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The Readiness for and Current Status of E-Government in China

Yue Zhang
California State University, Northridge

Zhiyang Lin
Xiamen University, Xiamen, China

Quan Lin
Xiamen University, Xiamen, China

Chang-tseh Hsieh
University of Southern Mississippi

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Yue "Jeff" Zhang
California State University, Northridge

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ABSTRACT

E-government is important for China's economic and social development. A measurement is developed and applied to assess the readiness of local Chinese governments for e-government. E-government development status of local Chinese governments is assessed through evaluation of their websites. Relationships between e-government readiness and the actual progress on e-government are discussed.

INTRODUCTION

On December 31, 2005, the number of Chinese Internet users reached a new height of 111 million, a number that is the second largest in the world, only behind that of the United States (CNNIC, 2006). With such a large Internet population, e-businesses are booming in China.

Since early 1980s, China had embarked on a journey of modernization through market-oriented reform and opening to the outside world. The reform and opening have achieved amazing progresses for the country, both in quantity (GDP) and structure (the increasingly larger proportion of private sector in the nation's economy). Contrasting with the great economic achievements, however, China's political structure and system have not seen a fundamental change. The poor transparency of government decision-making and operations, and the weak rule of law have contributed to prominent problems, such as corruption, waste of pubic funds and resources, and an alarming disparity among social classes and among different regions in the country (Kurtenbach, 2005; XinhuaNet, 2006). Improving government transparency, strengthening rule of law, and increasing the participation of Chinese citizens in the political process and general affairs of the society have become critical to the country's healthy development in the future decades into an open, stable, and responsible member of the world community.

The Internet, with its openness for information flow and information sharing, is seen as a strong vehicle for people to exchange ideas and to interact. Leveraging the Internet for government operations and for the interaction between governments and citizens – "electronic government" or "e-government," are believed to have the benefits of "cost effectiveness in government and public operations, …, with better and continuous contacts with citizens," and "greater transparency and accountability in public decisions, powerful ways to fight corruption, the ability to stimulate the emergence of local e-cultures, and the strengthening of democracy." (The Center for Democracy & Technology, 2002). The Chinese government, influenced by the industrial world, and to some degree pushed by its own people, in particularly, those elites in science and technology, also has initiatives toward e-government (Li, *et al*, 2004), which is a desirable trend that should be encouraged and facilitated by those in the outside world.

While China has reached a large Internet population of well over 111 million, the Chinese Net population is only about 8.5% of the country's total population of 1.3 billion; while China has become the fourth largest economy in the world (AFP, 2006), its per capita GDP is still ranked after 100 (CIA, 2006). While the Chinese government had changed greatly after more than twenty years of reform and opening, it still is fairly non-transparent, controlling, and being steered by transient wills of powerful officials rather than by rationally designed policies, and operating in

changeable ways rather than following laws and procedures. There are many complicated issues and challenges facing e-government adoption in China.

What, then, is the readiness of China for the adoption of e-government? What would be the appropriate measure of readiness related to e-government in China? What is the status of China's e-government implementation? The current study attempts to answer these questions.

The few research papers found related to e-government in China (some remotely relevant) either were primitive survey on general issues from very limited samples in the country's most developed regions (Ma, et al., 2005), or only counted the number of government websites and some features of those websites (Holliday & Yep, 2005). A few others focused on quasi-government agencies. Examples are the exploration of wireless technology in China (Lu, et al., 2005), and the application of Internet technology to government-controlled company (Liu & Sun, 2006). They either lacked depth and generalization, or simply reporting percentages without further analysis. To date, in-depth study on e-government in China regarding level of readiness, current status, adoption patterns, to name a few issues is virtually non-existing.

Electronic government serves as an emerging interface between the government and its constituency. In that function, it is local governments (cities and counties) that are the most important. Therefore, rather than focusing on the central level of Chinese government (similar to the federal level in the US), we focused on issues related to the local governments in China – e-governments of cities and counties. This study aims at achieving better and more systematic understanding of major issues related to e-government in China. Specifically, the following goals will be accomplished:

1. Based on literature on e-commerce readiness (Bui, et al., 2003; UNDESA, 2005), conduct adaptive revision of the readiness measures, and apply the adapted measuring system to determine e-government readiness for local Chinese governments (city/county level). Understand the current level or status of development of e-government for local Chinese governments.
2. Understand the current level or status of development of e-government for local Chinese governments.
3. Understand the impacts of telecommunications infrastructure, economic development level, and other e-readiness factors on the development status of e-government for local Chinese governments.

There has not been a relationship established between readiness and e-government development status in existing literature. The understanding of the relationship will greatly enhance the preparation and planning for e-government for local Chinese governments, and will provide important insights for local governments in other developing countries and also for countries in social/economic transitions such as former Soviet republics/ eastern European courtiers that were centrally-controlled societies with planned economies, that are all undergoing economic and social transitions to market economy and democracy.

METHODOLOGY

To understand the e-government readiness of cities and counties in China, a measurement of readiness is fundamental. A closely relevant research was done by Bui, Sankaran and Sebastian (2003). In their research, a metric of eight factors with 52 measures were compiled. These factors are: Knowledgeable Citizens, Access to Skilled Workforce, Macro Economy, Digital Infrastructure, Industry Competitiveness, Culture, Ability, Willingness to Invest, and Cost of Living and Pricing.

Because the focus of the current study is e-government at local levels (city and county), macro economy becomes irrelevant, and culture is not as important as it would in the cross-country cases. So we decided to exclude these two factors from our readiness components. However, the **economic development status** of the region (city/county) of interest should remain an important precursor of the e-commerce and e-government activities of the said region. At the same time, since the focus is e-government rather than e-commerce, the "Ability, Willingness to Invest" and "Cost of Living and Pricing" are less critical and will be excluded. Among the remaining factors, "Knowledgeable Citizens" and "Access to Skilled Workforce" can be reflected through the **level of education development** in the

city/county of interest. "**Internet Infrastructure**" is directly related to citizens' access to e-government and should be included.

In addition to the above factors that are derived from Bui and others' metric (2003), we introduced the following two new factors: **overall development of tertiary industry**, and **degree of openness and the extent of foreign economic interaction (foreign trade, foreign investment)**.

Governmental service to citizens is an important part of the service industry or tertiary industry. The overall development level of tertiary industry in the city/county of interest should have a positive correlation with that of governmental services. Therefore, it is plausible that e-government correlates with the **overall development of tertiary industry**. The next factor is an unique factor for China: Since China's opening to the outside world in 1980's, the regions having the most international influence have been the regions that are early adopters of modern world practices on management and market mechanism. The development level and the maturity of government services in the region of interest would logically be related to the readiness of e-government. Therefore, it is plausible that e-government correlates with the **overall development of tertiary industry** in the region of interest.

The next factor is an unique factor that is worth attention, which is from a significant or even critical phenomenon about technological innovation and social changes in China: Since China's opening to the outside world in 1980s, the regions experiencing the most international influence – first the coastal provinces of Guangdong and Fujian, then the whole costal area of South and East China – have been the regions that are leaders or early adopters (Rogers, 2003) of modern world practices on management, market operation, as well as government organization and operations. The economic interaction with the outside world has greatly changed the part of China that is opening to the world (Tong, 2006; Herd & Dougherty, 2005). The innovative propensity of these coastal regions could be attributed to the needs to accommodate international investments (real and fundamental needs), and to create and maintain "an image of openness and modernization" of the government itself ("superficial" it may sound, it is seen as a "branding" and "glorifying" means by virtually all local Chinese governments). Therefore, it is very reasonable to hypothesize that the **degree of openness and the extent of foreign economic interaction (foreign trade, foreign investment)** would strongly influence the e-government initiatives of local Chinese governments.

China is a country with vast geographical span; the difference in economic and social development level of different regions is often astonishing. It is logical to hypothesize that the **readiness for e-government as well as the achieved level of e-government development should be fairly different among cities and counties in different geographical regions**. In addition, different governmental functional departments have different characteristics and different traditions. As such, different governmental departments are likely to be at different level of e-government implementation. Therefore, it is worthy to probe the **different levels of e-government development for various governmental departments/bureaus**.

Based on the above discussions, we hereby identify the following key factors constituting the e-government readiness measures for local (city and county) governments in China, and proposed a framework to represent the relationships between the factors of e-government readiness and the current development status of local Chinese governments as in Figure 1:

> **1. economic development status** of the region
> **2. level of education development**
> **3. Internet Infrastructure**
> **4. industry competitiveness**
> **5. overall development of tertiary industry**
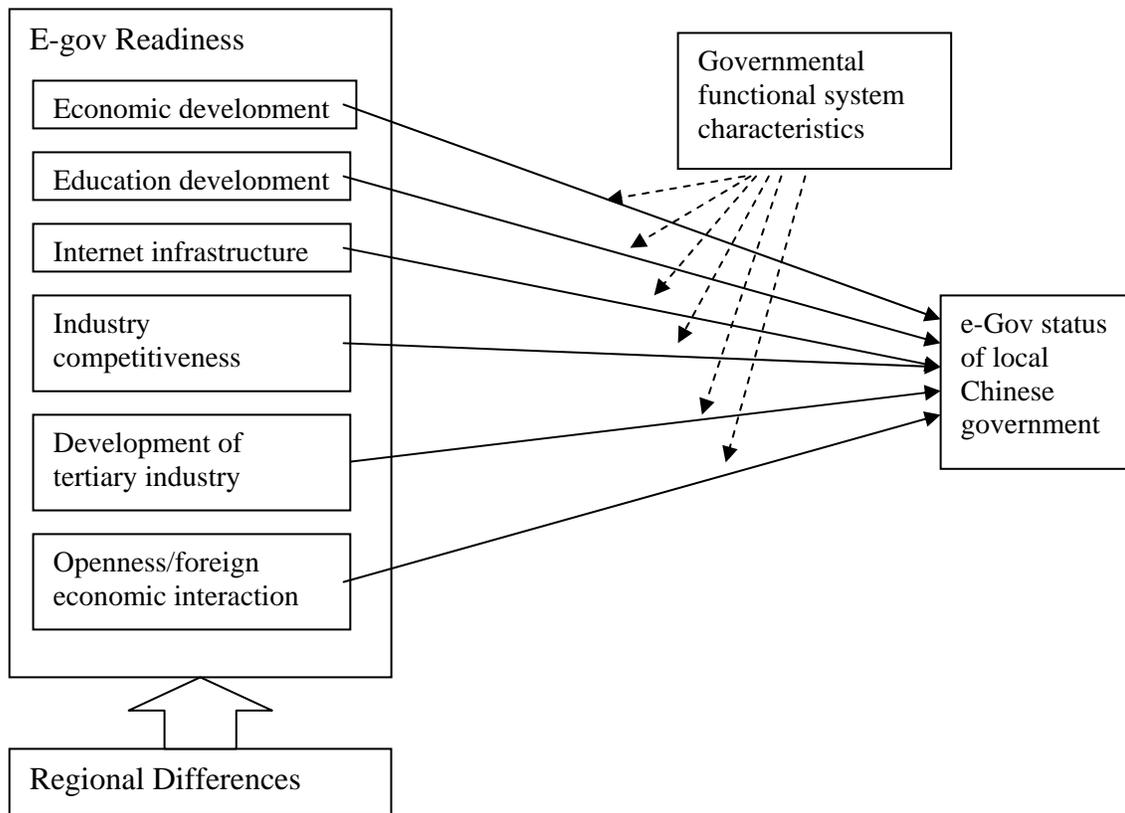> **6. degree of openness and the extent of foreign economic interaction**

Figure 1: Factors influencing e-government development status of local Chinese governments.

MEASUREMENT OF VARIABLES AND DATA COLLECTION

To measure e-government status of the cities/counties of interest, actual visits to and examinations of the government websites of the cities/counties were conducted. Websites were evaluated using a metric adapted from the 50 variables in the research by Holliday and Yep (2005). Items in that metric of 50 variables were examined against the current reality in China, and were abridged to 30 items. In addition, to improve from the original metric which treats every characteristic of websites equally, we developed a questionnaire to collect Chinese citizens' opinions on the relative importance of government websites. The result of the survey was then applied to derive the weights for the website evaluation metric to arrive at an overall score for each government website evaluated. The weighted scores of the government websites were then used as the measurement of the development status of e-government in the city/county of interest.

With the hypothesis that regional differences in China would affect e-government readiness and development status among different regions, we collected data in China's three main "zones" of different economic and social development level – East, Central, and West, with the economic-social development level being highest in the east region and declining westward. Among the 31 provincial-level administrative entities in Mainland China (provinces, autonomous regions, and municipalities directly under the Central government such as Beijing and Shanghai; will simply be referred to as "provinces" hereafter), we visited the government websites of 53 cities/counties (will use "cities" hereafter) in 26 of the provinces. The 26 provinces surveyed cover 10 of the 11 provinces/provincial-level cities in the east, all 8 provinces in the central, and 8 of the 11 provinces in the west. In each province, we selected the provincial capital of the province, and another city that is geographically distant from the capital city, so as to introduce sufficient amount of difference between the second city and the first. For each city we surveyed, we visited and evaluated its city government web portal, as well as the websites of three bureaus that are most directly related to citizens' daily life: the education bureau, the price monitor/control bureau ("price bureau" hereafter), and

the labor and social security bureau ("labor bureau" hereafter). We obtained the readiness-related data, such as GDP, population, college enrollment, population percentage of Internet users, etc. from government statistics/census publications.

DATA ANALYSES

e-Government Development Level and the Effects of Readiness

Using the adapted metric discussed in the previous section, we evaluated the government portals and the three bureaus of the 53 cities. For each of the websites we computed a total score. On a 10-point scale, the average city government portals received a score of 6.03 points, just above 60%. The average education bureaus received a score of 4.40 points, the price bureaus 4.40 points, and bureaus 4.40 points. A chart displaying the average website scores is in Figure 2.
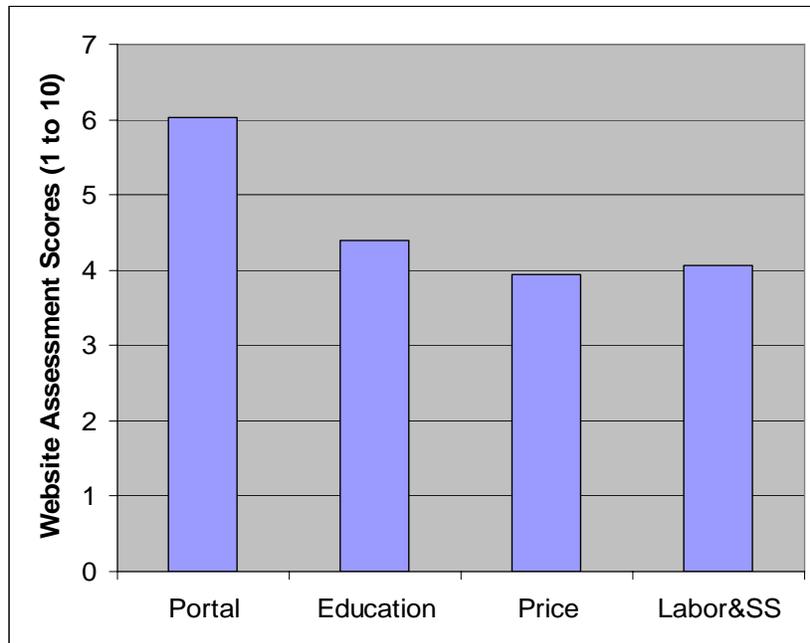
Figure 2: Website scores of city government portal and three bureaus.

The evaluation results of the said government websites were correlated with the components of e-government readiness as discussed in Section 2 and measured using methods discussed in Section 3. Regression analyses were conducted to construct the relationship between e-government development level and the readiness factors. The regression equations are as follows:

$$\text{TPORT} = 5.31 + 0.0000495 \text{ GDPcap} \qquad\qquad (1)$$
$$\phantom{\text{TPORT} = } (1.44\text{E-16}) \qquad (0.000399)$$

where –
TPORT = City e-government portal total scores
GDPcap – GDP per capita

$$DEPT = 3.09 + 0.0000641\ GDPcap + 0.202686\ PcnCol \qquad (2)$$
$$\qquad\quad (2.5E\text{-}07)\quad (0.000968)\qquad\qquad (0.02994)$$

where –
DEPT = Departmental e-government website scores
GDPcap – GDP per capita
PcnCol – percent of enrolled college students in the local population

Regional Differences and Departmental Differences

Because of the above disparity in economic development and development level of telecommunications and openness to the outside world, we expect to see significant differences in the development levels of electronic government in the three regions. Our data did clearly indicate significant differences among the three regions (significant level at $p < 0.0001$ level), in all four categories – the city government portals, and the websites of the three bureaus. As anticipated, the east performed the highest (portal received 6.66 out of 10 points), the central and the west lagged behind with 5.51 and 5.68, respectively (Figure 3).

Figure 3: Website scores by governmental bureau, by region.

Examining the differences in bureaus shown in Figure 3 above provides an even clearer picture: for example, the websites of the education bureaus reflected a contrast difference with the three regions' scores being 5.46 (East), 4.51 (Central), and 2.71 (West), respectively. The other two bureaus have the same patterns (see Figure 3 below). From the figure, we can see that while the two more backward regions did not lag behind the more advanced eastern region in the status of city government portal, they are much far behind in the websites of the bureaus. In addition, it is interesting to see that while the western regions managed to cling at the same level as the central on city portals, the bureaus of the west are significantly lower than those of the central regions in website function scores, showing a very clear (an impressive) east-central-west declination, with the west dropping lower faster than the central, when compared with their counter parts in the immediate more advanced regions, that is, the west is much lower than the central, than the central is lower than the east.

It is also interesting to notice that, among the three bureaus examined, the education bureau is the one that has higher performance than the other two – price and labor bureaus. This phenomenon may be attributed to the fact that the officials in education bureau are usually ones with better education background, and that education (typically middle schools and high schools in a city) is among the "early adopters" of the Internet in China. The differences among different governmental departments in e-government development/adoption are worth further inquiry.

DISCUSSIONS AND IMPLICATIONS

Our study has provided an overview of e-government in China. Overall, e-government development level in China is still low. Governmental departments/bureaus' websites are even lower than city portals. There are interesting differences among different governmental departments, which is worth further probe. The results may help learn the different departmental cultures in the Chinese government and help Chinese government to advance e-government in a more effective manner.

Regional difference remains an important factor in China's development and social transition, and it manifests itself again here in the implementation and adoption of e-government. While the west and central regions are lagging behind the east in e-government adoption and implementation in general, individual governmental department websites display more alarming distance among regions than city government portals.

While there may be many factors in the readiness components, two factors seem to stand out to affect e-government implementation: GDP per capita, and the percentage of college enrollment as against resident population. Further inquiry is warranted to confirm the factors and identify more factors contributing to e-government adoption and implementation.

There are several limitations and some other findings in this study, from which we suggest future improvements and direction:
1. Instability: there were quite a few new websites which were only in test operation. Therefore, the measurement and evaluation may not reflect a normal situation.
2. Accessibility to citizens: many sites were hard to find. An ordinary citizen may not have the skills and/or knowledge about governmental structure and the searching capability to locate the sites. Therefore, an "index of ease of access" should be introduced in the future.
3. Availability of variables: some data was not readily available and had to be estimated, which reduced the accuracy and reliability of data.
4. Sample size (number of cities) needs to be increased

Implementations of the e-government projects will inevitably encounter security issues as described in Bidgoli (2003). Other emerging Web 2.0 based applications such as social network could also have significant impact on the management of organization in general (Lea, et al., 2007), and e-government projects in China. These will be the focuses of our future studies.

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APPENDIX 1

Example of e-government website evaluation (of Hangzhou City, Zhejiang Province)

Key bureaus that are directly related to citizens' daily life:
Police　Education　Utilities　Price Control　Labor　Housing

	A	B	C	D	E	F	G	H	I	J
1		ZheJiang-Hangzhou								
2				0	1	2	3	4	5	6
3		Site maintenance	http://www.han	Portal	公安	教育	市政公	物价	劳动保	房产
4	1	LastUpdate-SenseCurrency		4	4	4	4	4	4	4
5	2	What's new		4	4	4	4	4	4	4
6	3	Usage statistics		4	4	4	4	4	0	4
7	4	Open chat room		0	0	0	0	0	0	0
8	5	Registration chat room	WebForm	4	0	0	0	0	0	4
9		FAQ								
10		**Site navigation**								
11	6	Site map		4	4	3	3	2	4	2
12	7	List of topic areas		4	4	4	4	4	4	4
13	8	Search engine		4	4	3	4	4	4	1
14										
15		**Site content**								
16	9	Mission statement			4	4	4	4	4	4
17	10	Current activities		4	4	4	4	4	4	4
18	11	*Annual report*								
19	12	Briefings/Press release		4	4	4	4	4	4	4
20	13	List of publications		4	4	4	4	4	4	4
21	14	Order pub by email	Download	4	4	4	4	4	4	4
22	15	Download forms		4	0	4	4	4	4	4
23	16	Submit forms electronically			4	0	4	4	3	4
24	17	Make purchases			0	0	0	0	0	0
25	18	Workflow/Procedure		4	4	3	4	1	3	4
26	19	Overall Relevance	Party	4	4	4	4	4	4	4
27										
28		**Links**								
29	20	Supervising department(s)		4	0	4	0	4	4	4
30	21	Supervised department(s)		4	1	4	0	3	4	4
31	22	Other gov org		4	4	4	4	4	4	4
32	23	International organisations		4	0	0	0	0	0	0

JiS-SZ **ZhJ-HZ** ZhJ-I

APPENDIX 2

Survey form to collect Chinese Internet users' opinions on relative importance of e-government website functions and features (Translated; originally designed in Chinese)

We are conducting a survey on e-government in China. We would like to know your opinions regarding the relative importance of e-government website functions and features of local Chinese governments (city/county). Thank you for your help!

Based on your own opinion, please indicate the relative importance of the following website functions or features fore-government websites. 1 – the least important; 5 – the most important.

A1. The accuracy of the contents of the website
A2. The relevance of the contents of the website
A3. The currency the contents of the website – properly updated, without documents whose dates can't be judged
A4. The usefulness of the contents of the website
A5. Website facilitates downloading of laws, regulations, procedures, forms, etc.
A6. Website provides contact information
A7. Website provides useful links to related services

B1. Website has clear navigation
B2. It does not take many clicks to reach the contents you are looking for
B3. Speed of the server
B4. The extent of existence of orphan links, broken links
B5. Search tools to search the site

C1. Preliminary interactions (such as FAQs)
C2. Intermediate to advance interactions (allowing emailing to the department/officials, citizens' forums, etc)
C3. Privacy policy
C4. Personalization service
C5. Aesthetics of the website
C6. Professional style of the website
C7. Distinct local culture

D1. The frequency of your visits to your local government websites:
a. daily   b. weekly   c. monthly   d. once in several months e. almost never

D2. Your age group (optional): a- below20   b-20~29 , c-30~39 , d-40~49 , e–50 or above

D3. Please give one or two government websites that you think are the best
D4. Please give one or two government websites that you think are the worst

Thank you for your help!!