of these countries better plan their services and also provide useful information to governments of other developing countries. The current study uses a new survey instrument to assess the importance of e-government services and website success factors from the perspective of citizens. Using multigroup analysis to validate the instrument, it identifies that an important difference between the perceptions of citizens of the two countries is that in Thailand, the importance of financial transaction services is negatively related to the importance of citizen identification with the e-government site whereas in Indonesia this relationship is insignificant. Only two expected relationships were found to be equivalent across both datasets, i.e., the importance of financial transactions services is positively related to the importance of website efficiency and the importance of local information services is positively related to the importance of citizen identification with the site. The multigroup analysis showed that citizens in both countries interpreted the survey instrument similarly but had very different expectations for their e-government services.

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1 Introduction

E-government is the commitment and initiative of a government to improve its relationship with citizens and the business sector through enhanced, cost-effective, and efficient delivery of services, information, and knowledge using information and communication technologies (ICT). It boosts the efficiency of government operations as well as enhances good governance and transparency. A system of transparent administration can create a contributing environment that facilitates economic development and lead to a number of government projects in which the private sector can participate. e-Government not only provides benefits such as fast, inexpensive, trustworthy, and reliable services to households and businesses but also offers the potential to reshape the public sector and remake the relationships between citizens, businesses, and the government by allowing for open-communication, participation, and public dialogs in formulating national regulations (Ke and Wei 2004; Tan and Subramaniam 2005; West 2000).

Identifying e-government services and website success features is important to the planning and deployment of e-government especially for developing countries that are exploring avenues to better serve their citizens. Therefore, the current study focuses on three issues: (1) identifying e-government services important to citizens, (2) identifying the website success features critical to these services and (3) validating a new instrument for use in future research. By analyzing data collected from citizens in two developing countries (i.e., Thailand and Indonesia) that are at comparable stages of e-government readiness, this research provides useful information to other developing countries planning to deploy e-government services.

1.1 e-Government performance

Thailand and Indonesia (being the two largest members of ASEAN—the Association for South East Asian Nations—in terms of gross domestic product) were selected as the research sites for the current study as they were considered similar in terms of e-government performance. They also provided a convenient sample because the researchers had access to representative cross-sections of citizens of the two countries.

The two countries were ranked similarly according to the Seventh Annual Global e-Government Survey (2007) conducted by the Taubman Center for Public Policy at Brown University. This study reviewed 1,687 government websites in 198 countries during June and July 2007. A variety of different sites were analyzed, including executive, legislative, and judicial offices as well as departments and ministries of the government such as health, education, foreign affairs, interior, finance, natural resources, foreign investment, transportation, military, tourism, and telecommunication. The researchers then rated countries for overall e-government performance on a 0 to 100 point scale. Indonesia was ranked 170th with a score of 24.0 and Thailand 178th with a score of 21.9.

The following sections describe the initiatives taken by the governments in both countries to implement e-governance.

1.2 e-Government initiatives in Thailand

Thailand has worked since the late 1980s to develop a national IT infrastructure that could serve the government and the private sector. In 1986, the Thai government initially established the National Electronics and Computer Technology Center (NECTEC), with the primary mission of transferring technology to Thai citizens. Because of lack of readiness of Thailand in many ways at that time, the early NECTEC was unable to fulfill its missions. However, in the early 1990s, NECTEC reinvented itself in order to improve its capability.

In February 1996, the Thai government approved the first National Information Technology Policy in Thailand, namely IT2000. IT2000, a short-term policy for 1997 through 2001, was initiated and developed by National Information Technology Committee (NITC). It provided a framework and guideline for the government's IT policies and initiatives. Also, it delivered standards, and a manual for implementing an e-government program. Realizing the importance of e-governance early on, NITC launched a number of programs in order to push e-government such as a computer training program for the government officers, the establishment of a Chief Information Officer (CIO) of public sector, and the establishment IT master plans for each department as well as all the provinces throughout

Thailand. All programs had the same objective, which was to prepare the basic infrastructure, and to encourage government agencies at all levels to incorporate Internet technologies.

However, as the result of financial crisis in the year 1997, Thailand was affected by the changes in the international arena such as globalization and international trade agreements. The NITC realized the need of a second phase of national IT policy in order to move Thailand forward into the future. Therefore, it carried out a project on the formulation of national IT policy for the next 10 years (2001–2009), namely IT2010, which has identified five main areas for development, i.e., e-society, e-education, e-industry, e-commerce, and e-government.

1.3 e-Government initiatives in Indonesia

The Indonesian government began to initiate a social transformation with aims to integrate ICT into its organizational structure when the fourth Indonesian President, Abdurrahman Wahid, released Presidential Decree 6/2001 titled "ICT Development and Usability in Indonesia." It provided the concept of e-governance with goals to establish good governance, government transparency and accountability, citizen participation, public services, and interconnection between government bodies.

Along with Presidential Decree 6/2001, the government also formulated a 5-year action plan for further ICT development in Indonesia. The next Indonesian President Megawati Soekarnoputri continued the ongoing ICT plan as she released Presidential Decree 3/2003 titled "Policy and National Strategy for e-Government Development." That policy specified the responsibilities of government bodies, both central and local, and also highlighted the importance of online government for Indonesia.

Following the Presidential Decree 3/2003, the Ministry of Communication and Information released ten documents to guide Indonesian e-government. This regulation proposed ten fundamental acts: (1) government portal standard infrastructure (2) e-record management (3) standard quality (4) service range and application development (5) authorization body policy (6) information exchange (7) private involvement (8) good governance development policy and change in management (9) education policy, project execution and budgeting, and (10) guideline to arranging developing e-government body plan.

Based on the Presidential Decree, every governor, mayor, and county executive was assigned the responsibility to formulate the steps needed for implementing e-government in their local regions. The Ministry of Communication and Information (Kominfo) was assigned the responsibility to coordinate and speed up e-government implementation nationally.

2 The current study

Because the Thai and Indonesian governments are in the early stages of implementing e-governance while dealing with the hurdles not uncommon to developing countries, the aim of this study is to understand e-government services and website success features important to the citizens of these countries. The following subsections delve into these issues.

2.1 Theoretical background

The choice of citizens for electronic delivery of government services over their traditional delivery can be considered as a technology adoption decision (Gilbert et al. 2004). Commonly proposed theoretical bases for technology adoption are:

Diffusion of innovation (DOI) According to Rogers (1995) an individual's decision to use a technology is based on perceptions of its characteristics. Important characteristics of an innovation (such as adoption of e-governance by citizens) include relative advantage (the degree to which it is perceived to be better than what it supersedes); compatibility (consistency with existing values, past experiences and needs); complexity (difficulty of understanding and use); trialability (the degree to which it can be experimented with on a limited basis); and observability (the visibility of its results).

Technology acceptance model (TAM) According to Davis (1989), among the many variables which influence people to accept or reject information technology, two are especially important. First, people tend to use or not use an application to the extent they believe it will help them perform their job better. This is referred to as "perceived usefulness." Second, even if potential users believe that a given application is useful, they may, at the same time, believe that the system is too hard to use and that the performance benefits of usage are outweighed by the effort of using the application. Thus in addition to usefulness, usage can also be influenced by "perceived ease of use." These two variables influence the *attitude* of end users towards a particular technology and thus indirectly influence the actual usage of the technology (Venkatesh 2000). Subsequent researchers have demonstrated that risk in using a technology is a significant factor in determining the intention to use (O'Cass and Fenech 2003).

Service quality Post-consumption evaluation of service performance can be as influential for its adoption as predetermined beliefs or perceptions (characterized by DOI and TAM) about the service (Grönroos 1984; Higgins and Ferguson 1991). Parasuraman et al. (1985) proposed the SERVQUAL model with five dimensions (tangibles, reliability, responsiveness, assurance and empathy) and Dabholkar (1996) demonstrated that speed of delivery, ease of use, reliability, enjoyment and control were all significant factors in determining expected service quality while comparing consumer decision making between traditional- and technology-based service delivery.

Each of these theories can be relevant to the adoption of e-governance services. Thus the current study follows Gilbert et al. (2004) by combining the attitude (DOI and TAM) and service quality theories to help identify the website success factors for the adoption of e-governance (see Table 1 below).

2.2 Research model

To strengthen the basis provided by Gilbert et al. (2004), the authors conducted a review of relevant academic literature (Aldrich et al. 2002; Brannen and Cornett 2001; Bretschneider et al. 2003; Barnes and Vidgen 2002, 2006; Edmiston 2003; Guo and Lu 2004; Hung et al. 2005; Koh and Prybutok 2003; Musso et al. 2000; Norris and Moon 2005; West 2001). They also studied white papers written by government departments, agencies, and think-tanks such as the cities of San Francisco (USA); Köln (Germany); Rosenheim (Germany); Salzburg (Austria), Vienna (Austria); US Association for Federal Information Resources Management; US National Audit Office; New South Wales (Australia) Audit Office; and the Accenture Government Executive Series. This review led to the identification of (a) 37 commonly cited e-government services (please see Appendix 1) and (b) 26 commonly cited features important to success of websites (please see Appendix 2).

The 37 e-government services can be classified into seven broad factors. These factors have been identified in prior research (Koh and Prybutok 2003) as characterizing the services typically offered by governments. These factors are (1) government efficiency (i.e., facilitation of the communication, efficiency and effectiveness of government employees; Edmiston 2003; Norris and Moon 2005) which has been termed as "operational support for employees" in Koh and Prybutok (2003, p. 38); (2) financial transactions (i.e., facilitation of financial transactions with the government; Edmiston 2003; Norris and Moon 2005; West 2001) which has been termed as "online payments" in Koh and Prybutok (2003, p. 38); (3) requests and records (i.e., facilitation of non-financial transactions with the government; Norris and Moon 2005; West 2001) which has been termed as "online customer service" in Koh and Prybutok (2003, p. 38); (4) local information (i.e., facilitation of delivery of local information; Musso et al. 2000) which has been termed as "on-line publishing" in Koh and Prybutok

Table 1 E-government website success factors (adapted from Gilbert et al. 2004)

Factor	Definition	Source references	Notes
Avoid personal interaction	The ability to be able to receive public services without having to interact with members of the service provider's staff	Forman and Ven (1991), Hansen (1995), Prendergast and Marr (1994)	
Control	The ability to exert more control over the delivery of the service than through another method	Dabholkar (1996), Liao and Cheung (2002), Zhu et al. (2002)	This can be expressed as giving empowerment to the individual
Convenience	The ability to receive the service how and when the individual wants to	Meuter et al. (2000), Szymanski and Hyse (2000), Zhu et al. (2002)	This factor relates to the electronic service being more accessible and available
Cost	The electronic delivery of public services saving money	Liao and Cheung (2002)	This includes savings to both the individual and the organization providing the service
Personalization	The ability to tailor the delivery of the service more towards the individual	Van Riel et al. (2001)	Includes the technical aspect of being able to customize a public sector Web site
Time	The time saved by obtaining the service electronically	Berkley and Gupta (1994), Dabholkar (1996), Hansen (1995)	This includes the time that is spent queuing at government offices or on the phone. It also includes the responsiveness of the service delivery. Relates to the "responsiveness' SERVQUAL dimension
Confidentiality	Personal data must be kept private and not used for other purposes	Van Riel et al. (2001), Zhu et al. (2002)	Relates to "assurance" SERVQUAL dimension
Easy to use	The delivery mechanism must be straightforward to use with minimum effort required	Agarwal and Prasad (1998), Dabholkar (1996), Lederer et al. (2000), Meuter et al. (2000)	
Enjoyable	Using the system must be an enjoyable experience	Dabholkar (1996), Davis et al. (1989), Liao and Cheung (2002)	
Reliable	The Web site must have services that are required, and individuals must trust that a requested service will be delivered	Berkley and Gupta (1994), Evans and Brown (1988), Hansen (1995), Zhu et al. (2002)	This factor also includes accuracy and currency of the information on the Web site and has a direct relationship with "reliability" SERVQUAL dimension
Safe	The web site must be secure with respect to entering financial details	Berkley and Gupta (1994), Evans and Brown (1988), Szymanski and Hyse (2000), Liao and Cheung (2002)	
Visual appeal	The web site should look good	Lederer et al. (2000), O'Cass and Fenech (2003)	This is a technical attribute of the web site itself, and can be considered as a technical service quality attribute (Grönroos 1984)

(2003, p. 38); (5) government information (i.e., facilitation of a transparent government; West 2001) which has been termed as "broadcasting" in Koh and Prybutok (2003, p. 38); (6) citizen feedback (i.e., facilitation of feedback from citizens; Musso et al. 2000; West 2001) which has been termed as "e-decision-making/e-government" in Shackleton, Fisher and Dawson (2006, p. 93); and (7) government documents (facilitation of the delivery of government resources; Musso et al. 2000) which has been termed as "miscellaneous" in Koh and Prybutok (2003, p. 38).

The 26 website success features (DeLone and McLean 2003; Gilbert et al. 2004) can be classified into four broad factors. These success factors have generally been accepted as being desirable in websites (Barnes and Vidgen 2002,

2006; Becker 2005) and also important to the adoption of e-government based on the technology acceptance model and web trust models (Carter and Belanger 2005). These factors are the e-government website's (a) quality (i.e., the accessibility, reliability, security, and ease of use of the site) which has been termed as "systems quality" by DeLone and McLean (2003, p. 26); (b) appeal (i.e., the user friendliness, appearance, and convenience) which is encompassed in the "use" metric of DeLone and McLean (2003, p. 26); (c) efficiency (i.e., savings generated in cost and time and greater control over delivery of services) which has been termed as "net benefits" by DeLone and McLean (2003, p. 26); and (d) identification (i.e., person-alization and community created by the site) which is

encompassed by the "information quality" metric of DeLone and McLean (2003, p. 26).

The current research expects the seven services factors to be positively related to the four success factors. Figure 1 shows the research model.

2.3 Hypotheses

Citizens and businesses understand and expect that e-governance will provide them features such as improved information quality (Barnes and Vidgen 2002, 2006), enhanced usability and user-centric design (Carter and Belanger 2005), greater efficiency, time savings and cost effectiveness (Luling 2001), and a sense of personalization, involvement, and belonging (West 2001; Barnes and Vidgen 2006). Thus this study hypothesizes that the seven e-government services factors are positively related to the four website success factors, i.e., a user's perception of the importance of e-government services is positively related to the user's perception of the importance of the quality, appeal, efficiency and identification in the e-government

website. The hypotheses are based upon prior research literature wherein such website features have generally been deemed important to the user adoption of e-government (DeLone and McLean 2003; Schaupp and Carter 2005; Carter and Belanger 2005; Gilbert et al. 2004) as well as desirable in websites (Barnes and Vidgen 2002, 2006).

Government employees' services can improve communications within and across government agencies. The information exchanged will need to be reliable, confidential, timely and of high quality. It can result in savings in cost and time for citizens and the government. Since not all users may be technologically savvy, the website should be easy to use, aesthetically designed, and personalized to induce usage. Thus we hypothesize that for citizens:

H1 The importance of government efficiency services will be positively related to the importance of the

(a) quality of the e-government site and its information,
(b) appeal of the e-government site,
(c) efficiency of the e-government site,
(d) identification with the e-government site.

Fig. 1 The research model
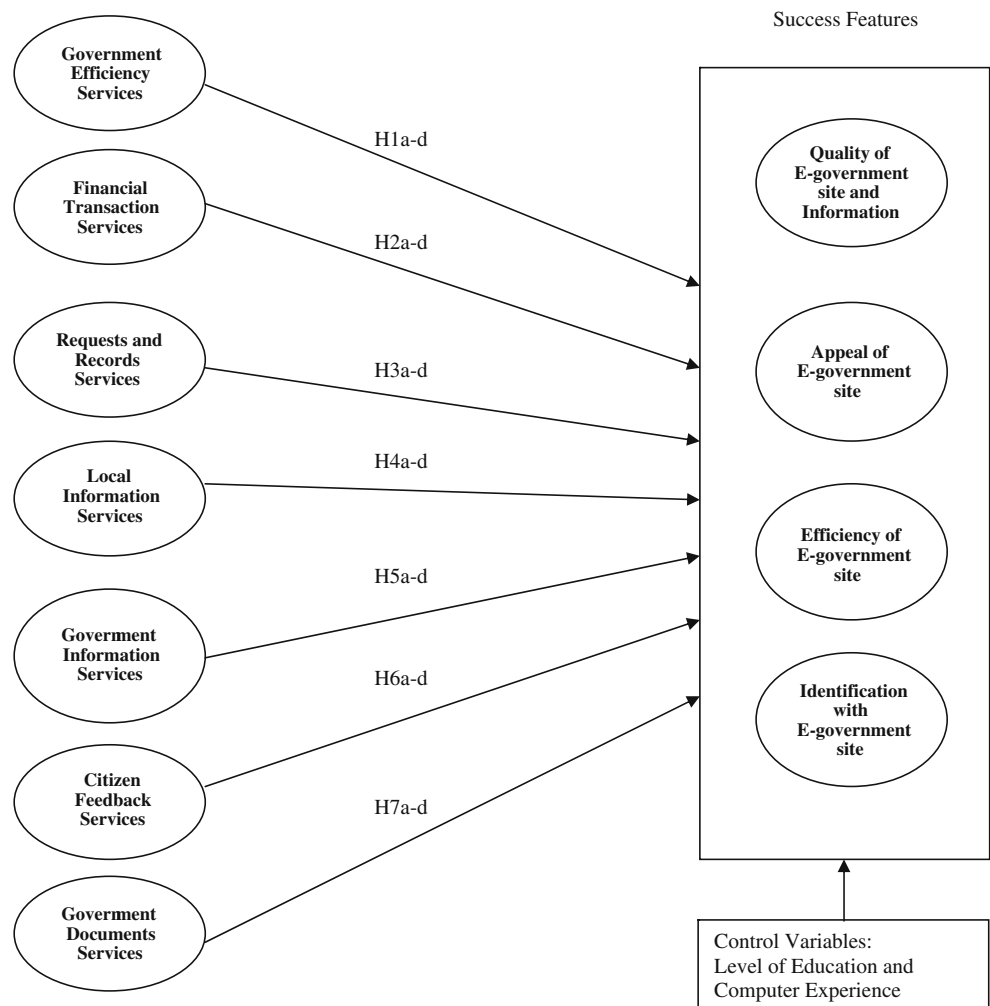
Financial transactions services and requests and records services can result in savings in cost and time for citizens and the government. The information exchanged between parties will need to be reliable, secure, timely and of high quality. The website should be user friendly and attractive so that even technologically naive citizens can easily avail of the services. Furthermore, the interaction screens should be personalized for each individual. Thus we hypothesize that for citizens:

H2 The importance of financial transactions services will be positively related to the importance of the

(a) quality of the e-government site and its information,
(b) appeal of the e-government site,
(c) efficiency of the e-government site,
(d) identification with the e-government site.

H3 The importance of requests and records services will be positively related to the importance of the

(a) quality of the e-government site and its information,
(b) appeal of the e-government site,
(c) efficiency of the e-government site,
(d) identification with the e-government site.

Local information services and government information services will require high quality information that citizens/users can make decisions based upon. It can save costs for the government in disseminating information as well as save time for the users in acquiring information. Since the users may not be technologically savvy, the website should be designed to appeal to all users as well as help enhance their sense of community. Hence we hypothesize that for citizens:

H4 The importance of local information services will be positively related to the importance of the

(a) quality of the e-government site and its information,
(b) appeal of the e-government site,
(c) efficiency of the e-government site,
(d) identification with the e-government site.

H5 The importance of government information services will be positively related to the importance of the

(a) quality of the e-government site and its information,
(b) appeal of the e-government site,
(c) efficiency of the e-government site,
(d) identification with the e-government site.

Citizen feedback services will require reliable, confidential, and timely transfer of information between citizens and the government. It can save costs for the government in obtaining feedback from citizens and for citizens in voicing their concerns and opinions. Since constituents may not be technologically savvy, the website should be designed to be easy to use, attractive to induce repeated use, as well as

help enhance their sense of community by giving them a voice that is heard. Hence we hypothesize that for citizens:

H6 The importance of citizen feedback services will be positively related to the importance of the

(a) quality of the e-government site and its information,
(b) appeal of the e-government site,
(c) efficiency of the e-government site,
(d) identification with the e-government site.

Government document services will require high quality information that citizens can utilize and act upon. Since the users may not be technologically savvy, the website should be designed to appeal to all users as well as be personalized to them. Hence we hypothesize that for citizens:

H7 The importance of government document services will be positively related to the importance of the

(a) quality of the e-government site and its information,
(b) appeal of the e-government site,
(c) efficiency of the e-government site,
(d) identification with the e-government site.

3 Methodology

A survey instrument was developed that consisted of seven point Likert scale items (1 representing "not important" and 7 representing "very important") that measured the importance of (a) the 37 e-government services and (b) the 26 website success features. Prior to data collection, the instrument was pilot tested with a sub-sample of Indonesian citizens and government officials. To provide qualitative understanding, interviews were conducted with some e-government experts. Most of these were government officers from the e-government unit in the Indonesian Ministry of Communication and Informatics, while others were e-government experts from several private IT institutions and also professional researchers from several highly reputable universities in Indonesia. In addition, one of the researchers attended an expert panel consisting of people with acknowledged experience and insight in the field of digital government in Indonesia. This panel discussion provided some modal definitions and feedback on the appropriateness and validity of the study and the instrument. This feedback led to minor modifications in the wording of the questionnaire. For the purpose of comparison across datasets, the instrument used in Indonesia was used without any modification to collect data from Thailand.

Data was collected from Indonesian citizens from August to November 2005. Using systematic sampling,

150 questionnaires were both emailed and personally given to individuals known to the researchers. These individuals included members of the public (employees of private institutions, businessmen, students, and teachers) as well as inter-governmental users. The government agencies that were chosen were the Indonesian Ministry of Education, Ministry of Telecommunication and Informatics, Ministry of Health, and also the Indonesian State Electrical Company.

Of the 150 questionnaires, 78 responses were received, but only 76 of them were considered valid, since there was missing data on two responses. Thus the response rate was 50.67%. Among the responses, 34 responses (44.74%) were obtained from government agencies and the other 42 (55.26%) were from public users. From the education standpoint, the majority of respondents had at least a bachelor's degree or higher (80.27%). Most of the respondents had experience working with a computer or the Internet and had used e-government websites.

Data was collected from Thai citizens using an online survey conducted from September to November 2005. Seventy-six questionnaires were returned by several categories of Thai citizens such as government officials, non-governmental white collar employees, office managers, and students. Sixty-one percent of the respondents had a Master's degree or higher with none reporting an educational level lower than a high school level. Correspondingly, only 1% of respondents indicated that they had poor computer skills with a majority reporting at least an average level of computer proficiency. Seventy-two percent had used current e-government services whereas remainder had not. Tables 2 and 3 summarize the data.

4 Data analysis

The partial least squares procedure utilizing PLS-Graph (version 3.0) was used to assess convergent validity for the study's constructs in both datasets (Chin 1998). The stability of the estimates was tested using a bootstrap sampling procedure (1,000 samples; Mooney and Duval 1993).

Two control variables were considered in the research model, i.e., the user's level of education and the user's computer experience (Choudrie and Dwivedi 2005). Internet users are much more likely to contact the government than non-Internet users (Horrigan 2004). Success in their inter-actions with government is influenced by the user's education and problem-solving skills, not just technological assets. Those with higher levels of education and those who think government can be trusted are more likely to be successful with government than those without those characteristics. Based on research of Center of Democracy and Technology (CDT 2005), even in areas with access to technological infrastructure, there are still marginalized groups who are unable to make use of ICT because they are not 'e-literate.' Thus, e-government programs have to take special steps to include people who are not e-literate. People who are unfamiliar with technology may be reluctant to try e-government services out of distrust or belief that online services will not meet their needs or due to their lack of understanding of the technology. Neither of these control variables were significant indicating that they did not affect the model for either dataset.

For each of the latent constructs in the study (i.e., the seven services factors and the four success factors), the

Table 2 Demographic information

Demographic variable	Level	Thailand dataset		Indonesia dataset	
		Number	Percentage	Number	Percentage
Education	Elementary school	0	0.00	0	0.00
	Middle school	0	0.00	0	0.00
	High School	1	0.01	14	18.42
	Bachelors degree	29	38.15	51	67.11
	Masters or PhD degree	38	60.52	10	13.16
	N/A	8	10.52	1	1.32
Capability of working with a computer or the Internet	Very good	22	28.94	19	25.00
	Good	37	48.68	23	30.26
	Average	16	21.05	25	32.89
	Poor	1	0.01	8	10.53
	Very poor	0	1.32	1	1.32
Exposure to e-government websites	Yes	23	30.26	39	51.32
	No	53	69.74	37	48.68
Preference of service	Online service	24	31.58	19	25.00
	Offline service	4	5.26	10	13.16
	Both	48	63.16	47	61.84

Table 3 Means and standard deviations for the study's constructs

Factors	Thailand dataset ($n=76$)		Indonesia dataset ($n=76$)	
	Mean	SD	Mean	SD
Independent				
Government efficiency	4.83	1.22	5.33	1.12
Financial transactions	5.45	1.12	5.56	1.15
Requests and records	5.27	1.04	5.89	1.02
Local information	5.32	0.95	5.73	0.97
Government information	4.69	1.34	4.56	1.46
Citizen feedback	5.09	1.16	5.82	1.07
Government documents	5.91	0.82	5.63	1.00
Dependent				
Quality of site and information	6.04	1.03	6.39	0.51
Appeal of site	5.39	0.91	5.76	0.87
Efficiency of site	5.75	0.89	6.08	0.74
Identification with site	4.97	1.09	5.43	1.07

observed variables loaded significantly ($p<0.05$) on their respective latent factors for both the Thai citizen dataset as well as for the Indonesian citizen dataset. These results support the convergent validity of the constructs. A multigroup analysis was then conducted to compare the strength of the item-construct loadings in the two datasets. The t-values of the loadings were compared using the following formula (Bradley et al. 2006):

$$t = \frac{\text{Pathsample1} - \text{Pathsample2}}{\left[\sqrt{\frac{(m-1)^{\wedge}2}{(m+n-2)}} \times \text{SE sample1}^{\wedge}2 + \left(\frac{(n-1)^{\wedge}2}{(m+n-2)} \times \text{SE sample2}^{\wedge}2\right) \times \left[\sqrt{\frac{1}{m} + \frac{1}{n}}\right]\right]}$$

where,

sample1	Thai citizen dataset
sample2	Indonesian citizen dataset
m	number of cases in the Thai citizen dataset, i.e., 76
n	number of cases in the Indonesian citizen dataset, i.e., 76
SE	standard error of the path

Each computed t-value had ($n + m-2$) degrees of freedom, i.e., $df=142$. Table 4 presents these results along with the convergent validity analysis.

The multigroup analysis revealed that only six items differed significantly between the Thai citizens' dataset and the Indonesian citizens' dataset in the path loadings on their respective constructs. These were "accepting citizen/constituent requests for service online" which had a stronger loading on the Thai dataset ($p<0.05$); "Accepting reservations for government facilities online" which had a stronger loading on the Indonesian dataset ($p<0.01$); "providing citizens/constituents the ability to communicate electronically with officials" which had a stronger loading on the Indonesian dataset ($p<0.01$); "reliability of the services provided" which had a stronger loading on the Thai dataset ($p<0.01$); "appropriateness of the format of the information" which had a stronger loading on the Thai dataset ($p<0.01$); and "confidentiality of data" which had a stronger loading on the Thai dataset ($p<0.05$). In general the items tended to load higher on their constructs in the Thai dataset. The similarities in the loadings in the two datasets shows support for the validity of the research instrument used in the current study for measuring e-government services and website success factors.

4.1 Discriminant validity

Support for discriminant validity was shown through the use of the average variance extracted (AVE) test (Hatcher 1994). In this test, the square root of the AVE for each pair of constructs (in bold on the diagonal) was compared to the correlation between them (in the off-diagonal; Chin 1998). The results of the tests appear in Table 5 and for the Thai dataset and Indonesian dataset respectively. In each case the square root of the AVE was greater than the correlation. Moreover, no observed variable cross-loaded on another construct, i.e., each observed variable had a higher correlation with its own construct as compared to its correlation with other constructs thus establishing discriminant validity (Chin 1998).

Table 4 Convergent validity

Factor	Variables	Thailand loading	Indonesia loading	Multi-group t-value
Government efficiency	Providing e-mail access for government employees	0.80***	0.76***	0.63
	Providing an online calendar for government employees	0.79***	0.79***	0.0
	Providing government employee manuals online	0.86***	0.73***	1.20
	Providing government employees the ability to schedule meetings online	0.85***	0.78***	0.87
	Providing government employees the ability to manage documents online	0.87***	0.73***	1.42
	Providing government employees the ability to video conference	0.75***	0.71***	0.44
	Providing government employees an intranet to exchange information among agencies	0.81***	0.69***	1.34
Financial transactions	Accepting utility (e.g., electricity, gas and telephone) payments online	0.77***	0.60***	1.22
	Collecting fees online	0.90***	0.90***	0.0
	Collecting fines online	0.92***	0.84***	1.48
	Collecting taxes (individual and business) online	0.84***	0.82***	0.28
	Making payments to government service providers online	0.85***	0.82***	0.42
	Managing government procured inventory online	0.59***	0.53***	0.42
Requests and records	Accepting citizen/constituent requests for service online	0.74***	0.44**	2.23*
	Providing permit application and renewal online	0.86***	0.87***	−0.17
	Providing license application and renewal online	0.85***	0.86***	−0.20
	Providing voter registration online	0.71***	0.70***	0.09
	Accepting requests for government records (e.g. birth and death records) online	0.66***	0.79***	−0.123
	Accepting property registration online	0.74***	0.83***	−1.07
	Accepting reservations for government facilities online	0.47***	0.80***	−2.67**
Local information	Providing city/state/country information online	0.83***	0.74***	0.66
	Providing geographic information systems data (infrastructure, costs, demographics) online	0.75***	0.75***	0.0
	Providing government budgets online	0.62***	0.71***	−0.61
	Providing city/state/country virtual tours online	0.75***	0.72***	0.29
	Providing live broadcast from traffic cameras online	0.42**	0.43**	−0.05
Government information	Providing minutes of government meetings online	0.84***	0.75***	0.41
	Providing video broadcast of government meetings online	0.96***	0.96***	0.0
	Providing audio broadcast of government meetings online	0.93***	0.76***	0.80
Citizen feedback	Providing surveys and polls to gauge citizen/constituent sentiments online	0.76***	0.73***	0.33
	Providing forums and discussion groups for citizens/constituents online	0.78***	0.87***	−0.78
	Providing citizens/constituents the ability to communicate electronically with officials	0.77***	0.88***	−2.61**
Government documents	Accepting applications for government jobs online	0.76***	0.81***	−0.55
	Providing emergency/disaster management documents, policies and procedures online	0.78***	0.83***	−0.59
	Providing government owned educational resources online	0.77***	0.69***	0.66
Quality of site and information	Accessibility of the website (including accessibility to the poor, uneducated and disabled)	0.75***	0.60***	1.39
	Reliability of the services provided	0.90***	0.61***	2.83**
	Reliability of the information provided	0.89***	0.67***	1.92
	Ease of use of the information provided	0.84***	0.69***	1.52
	Appropriateness of the format of the information	0.83***	0.68***	1.96*
	Appropriateness of the level of detail of the information	0.81***	0.58***	1.90
	Security of data	0.76***	0.54***	1.40
	Confidentiality of data	0.83***	0.56***	2.32*
	Timeliness of information	0.80***	0.63***	1.33

Table 4 (continued)

Factor	Variables	Thailand loading	Indonesia loading	Multi-group t-value
	Service and functionality of the website	0.81***	0.73***	0.87
	Quality of content (completeness, relevance and accuracy)	0.79***	0.75***	0.42
Appeal of site	Visual appeal of the website	0.83***	0.78***	0.64
	User friendliness of the website	0.80***	0.85***	−0.78
	Reputation of the website	0.72***	0.70***	0.17
	Enjoyability in use of the website	0.70***	0.72***	−0.16
	Ability to receive personal services without interacting with human staff	0.61***	0.63***	−0.13
Efficiency of site	Ability to exert more control over the delivery of service	0.71***	0.80***	−0.96
	Ability to receive service how and when the citizen/constituent wants	0.82***	0.65***	1.40
	Savings in cost for the citizen/constituent and the government	0.80***	0.71***	0.74
	Savings in time by obtaining the service electronically	0.85***	0.78***	0.97
	Ability to tailor the delivery of the service more towards the citizen/constituent	0.82***	0.64***	1.34
Identification with site	Sense of personalization created by the website	0.86***	0.95***	−1.79
	Sense of community created by the website	0.95***	0.95***	0.0

*$p<0.05$, **$p<0.02$, ***$p<0.001$

4.2 Reliability

Table 6 shows the composite reliabilities of the study's constructs (Anderson and Gerbing 1988). Constructs in both datasets had reliabilities greater than 0.70 (Nunnally 1978).

4.3 Structural model

The bootstrap procedure with 1,000 samples was used to calculate the significance of the path coefficients (Chin 1998) as shown in Table 7. Table 7 also shows the

Table 5 Discriminant validity for Thai and Indonesian datasets

Construct	AVE	GE	FR	RR	LI	GI	CF	GD	QY	AP	EF	ID
Thai dataset												
Government efficiency (GE)	0.67	0.82										
Financial transactions (FR)	0.67	0.38	0.82									
Requests and records (RR)	0.53	0.42	0.54	0.73								
Local information (LI)	0.47	0.38	0.21	0.26	0.69							
Government information (GI)	0.83	0.47	0.08	0.14	0.27	0.91						
Citizen feedback (CF)	0.71	0.58	0.34	0.38	0.30	0.28	0.84					
Government documents (GD)	0.59	0.64	0.33	0.47	0.50	0.33	0.51	0.77				
Quality (QY)	0.67	0.45	0.41	0.47	0.34	0.10	0.53	0.49	0.82			
Appeal (AP)	0.54	0.39	0.52	0.55	0.43	0.10	0.38	0.41	0.67	0.73		
Efficiency (EF)	0.64	0.40	0.53	0.36	0.33	0.14	0.52	0.49	0.60	0.62	0.80	
Identification (ID)	0.82	0.49	0.43	0.40	0.42	0.20	0.52	0.39	0.53	0.72	0.63	0.91
Indonesian dataset												
Government efficiency (GE)	0.55	0.74										
Financial transactions (FR)	0.58	0.27	0.76									
Requests and records (RR)	0.59	0.48	0.53	0.77								
Local information (LI)	0.46	0.44	0.16	0.35	0.68							
Government information (GI)	0.69	0.47	0.05	0.16	0.30	0.83						
Citizen feedback (CF)	0.69	0.63	0.33	0.53	0.43	0.33	0.83					
Government documents (GD)	0.61	0.72	0.48	0.48	0.57	0.41	0.63	0.78				
Quality (QY)	0.42	0.54	0.33	0.42	0.37	0.25	0.62	0.52	0.65			
Appeal (AP)	0.55	0.34	0.49	0.55	0.39	0.03	0.54	0.33	0.62	0.74		
Efficiency (EF)	0.52	0.40	0.55	0.38	0.42	0.14	0.66	0.45	0.56	0.66	0.72	
Identification (ID)	0.91	0.51	0.34	0.46	0.41	0.24	0.52	0.34	0.48	0.69	0.65	0.95

multigroup comparison of the paths of the two samples. Only one significant difference was found between the two datasets in that Thai citizens rated the importance of financial transactions services to be negatively related to the importance of identification with the site whereas the Indonesian citizens rated the relationship as being insignificant. The multigroup difference for this relationship was significant ($t=-2.64$, $p<0.01$).

In the Thai dataset, the study found support for the hypothesis that the importance of financial transactions services is positively related to the importance of quality ($p<0.05$). However, counter intuitively, its importance was negatively related to the importance of identification ($p<0.05$). Interestingly, the appeal factor was also not significant to financial transactions services. As expected, the importance of requests and records services was positively related to efficiency ($p<0.05$) and identification ($p<0.05$); the importance of local information services was positively related to appeal ($p<0.05$) and identification ($p<0.05$); the importance of government information services was positively related to efficiency ($p<0.05$); and the importance of government document services was positively related to identification ($p<0.05$). Surprisingly, the analysis showed no support for the hypotheses pertaining to government efficiency (H1) and citizen feedback (H6) services. Interestingly, as seen in Table 3, these two factors were among the lowest in importance to Thai citizens. Perhaps their lack of importance in the eyes of citizens contributed to their indifference to them.

In the Indonesian dataset, the study found support for the hypothesis that the success of financial transactions services is positively related to appeal ($p<0.05$) and efficiency ($p<0.05$). As expected, the study found that the success of records services was positively related to appeal ($p<0.05$); the success of local information services was positively related to appeal ($p<0.05$) and identification ($p<.05$); the success of citizen feedback was positively related to quality ($p<0.05$), efficiency ($p<0.05$), and identification ($p<0.05$);

Table 6 Composite reliabilities of constructs

Factors	Thailand dataset	Indonesia dataset
Government efficiency	0.93	0.90
Financial transactions	0.92	0.89
Requests and records	0.88	0.91
Local information	0.81	0.81
Government information	0.93	0.87
Citizen feedback	0.88	0.87
Government documents	0.81	0.82
Quality	0.96	0.89
Appeal	0.85	0.86
Efficiency	0.90	0.84
Identification	0.90	0.95

and the success of government resources services was positively related to efficiency (H7). Analogous to the Thai dataset, the analysis showed no support for the hypothesis pertaining to government efficiency services (H1). It also did not show support for the hypothesis pertaining to government information services (H5).

5 Discussion

Interestingly, only two relationships were found to correspond across both datasets, i.e., the relationship of financial transactions services with efficiency and the relationship of local information services with identification. The evidence provided by the multigroup analysis, shows that citizens of both countries interpreted the survey instrument similarly but have very different expectations for their e-governance, Thus implementation of generic e-governance solutions might not prove successful in these countries.

From the website success factors standpoint, each of the four factors i.e., quality, appeal, efficiency and identification was significantly associated with one or more of the e-government services factors suggesting their importance to both Thai and Indonesian citizens. Website quality was found to be positively associated with financial transactions services (Thailand) and citizen feedback (Indonesia). The website's appeal, i.e., appearance, user friendliness, reputation, and personal enjoyability was found to be positively associated with local information services in Thailand and with financial transactions, requests and records, and local information services in Indonesia.

The website's efficiency, i.e., savings in cost and time and greater control over service delivery, was associated with financial transactions, requests and records, government meetings and government resources services in Thailand, and with financial transactions, citizen feedback, and government documents services in Indonesia.

Lastly, identification, i.e., the sense of personalization and community created by the website was negatively associated with financial transactions services but positively associated with records and local information services in Thailand. As seen in Table 3, identification had the lowest mean importance among the website site success factors for Thai citizens whereas financial transactions services were the most important among the services to them. Identification however was positively associated with local information and citizen feedback services in Indonesia.

6 Implications

This study provides several implications for research. First, it validates an instrument which can identify the e-

Table 7 Summary of structural model

H	Independent factors	Dependent factors website's…	Thailand dataset path	Indonesia dataset path	Multi-group t-value
H1	Government efficiency services	Quality	0.04	0.09	−0.25
		Appeal	0.20	0.06	0.65
		Efficiency	−0.06	−0.09	0.15
		Identification	0.21	0.21	0.00
H2	Financial transactions services	Quality	0.22*	0.12	0.60
		Appeal	0.21	0.26*	−0.26
		Efficiency	0.22*	0.40**	−1.10
		Identification	−0.32*	0.20	−2.64**
H3	Requests and records services	Quality	0.13	0.18	−0.30
		Appeal	0.11	0.28*	−0.93
		Efficiency	0.22*	−0.07	1.71
		Identification	0.32*	0.08	1.36
H4	Local information services	Quality	0.07	0.11	−0.21
		Appeal	0.27*	0.27*	0.00
		Efficiency	0.14	0.09	0.34
		Identification	0.29*	0.26*	0.16
H5	Government information services	Quality	0.04	−0.14	1.05
		Appeal	0.13	−0.10	1.31
		Efficiency	0.20*	−0.04	1.34
		Identification	0.04	−0.04	0.44
H6	Citizen feedback services	Quality	0.22	0.29*	−0.34
		Appeal	0.09	0.09	0.00
		Efficiency	0.02	0.33*	−1.63
		Identification	−0.09	0.28*	−1.70
H7	Government document services	Quality	0.22	0.16	0.29
		Appeal	−0.02	0.01	−0.16
		Efficiency	0.31*	0.25*	0.37
		Identification	0.24	0.10	0.69

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

government services and website features that are important to citizens. Future researchers can use the instrument more confidently in their own research on e-government. However, it would be interesting to examine the instrument's validity in other regions of the world and also in individual districts/states within a country.

Second, two main hypotheses were not supported (i.e., H1 and H6) for the Thai dataset and likewise two main hypotheses were not supported for the Indonesian dataset (H1 and H5). Future researchers might investigate possible explanations for their lack of support. Further data collection in both countries as well as in other countries might help in this effort. Moreover, the current research did not consider the effect of income and age of the respondents on the model. Future research can address this shortcoming.

One limitation of the study was the small sample size obtained in both datasets, which is a concern because of reliability and validity issues. While this did not constrain the data analysis, a larger and more representative sample may yield more useful results. Another limitation was the

use of perceptual measures and the fact that the study does not predict human behavior but just human beliefs. However, this study helps provide some insights that can lead to improved planning for e-governance in developing countries.

The study also provides useful implications for practice. An understanding of the above relationships can provide a government at a similar stage of e-government deployment as Thailand and Indonesia the impetus to consider the needs and perceptions of its citizens. For example, improving the quality, appeal, and efficiency of e-government sites might induce more citizens to utilize specific services. However, creating an e-government site with a sense of personalization or community may hinder rather than facilitate the delivery of services. Because the latter factor was important to Thai citizens but not to Indonesian citizens, each government should individually consider the needs of their citizens. Utilizing the validated instrument of the current study may help them do so.

The evidence provided by the multigroup analysis shows that respondents from both countries interpreted the study's

survey instrument similarly but had different expectations for their e-governance, i.e., if generic e-governance solutions are implemented they may not prove successful.

7 Conclusion

This study used a survey methodology to examine Thai and Indonesian citizens' perceptions towards e-government services and success factors. It suggests that to develop an integrated platform for making high-quality e-government services, governments need to pay attention to the services and success factors important to citizens. Improving perceptions of the reliability and appropriateness of the information, the ability to exert more control is important and should not be ignored. Interestingly however, creating a site with a sense of personalization or community may hinder rather than facilitate the delivery of services.

Appendix 1

Commonly cited e-government services

Providing city/state/country information online
   Providing geographic information systems data (infrastructure, costs, demographics) online
   Providing government budgets online
   Providing city/state/country virtual tours online
   Providing minutes of government meetings online
   Providing video broadcast of government meetings online
   Providing audio broadcast of government meetings online
   Providing live broadcast from traffic cameras online
   Calling for bids or proposals for government contracts online
   Accepting bidder applications for government contracts online
   Accepting utility (e.g., electricity, gas and telephone) payments online
   Collecting fees online
   Collecting fines online
   Collecting taxes (individual and business) online
   Making payments to government service providers online
   Managing government procured inventory online
   Accepting citizen/constituent requests for service online
   Providing citizens/constituents the ability to track complaints online
   Providing permit application and renewal online
   Providing license application and renewal online
   Providing voter registration online

Accepting requests for government records (e.g. birth and death records) online
   Accepting property registration online
   Accepting reservations for government facilities online
   Providing surveys and polls to gauge citizen/constituent sentiments online
   Providing forums and discussion groups for citizens/constituents online
   Providing citizens/constituents the ability to communicate electronically with officials
   Providing e-mail access for government employees
   Providing government employees the ability to schedule meetings online
   Providing government employees the ability to manage documents online
   Providing government employees the ability to video conference
   Providing government employees an intranet to exchange information among agencies
   Accepting applications for government jobs online
   Providing emergency/disaster management documents, policies and procedures online
   Providing government owned educational resources online

Appendix 2

Commonly cited success features for websites

Accessibility of the website (including accessibility to the poor, uneducated and disabled)
   Reliability of the services provided
   Reliability of the information provided
   Ease of use of the information provided
   Appropriateness of the format of the information
   Appropriateness of the level of detail of the information
   Security of data
   Confidentiality of data
   Timeliness of information
   Service and functionality of the website
   Quality of content (completeness, relevance and accuracy)
   Visual appeal of the website
   User friendliness of the website
   Ease of navigation of the website
   Ease of use of the website
   Enjoyability in use of the website
   Ability to receive personal services without interacting with human staff
   Ability to exert more control over the delivery of service
   Ability to receive service how and when the citizen/constituent wants

Savings in cost for the citizen/constituent and the government

Savings in time by obtaining the service electronically

Ability to tailor the delivery of the service more towards the citizen/constituent

Attractiveness of website's appearance

Sense of personalization created by the website

Sense of community created by the website

Reputation of the website

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