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Public Service in the Information Age: A Study of e-Government in Taiwan

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This article reviews the literature on e-government and discusses policy implications stemming from e-government initiatives in Taiwan. Drawing from evaluation frameworks established in previous research, this study surveys the content of 62 websites maintained by the local, secondary and central government. Study findings suggest that, while Taiwan has made significant progress in deploying e-government initiatives across different administrative levels- especially in delivering a single service window model providing one-stop service for citizens and businesses-the technology's overall implementation is hampered by operational inconsistencies at the local level and differential access across the population. The article argues that to fully realise the potential of e-government, the Taiwanese government should adopt systematic measures that reach beyond service delivery to encourage wider citizen inclusion and civic participation.

The rapid diffusion of information communication technologies (ICTs) during the last decade brought significant changes to the public sector. Increasingly, governments around the world are relying on the use of office networks and e-mails to facilitate communications and the exchange of information among employees, while websites and online portals are set up to deliver services and provide information to citizens over the Internet (West, 2003). This effort to integrate ICTs into public services reflects the emerging trend of electronic government (e-government), a practice in which the government applies digital technologies to its essential functions and operations. Successful implementation of e-government initiatives may bring forth benefits such as wider public access to information and services, reductions in transaction costs, and increases in organisational efficiency (United Nations, 2005).

However, despite years of research and development, scholars and practitioners alike note that e-government has yet to fulfil its expectations (Jaeger, Shneiderman, Fleischmann, Preece, Qu and Wu, 2007; Lin and Atkin, 2007; Thomas and Strieb, 2005). For example, in a 2003 survey conducted by the Pew Internet and the American Life Project, researchers found that while the use of e-government related services continues to rise in the United States, citizens are still more likely to rely on traditional means such as the telephone or in-person visits when contacting the government (Pew Internet, 2004). Although American politicians recognise the Internet's value for communicating with constituents (Chadwick, 2001), officials are using their websites chiefly as information dissemination tools (Taylor and Kent, 2004). As digital technologies create new opportunities for engagement, then, some argue that e-government initiatives must move beyond simply providing online services to include measures that would encourage citizen participation in policy and decision making (Chadwick, 2003). In light of these research findings, it appears that the development of e-government has arrived at a crossroads, where technological innovations need to be balanced with cultural and organisational transformation.

In this article, we focus on Taiwan, one of the global e-government leaders recognised by several benchmark studies (Accenture, 2003; West, 2005), and attempt to articulate the challenges facing e-government development by evaluating the Taiwanese case. We begin by reviewing existing literature on e-government development and the different evaluation frameworks proposed by previous studies. With a guiding research question of "What is the status of e-government in Taiwan?" we then examine the content of 62 government websites in Taiwan using a four-stage model developed by Lau, Abolhoson, Atkin and Lin (2008).

E-government research and development

Conceptual definition

From simply providing online feedback forms to managing complex transactions, the term "e-government" encompasses a wide range of issues and topics. As the popularity of e-government continues to increase around the world (West, 2003), scholars and practitioners have created different definitions to capture the many facets of e-government. For example, the United States Congress defined the term in the E-government Act of 2002 as, "the use by the government of web-based Internet applications and other information technologies, combined with processes that implement these technologies, to enhance the access to and delivery of government information

and services to the public, to bring about improvements in government operations" (e-Government Act 2002). Similarly, Gronlund (2002) defined e-government as using information communication technologies (ICTs) to provide easy access to government information and services, increase the quality of services, and give citizens opportunities to participate in democratic processes of different kinds.

Based on that conceptual framework, previous studies in this area are consistent with contemporary scholarship in Europe and the United States, which can be generally categorised in two domains: (a) e-government as ^service portal; and (b) e-government as apolitical communication medium. Many e-government studies employing the first approach focus on the service, business and economic potential of e-government, emphasising how governments may utilise their digital arms to save cost and increase efficiency while users may benefit from direct access to information and services. Such work usually appears in the form of rankings, surveys or benchmarks, and is typically conducted by non-academic investigators, mostly by NGOs or business consultants (Sofres, 2001). For instance, Accenture (2004), World Market Research Center (2001), United Nations (2001) and Brown University (West, 2003) have produced comparable reports and surveys based on what researchers deemed as important indicators of e-government development. In Taiwan, research that falls into this category includes studies on the transparency and interactivity of local government websites (Lee and Huang, 2001; Shi, 2002), usage pattern and user satisfaction (Lin, 2002; Hsu, 2003; Cheng, 2001), and human-interface design (Chen, 2002; Huang and Chao, 2001).

On the other hand, the second group of studies places the progress of e-government under a broader context of digital democracy, aimed at examining the impact of the Internet and other ICTs on enhancing the essential elements of democratic society (Grönlund, 2002). Empirical studies that resonate with this model focus on how the Internet can be translated into political uses and often yield research on who cybercitizens are, how ICTs might initiate government reforms, what political ends can be accomplished, and what models of democracy might emerge along with the information age (Hill and Huges, 1998; Margolis and Resnick, 2002; Hoff, Horrocks and Tops, 2000). Scholars in Taiwan have also taken similar steps. For example, Tseng (2003) analysed the implication of e-government on administrative governance. Weng (2001), Shyu (2000) and Lo (2004) chronicled the diffusion of public discussion forums and measured the degree of civic participation in government websites. The section to follow considers this development in the broader context of global e-government adoption.

Four phases of e-government development

The present study is not specifically aimed at either one of the research orientations described above. Rather, the purpose is to broaden the scope of analysis with a thorough examination of the status of e-government development in Taiwan. We hope to provide a more comprehensive picture as well as empirical data for future studies. To that end, we use the concept proposed by Lau et al. (2008), which combines the World Bank's (2001) communicative model, the three-tier model of Howard (2001), and the four-step model of Balutis (2001) into an integrated framework to measure the progress of e-government. This conceptual framework classifies the adoption of e-government into four phases: information dissemination, interaction, transaction and seamless service.

Information dissemination is the initial phase of e-government, wherein the government makes information available online as a way to increase convenience and transparency for the public and to reduce transaction costs. The interaction phase consists of the ability to contact government offices through "interactive correspondence" (e.g. email, message board) or to "request" services (e.g. search for documents, checking the status of an application, reserve public faculties). An important note is that "request" for services does not suggest a complete transaction and may still require either a follow up telephone call or a physical presence at local offices. The third phase is the ability to process transactions online, which includes the completion of service requests online and any end-to-end digital transactions.

The final phase is termed seamless service, which consists of horizontal and vertical linkages. Horizontal linkage is also known as intra-level linkage, linking together government websites at the same level (e.g. central government office links to another central government office). In contrast, vertical linkage, otherwise known as inter-level linkage, provides connections between and among different levels of government (e.g. central government office links to local government office). These two types of linking practices are not mutually exclusive. However, if both inter- and intra-level linkages are present, the structure of the e-government becomes a seamless web sphere, where users can browse for services and information at ease, without knowing the structure and organisation of the government.

Table 1 illustrates the characteristics of each phase with some examples commonly found on e-government websites that fit into each category. This list is not exhaustive, but aims to make sense of recurring patterns of e-government configurations in a widely ranging set of contexts.

e-government in Taiwan

With a matured telecommunication infrastructure and a vibrant information technology industry, the Taiwan government has been actively promoting digitisation of government services and introducing an e-lifestyle to its citizens. Taiwan's electronic government scheme www.gov.tw/ is ranked among the global leaders in various benchmark reports (West, 2006; Waseda University, 2007). As a member of the "high tech hub" of East Asia, Taiwan's overall "e-readiness" also consistently receives high marks from research organisations. For example, a recent report published by the International Telecommunication Union (2007) ranked Taiwan as the 17th in the world in its ICT opportunity study. Similarly, The World Economic Forum (2007) saw Taiwan in 13th place in its 2007 Networked Readiness Index (NRI) rankings.

Domestically, the Internet penetration rate in Taiwan has been steadily rising, especially with the availability of wireless and broadband networks in recent years. According to a 2006 survey conducted by the Institute for Information Industry (III), 79 per cent of households in Taiwan-owned computers, 72 per cent of households had Internet access, 62 per cent of households had broadband access and 87 per cent of online households were using broadband connections. In addition, the number of regular Internet users in Taiwan reached 9.68 million, representing about 9.8 per cent growth from the previous year. At the same time, broadband subscribers in Taiwan stood at 4.55 million at the end of 2006 (FIND, 2007). In terms of wireless Internet access, following a number of government initiatives to deploy wireless network coverage in several

metropolitan areas, a genuine mobile communications environment is also emerging in Taiwan. The island currently has an estimated mobile Internet subscriber base of 1.91 million people (FIND, 2006).

These technology diffusion trends indicate that Taiwan is progressing in its efforts to develop an information society. Taiwan's ambition to build a world class e-government scheme is led by the Research, Development and Evaluation Commission (RDEC) under the Executive Yuan. In 2002, the Taiwan government portal www.gov.tw was officially launched, and by that time, more than 4,400 governmental agencies had established a web presence (RDEC, 2003). In May 2002, the government launched the "e-Taiwan Program", mapping out the e-agenda to develop the information and communications infrastructure across the country, boost industry competitiveness, upgrade government performance, and transform Taiwan as an e-leader in Asia. Some of the programme's ambitious objectives include the following: creating 20,000 jobs; reaching NT\$300 billion in overall e-services revenue; expanding the broadband user base to six million; extending the penetration of e-transactions to over 60 per cent of businesses; providing 600 online public services through e-government services and achieving 75 per cent public satisfaction rate; and to enable e-commerce to represent 15 per cent of total GDP (FIND, 2005).

Research approach

As an exploratory study, the conceptual framework is applied to examine the central, secondary and local governments in Taiwan. We located websites of different agencies and offices through the official government portal (www.gov.tw), hyperlinks from government websites, and through a thorough search of the two major search engines in Taiwan: www.tw.yahoo.com and www.yam.com.tw. The website is then categorised according to our definition of central, secondary and local government sectors mentioned earlier.

Sample

With all the websites listed in alphabetical order, we tracked the availability of the website over a 10-month period for continuous web operation and identified 410 sites as our total population. By means of random sampling, we selected 62 (15 per cent) for content analysis. Since Taiwan's Executive Branch consists of more agencies and offices than other branches of the central government (thus more websites), central government websites were further stratified to ensure sample robustness. There are two "must include" websites in our analysis: the President's Office (www.president.gov.tw) and the My ?-Gov Portal (www.gov.tw), because they are the flagship websites that represent the government. A list of our samples is documented in Appendix I.

To further place our analysis in a Taiwanese perspective, we also categorised our subject of examination according to Taiwan's administrative and territorial structure into three levels: central government, secondary government and local government. The central government level includes the President's Office, the five branches of government and its direct subordinate commissions and agencies. The secondary government includes 25 major city/county offices. Local government includes 336 smaller cities, villages and towns, all of which are under the jurisdiction of the secondary government.

Table 2 illustrates the three-levels of government with some examples that fit into each of the criterion within the categories. This list is not exhaustive.

Measures

Criterion websites were analysed and coded by two researchers, with inter-coder agreement (Scott's pi) reaching 97 per cent. The study is designed, in particular, to determine the level of e-government that each site has attained. Given our focus on the informational, responsive and transactional levels of these web pages, our unit of analysis does not simply encompass the index page of the websites present in other e-government studies (Zhang, 2002) . This is because some interactive or service features may be hidden in the second or third layer. Coders, therefore, had to click through every layer and look at the individual web pages to determine whether the sites are informational, responsive, transactional or a combination of these characteristics. The coding criteria are specified in the conceptual framework outlined above.

Findings: An assessment of e-government in Taiwan

Content analysis results suggest that the development of e-government in Taiwan, in terms of information dissemination capability, is achieved at all levels of government (central, secondary and local levels, see Table 2). Results summarised in Table 3, however, suggest that the range of topics and the depth of information vary greatly across office levels.

Focusing on the interaction phase, the interaction feature is present in the majority of the websites examined, with the exception of a few local government sites. Study data suggest that secondary governments have the most comprehensive interactive features, including both "inquiry" and "request" types of interaction on their websites. Citizens have the opportunity to submit online inquiry forms, to request services, to search for regulatory databases, or to participate in online polls and surveys. By contrast, the interaction function is limited on the majority of central and local government websites. Most central government sites offer some kind of database search, while local government sites provide online inquiry forms.

With regard to transactional capabilities, while 54 per cent of the websites offer forms for users to download, the majority of the websites we surveyed at all three levels of governments do not provide transactional services online. However, this does not mean that the transactional phase is not achieved in Taiwan's development of e-government: nearly all websites (98 per cent) link back to the central online transaction portal (www.gov.tw), where users can complete a wide range of transactions online.

Lastly, the seamless service phase has not been fully achieved by websites at the various levels of governments. Most of the websites include vertical (inter-level) linkages that connect subordinates to supervising departments/ offices. Almost all websites also link to the central e-government portal. By contrast, horizontal (intra level) linkage is not as common. Only 66 per cent of the websites we surveyed have links to offices at the same level.

Policy implications

Two key characteristics about Taiwan's e-government programme stand out from our observation. The first is that the specific information, interaction and transactional functions available on the websites often parallel the function and purpose of the particular office/ agency. For example, many regulatory agencies in the central government tend to offer citizens opportunities to learn more about the application of certain laws and regulations, rather than providing opportunities for direct interaction. In contrast, secondary and local government websites tend to offer essential everyday information and the overall content often reflects such day-to-day interaction because these authorities bear the responsibilities of ensuring the quality of life for their residents. This attribute has been found consistent across the three levels of government and shows that administration officials in Taiwan understand the "service potential" of e-government.

Second, the structure and organisation of Taiwan's e-government reflects a single-service window approach. As mentioned earlier, the transaction and seamless service capability is not present at the individual agency/ department website. Instead, they are redirected to the central e-government portal (www.gov.tw). The transaction section on this central portal offers a vast collection of downloadable forms and more than 2,000 services to be completed online, all divided into different categories. In addition to the My ?-Gov portal, many local government websites also redirect online transaction services to the Village Services Portal www.village.gov.tw, which provides specific online services tailored to meet the needs of residents in smaller rural towns and villages.

Our study also shows that the current progress status of e-government is on par with the country's long-term development plan and overall infrastructure readiness . As mentioned previously, the Taiwanese government set the goal to convert at least 40 per cent of the current 1,500 application services online by 2004. As we have discovered, the central e-government portal offers more than 2,000 transactions, ranging from traditional application forms to many miscellaneous services such as buying rail tickets. In addition, nearly all (94 per cent) government agencies have established web presence and provide some kind of services online, which is a major objective for Taiwan to jump-start its e-government initiative.

At the same time, the implementation of e-government also parallels the situation of digital divide in Taiwan, with urban areas in the north and west leading the stage, while rural regions of south and east are trailing behind, most of them still remaining at the information dissemination level. This is no surprise - but if the government's plan is to build an e-society, this is a problem that cannot be overlooked. In addition, our tracking of website availability shows that many websites are not "always-on": some websites are not available during weekends or public holidays, and 22 per cent of government agencies changed their web address during the 10-month tracking period. This contradicts the purpose of providing 24/7 services to citizens through e-government programmes.

Conclusion

Study results suggest that the development of e-government in Taiwan is at an advanced level - achieving all four phases of our conceptual framework - alongside a centralised e-government service portal, where users can fetch information, interact with government officials, or complete their transactions ... all at one stop. The service's overall implementation remains hampered, however, by operational inconsistencies at the local level and differential access levels across the population. It will be important, then, for Taiwan's e-government initiative to overcome challenges associated with this digital divide, alongside such ancillary concerns as content management.

The present findings are limited, of course, to a single national setting and later work might fruitfully apply this framework to a broader comparative context. For instance, is Taiwan's e-government model more cost effective than others? What are the social, political and economic implications stemming from Taiwan's relatively far-reaching implementation of e-government? As a relatively nascent Asian democracy, does the Taiwanese government have a plan to cope with the increasing digital divide? These are some of the research questions that should be considered in later work. It will be important, in particular, to undertake an ongoing evaluation of e-government performance. This process might entail, for instance, a continual effort to measure both the goal of the government and the needs of constituent users, including private as well as public stakeholders.

In sum, Taiwan is but one of many successful e-government examples in the world. For e-government practitioners in both public and private sectors, it is important to recognise that the road to e-governance is often a trial-and-error process. There is no universal solution to address the needs of different nations and its citizens, as implementation policies need to be tailored to the factors that help define a given country's media infrastructure (e.g. level of government regulation, cultural factors and the like; see Anowkwa et al., 2003). Individual governments should explore the experience of others and determine what they can provide, and what services are desired by the constituents. The conceptual framework and findings uncovered here concerning Taiwan provides a compelling case study in successful e-Government diffusion, one in which the government has integrated a vision for digital governance with the island's economic development plan.

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Appendix

APPENDIX 1 Sample e-government websites

<i>Central government</i>	<i>URL</i>	<i>Availability 03/03</i>	<i>Availability 01/04</i>
E-Government Gateway	www.gov.tw	Yes	Yes
Office of the President	www.president.gov.tw/	Yes	Yes
Research Development and Evaluation Commission	www.rdec.gov.tw/home/	Yes	Yes
Atomic Energy Council	www.aec.gov.tw/	Yes	Yes
Council on Physical Fitness and Sports	media.justsports.net.tw/spo_demo/index.asp	Yes	Yes
Taiwan Forestry Bureau	www.forest.gov.tw/	Yes	Yes
Commission on Women's Rights Promotion	cwrp.moi.gov.tw/	Yes	Yes
Civil Aeronautics Administration	www.caa.gov.tw/	Yes	Yes
Construction and Planning Administration	www.cpami.gov.tw/Welcome.htm	Yes	Yes
National Police Administration	www.npa.gov.tw/	Yes	Yes
Ministry of Education	www.edu.tw/	Yes	Yes
Water Resources Agency	www.wra.gov.tw/	Yes	Yes
Department of Industrial Technology	doit.moea.gov.tw/	Yes	Yes
Bureau of Health Promotion	www.bhp.doh.gov.tw/	Yes	Yes
Ministry of Civil Service	www.mocs.gov.tw/	Yes	Yes

<i>Secondary government</i>	<i>URL</i>	<i>Availability 03/03</i>	<i>Availability 01/04</i>
Taipei County	www.tpc.gov.tw/	Yes	Yes
Chiayi City	www.chiayi.gov.tw/	Yes	Yes
Kaohsiung County	www.kscg.gov.tw/	Yes	Yes
Pingtung County	www.pthg.gov.tw/	Yes	Yes
<i>Local government</i>	<i>URL</i>	<i>Availability 03/03</i>	<i>Availability 01/04</i>
Panchiao City	www.panchiao.gov.tw	Yes	Yes
Sanchung City	www.sco.gov.tw	Yes	Yes
Shrding Village	www.shrding.tpc.gov.tw	Yes	Yes
Pingshi Village	www.pingshi.tpc.gov.tw	Yes	Yes
Dashi Town	www.dashi.gov.tw	Yes	Yes
Henshan Village	www.hchst.gov.tw	Yes	Yes
Miaoli City	web.mlcg.gov.tw/	Yes	Yes
Shihwu Village	www.shihwu.gov.tw/	Yes	Yes
Chushang Town	www.chushang.gov.tw/	Yes	Yes
Puli Town	village.nthg.gov.tw/puli/	Yes	Yes
Jenai Village	village.nthg.gov.tw/jenai/	Yes	Yes
Dadu Village	www.dadu.gov.tw/	Yes	Yes
Wujih Village	www.wujihcc.gov.tw/	Yes	Yes
Fanyuan Village	www.chhg.gov.tw/chhgtown/town03/index.asp	Yes	Yes
Erhliin Town	www.erhlin.gov.tw/	Yes	Yes
Dacheng Village	www.chhg.gov.tw/chhgtown/town08/index.asp	Yes	Yes
Touliu City	www.dl.gov.tw/	Yes	Yes
Taihsi Village	www.taihsi.gov.tw/	Yes	Yes
Yuanchang Village	w3.yunlin.gov.tw/partment/town/yuanc/index_yuanc.html	Yes	Yes
Taibao City	taibao.cyhg.gov.tw/	No	Yes
Mingshung Village	www.msch.gov.tw/	Yes	Yes
Yichu Village	www.yichu.cyhg.gov.tw/	Yes	Yes
Dungshan Village	dungshan.tainan.gov.tw	Yes	Yes
Shingying City	www.sych.gov.tw/	Yes	Yes
Shiuejia Town	shiuejia.tainan.gov.tw	Yes	Yes
Madou Town	madou.tainan.gov.tw	Yes	Yes
Anding Village	anding.tainan.gov.tw	Yes	Yes
Daliau Village	www.daliau.gov.tw/	No	Yes
Yuanan Village	service.kscg.gov.tw/kscg/town/16/public.asp?t=1	No	Yes
Kaoshu Village	www.pthg.gov.tw/chinese/town/PTT04/default.asp	Yes	Yes
Jouru Village	www.pthg.gov.tw/chinese/town/PTT02/default.asp	Yes	Yes
Pingtung City	www.ptcg.gov.tw/	Yes	Yes
Taiwu Village	www.pthg.gov.tw/chinese/town/PTT28/default.asp	Yes	Yes
Tungkan Town	www.pthg.gov.tw/chinese/town/PTT17/default.asp	Yes	Yes
Shitsu Village	www.pthg.gov.tw/chinese/town/PTT31/default.asp	Yes	Yes
Kuanshan Town	www.kwanshan.gov.tw/	Yes	Yes
Lanyu Village	lanyu.taitung.gov.tw/	No	Yes
Tungshan Village	www.dongshan.gov.tw/	Yes	Yes
Wanrong Village	www.hl.gov.tw/hualien/as07/home.htm	Yes	Yes
Juoshi Village	www.hl.gov.tw/hualien/as13/home.htm	Yes	Yes
Wangan Village	www.wangan.gov.tw/	Yes	Yes
Kingnin Village	www.kinmen.gov.tw/金寧鄉公所/admin_d4.aspx	Yes	Yes

Tables

TABLE 1
Four phases of e-government (Lau et al., 2008)

<i>Phases of e-government</i>	<i>Examples</i>
Information Dissemination Phase: Information publishing and dissemination capability	<ul style="list-style-type: none"> – events and public announcements – information about the agency/office – information about the officials – tourist information – weather and traffic information
Interaction Phase: Correspondence service capability Request for service capability	<ul style="list-style-type: none"> – online inquiry forms – message board – online survey/polls – downloadable forms – search for database
Transaction Phase: “End-to-end” transaction capability	<ul style="list-style-type: none"> – apply for ID cards – reserve public facility – renew driver’s license – paying parking tickets – paying income tax
Seamless Service Phase: Horizontal (intra-level) linkage Vertical (inter-level) linkage	<ul style="list-style-type: none"> – links from central government website to another central government website (intra-level linkage) – links from local government website to central government website (inter-level linkage)

TABLE 2
Three levels of government in Taiwan

<i>Level of government</i>	<i>Examples</i>
Central government: Office of the President, the five executive branches and their subordinate commissions and offices	– Executive Yuan – Legislative Yuan – Judicial Yuan – Control Yuan – Examination Yuan – Other commissions and offices
Secondary government: Taiwan's 16 administrative counties, five municipalities, and two special municipalities	– Taipei County – Taipei Municipality – Chia-Yi Municipality – Taichung Municipality – Tainan County – Kaohsiung Municipality
Local government: The 336 smaller cities, towns and villages under the jurisdiction of the secondary government	– Shihwu Village – Puli Town – Daishi Town – Touliau City – Taibao City – Lanyu Village

TABLE 3
e-government in Taiwan

<i>Phases of e-government</i>	<i>Level of government</i>
Information Dissemination Phase reached ...	Central – Yes Secondary – Yes Local – Yes
Interaction Phase reached ...	Central – Yes Secondary – Yes Local – Yes, but mostly inquiry correspondence
Transaction Phase reached ... Transaction capability is not present on individual website, but all re-direct transactional web traffic to the central portal www.gov.tw , which has online transaction capability. Individual websites offer forms to download.	Central – No (links to central transaction portal) Secondary – No (links to central transaction portal) Local – No (links to central transaction portal)
Seamless Service reached ...	Central – Yes Secondary – Yes Local – Yes (vertical, inter-level linkage only)