

Assessing E-Government Readiness of Local Governments in China: Developing a Bottom-up Approach

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ABSTRACT

This paper attempts to take a bottom-up approach to develop a field-based E-government Readiness Assessment method that could be usable and applicable for a specific local government with its own unique particular e-government priorities and goals. As a result of the method, a set of specific readiness assessment indicators, rather than predefined all-size-fits-all criteria, will be derived. The method takes both qualitative and quantitative approaches, and collects both primary and secondary data. An assessment case was also carried out in China to test the assessment method.

Categories and Subject Descriptors

C.4.3 [Performance of Systems]: Measurement Techniques

General Terms

Management, Measurement, Performance

Keywords

Readiness, Assessment, E-government, Method

1. INTRODUCTION

E-government readiness assessment (ERA) evaluates how ready a country, a city, or a particular government agency is to develop e-government. e-Readiness assessment can be an effective tool to carry out planning, monitoring and evaluation of the initiatives toward Information Society in general and e-Government in particular [18]. It can serve as a useful starting point, because deciding where to go, one must first know where it is now. Thus, the assessment could “provide a firm base upon which to make strategy, plan, policy and decisions [7]. Through ERA, a government can assess its stage of readiness, identify its gaps, and then redesign its e-government strategy. The assessment is especially relevant for government at its preliminary or intermediate development stage of e-government. Particularly, e-readiness assessment can help developing countries to measure and plan for ICT integration. It can help them focus their efforts from within, and identify areas where external support or aid is required [21]. In short, it is of great importance to establish a

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useful and feasible framework and methods of ERA.

2. LITERATURE REVIEW

2.1 E-readiness, E-Government Readiness and E-Government Maturity

Currently there has not yet been a standard and universal definition for e-government readiness. According to Ojo [18], E-readiness measures the extent to which a society is prepared to reap the opportunities from the information and communication technologies. The notion of e-readiness broadly covers political, regulatory, organizational, cultural, communication and technological factors. “To comply with e-Governance, one must first be e-Ready” [21], and e-Readiness is the ability to use ICT to develop one's economy and to foster one's welfare [21].

Some scholars clearly differentiate e-readiness assessment for particular themes, such as e-commerce or e-government, from e-readiness assessment for general purpose without focusing on any particular aspects of government society. One example of the former is the World Economic Forum Networked Readiness, and example of the latter includes the United Nations Department of Economic and Social Affairs (UN-DESA) e-government survey and the Economist Intelligence Unit E-readiness Index [8][9] which a focus on e-commerce.

Kachwamba and Hussein [16] further distinguish e-government readiness from e-government maturity. According to the authors, E-government readiness comprises of all prerequisite necessary to implement e-government while e-government maturity refers to the actual level of e-government progress a country has attained. The 2010 UNDESA E-government report [24] also replaces the term “e-government readiness”, which was adopted in its previous reports, with the term “e-government development”. The reason is that the term “e-government development” describes “how far governments have actually advanced in e-government”, while “e-government readiness” describes how ready or able they might be to do so. This research will focus on the e-government readiness assessment method.

2.2 Existing E-Government Readiness Index

So far, there are only a few globally or regionally surveys assessing e-government, such as United Nations Department of Economic and Social Affairs (UN-DESA) e-readiness Index (UNDESA 2004) [12], the Brown University e-government ranking [11], and overall Maturity Index [10]. These models use different sets of indicators, and many of them actually focus on evaluating the e-government maturity instead of e-government readiness, with concentration on the features on government websites and online services. For example, West' e-government

ranking [11] assesses the features of national government websites, and the Accenture E-government Maturity Index [10] focuses on evaluating the e-government service maturity, delivery maturity and citizen voice. Among them, the UNDESA e-government readiness survey explicitly adopts the term “readiness” until 2008 [23]. In its 2010 survey, the notion of “readiness” has been replaced by “development” to evaluate describes what governments have actually advanced in e-government [24].

The UNDESA e-readiness survey considers a relatively comprehensive assessment of e-government including both general and specific indicators, while other indices only consider the indicators regarding e-government applications or government websites [18]. The UNDESA conducted e-government surveys since 2001 [22]. Its E-government Readiness Index is a comprehensive scoring of the willingness and capacity of national administrations to use online and mobile technology in the execution of government functions. The conceptual framework of these surveys was derived from the vision of human development provided by the UN Millennium Declaration [13]. The conceptual question behind e-readiness assessment is how ready states are to take advantage of the opportunity provided by advances in information technology [23].

The UNDESA survey is comprised of four indices. First, Online Service Index (named Web Measure Index in earlier years) is based on a comprehensive survey of 192 countries’ national website as well as the websites of the ministries of education, labour, social services, health and finance. The survey evaluates countries based on the four-stage web maturity model of e-government development: emerging online presence, enhanced presence, transactional presence and connected presence. The second index, the telecommunication infrastructure index, is a composite of five indicators: number of personal computers per 100 persons, number of Internet users per 100 persons, number of telephone lines per 100 persons, number of mobile cellular subscriptions per 100 persons and number of fixed broadband subscribers per 100 persons. Thirdly, the human capital index is a composite of two indicators: adult literacy rate and the combined primary, secondary, and tertiary gross enrollment ratio. The fourth one, the e-participation Index focuses on the use of the Internet to facilitate “ e-information”, “e-consultation”, and “e-decision making” [12][13][22][23][24].

When assessing the UNDESA e-government readiness indices against the difference between the e-government readiness and maturity, it seems the UNDESA survey’s first and fourth indices, online service index and e-participation index, are in fact assessing the e-government maturity of a nation instead of its readiness. Only the rest two indices, human capital index and the telecommunication infrastructure index, truly meet the requirements of e-readiness assessment.

Since its launch in 2001, the UNDESA e-government readiness assessment has received many critiques and concerns with regard to its underlying assumption, assessment strategy and approach, level of assessment, index framework, indicator selections, data collection and analysis methods. Altman [2] argued that there was no direct link between countries with high readiness and those with actually broad use of e-government.

Many studies also challenged the top-down and all-size-fits-all approach of current global benchmarking surveys which ignore the unique characteristics of individual countries, and their different people, contexts, and purposes [7]. Potnis and Pardo [20] argued that the developing nations have very different priorities

compared to developed nations, and developed nations have better leverage over developing nations due to their established socio-economical and political conditions, while disadvantaged populations in developing nations are still struggling for survival. Therefore, “governments in developing nations face very different set of challenges in terms of acquiring e-government related technologies and offering e-governance to citizens.” [20]

Some also argued that the UNDESA Surveys confined themselves to central government website assessments alone [20]. Several benchmarking indices are available at the macro level primarily for ranking countries. However, what appears on the macro level can hide wide heterogeneity among organizations, local areas, and individuals, therefore, micro-level measurable criteria need to be developed [21].

Some researchers further asserted that the readiness indices of UNDESA e-government survey offered an over-simplistic solution to a complex task. One study argued that adult literacy, one of the Human Capital Index indicators, is not enough to take advantage of e-Government initiatives. Citizens must achieve technical acquaintances in order to be benefited from e-Governance initiatives [20]. Bannister [3] pointed out that some easily available quantitative and statistical indicators of e-readiness tend to be superficial and do not necessarily represent the true nature of the situation, while the more complex and significant measures often cannot be quantified easily and are subsequently omitted. In terms of the survey’s data collection methods, it might be inconsistent across countries as many different researchers are involved in gathering, retrieving and processing data [19].

2.3 Improving E-Government Readiness Index

A number of studies have attempted to improve or expand the index framework for e-government readiness assessment. Some researchers present a general framework which comprises six key factors to implement any E-government initiatives: Organizational Readiness, Governance and leadership Readiness, Customer Readiness, Competency Readiness, Technology Readiness and Legal Readiness [1]. Janssen, Rotthier and Snijkers [15] analyzed 18 international eGovernment benchmarking studies and led to five categories of indicators including Input indicator, Output indicators, Usage/Intensity indicators, Impact/Effect indicators, and Environmental/Readiness indicators. According to the authors, the Environmental indicators do not measure eGovernment itself, but instead measure the preconditions and surrounding environment of eGovernment, such as ICT infrastructure, ICT skills, trust in ICT and the legal environment. These environment indicators seem to be close to the readiness indicators. One study identified a number of core e-government readiness variables, which account for the wide disparity between the ‘top ready’ and ‘not ready’ countries. These results show that e-government readiness is determined by mature online presence characterized by full transactional services, support for citizens’ engagement in consultation and decision-making, and availability of the requisite access infrastructure [18]. However, the first two measures seem to be e-maturity indicators rather than e-readiness indicators.

Furthermore, Rahman [21] also suggested that although a number of e-readiness assessment tools and methods measure ICT connectivity, ICT use and integration, training, human capacity, government policies and regulations, infrastructure, security and economy, in order to measure the effectiveness, many consequences of socio-political-cultural economical stages of a country needs to be studied as well. Thus, an extensive study is

desired at the lower level government in formulating EGR performance indicators [21]. Rahman also pointed out that lack of technical skills and policy building capacity are other barriers to establish effective e-government at the grass roots [21]. Bridges.org [6] argued that e-readiness assessment needs to become more focused and action-oriented, and moves from the simple measurement to concrete action by looking at both micro and the macro level. Simply having an environment that is supportive of these technologies is not enough, in order to gain benefits from ICTs, an organization must first be willing to accept, adopt and internalize these new technologies, therefore, a integrated model should consider both the organizational factors that influence a user's acceptance of the technology, and the environmental readiness factors that create an enabling environment for technology including the perceived performance expectancy, effort expectancy, social influence etc [7]. Madon [17] argued that evaluation criteria should come from the field and reflect felt needs and priorities of the users of the project rather than the fined objective criteria.

The 2010 UNDESA E-government Survey also acknowledged that E-readiness is not fostered in a digital vacuum, but rather in a complex web of social, cultural, economic and political factors, ultimately driven by the usage imperative and proposed a number of suggestions for future assessment [24]. Particularly, E-government development is often impeded by constraints in public sector capacity including the fragmented information systems that accompany organizational complexity, the ICT skills, the mindset and behaviors of work force in the public sector, the existence and effectiveness of a supportive institutional framework such as government-wide chief information officer for coordinating national e-government policy, and the work processes. The 2010 UNDESA report [24] further suggests that future work on measuring e-government capacity need to expand beyond ICT infrastructure and human resource issues to cover the design of institutional machinery, laws, regulations, policies and standards. Capacity constraints are very much present on the demand side of the e-government equation as well. However, the currently UNDESA national capacity indicators do not provide breakdowns by population segment.

In sum, the current global benchmarking e-government assessment frameworks, methods and indices mainly take a top-down approach; focus on national level; rely heavily on macro and often quantitative indicators; base on theoretical assumptions which do not necessarily fit the development goals and strategies of a specific country, especially developing countries. In addition, some indicators of the UNDESA e-government readiness indicators are actually measuring the maturity rather than the readiness of e-government. Therefore, a predefined, top-down and one-size-fits-all ERA methods which is originally designed for ranking countries may not be applicable for a specific local government, especially that in a developing country, to assess its e-government readiness. This studies attempts to fill this gap by developing an assessment framework and methods with a different approach.

3. DEVELOPING A BOTTOM-UP ASSESSMENT METHOD FOR LOCAL GOVERNMENT

This paper attempts to take a bottom-up approach to develop a field-based E-government Readiness Assessment method that could be applicable for a specific local government with its own

unique particular e-government priorities and goals. As a result of employing the method, a set of specific readiness assessment indicators, rather than a set of predefined one-size-fits-all criteria, will be derived. The method takes both qualitative and quantitative approaches, collects both primary and secondary data, and comprises of the following steps:

3.1 Developing Field-based E-Government Readiness Indicators

3.1.1 Collecting Field Data

With this bottom-up approach, the assessment team should first conduct in-depth interviews and focus groups to identify assessment indicators from the field, a specific local government or a particular government agency. The purpose of collecting field data is to identify specific e-government goals and priorities of the government, external constraints and enablers as well as internal advantages and disadvantages that could impact the effectiveness of achieving the e-government goals. The external readiness factors refer to the variables outside the government, and the internal readiness factors refer to factors inside the government. Meanwhile, the team should also collect secondary data from relevant government documents and statistics to investigate the external and internal readiness factors.

3.1.2 Identifying Readiness Indicators

The collected data will then be coded and classified with qualitative approach according to the grounded theory to identify repeated common patterns. Factors that are mentioned frequently in the data will be recognized as indicators of e-government readiness for this specific government or agency. Next, those indicators recognized in qualitative analysis will be developed into a systematic indicators framework, which will then be turned into questionnaires for quantitative assessment.

3.2 Conducting Pilot Test

Before the formal readiness assessment starts, the questionnaires developed from the field should be tested with a few samples to examine their applicability and feasibility. The objective of the pilot study is to modify and improve the indicators' framework and the questionnaires. Some indicators might be added and removed base on the test results.

3.3 Starting Assessment

Finally, the revised questionnaires can be applied for assessing the readiness of this specific local government or agency. Other than conducting surveys in a quantitative approach, in-depth interviews and focus groups should also be conducted to assess the readiness with qualitative data. Those qualitative data could provide richer and more in-depth findings, and help to cross-check the results of quantitative surveys to improve the quality of assessment.

4. TESTING THE METHOD IN A LOCAL GOVERNMENT IN CHINA

The above assessment method has the opportunity to be applied to a city government in China in summer 2009. The detailed procedures are described as follows:

4.1 City Selection

City Z, located in the middle of China, is at intermediate stage of e-government development. E-government readiness assessment is commonly considered to be more suitable for regions and governmental departments at preliminary and intermediate stage

of e-government; therefore City Z provides an ideal case for testing the assessment methods. Thirty government agencies at City Z, mainly being responsible for delivering public services and social management, participated in the e-government readiness assessment project. The assessment also includes four governments at district or county level in City Z to test the applicability of method at different level of government. The assessment experiences learned from City Z might be valuable for other similar cities and have the potential of improving methods of e-government readiness assessment.

4.2 Developing a Specific Indicators' Framework for City Z

Four government agencies at City Z were first selected in a pilot study to develop a tailored indicators' framework for City Z. The four agencies have different and supplementary characteristics so as to enhance the representativeness of participants in the pilot study. Semi-structured interviews were conducted with IT leaders and business leaders in the four agencies, and focus groups were targeted at staff from both IT department and business departments. In each agency, at least one leader in charge of e-government initiatives was interviewed for 30-60 minutes, and around 15-20 government staff from both IT department and business departments were invited to attend a focus group lasting for approximately one hour. The questions asked in the interviews and focus groups include:

- 1) Please briefly describe the e-government development and major achievement of your agency in the last five years.
- 2) What are the major external enablers and barriers for e-government development in your agency in the last five years? Why?
- 3) What are the major internal strength and weakness for e-government development in your agency in the last five years? Why?
- 4) What are the e-government goals and priorities of your agency in the next five years?
- 5) In order to achieve these e-government goals, what external and internal issues and problems should be addressed and revolved in the next five years?

4.3 Indicator's Framework Developed

Through this bottom-up approach, an indicators' framework was developed by analyzing, coding and classifying the data collected. Meanwhile, the assessment team also reviewed some existing well-recognized ERA methods to identify indicators that did not stand out in the qualitative analysis from the field but might be relevant to E-government in City Z. These indicators identified in current ERA practices were also added into the framework.

By combining the indicators identified in the field as well as those derived from current best practices, the assessment framework becomes more comprehensive and complete (see Table 1). A number of first-level and second-level indicators are identified (see Table 1). The framework includes two major building blocks, the external environment e-readiness indicators and the internal government e-readiness indicators. The external environment readiness comprises of social ICT infrastructure and social and human environment. The internal government readiness is composed of managerial framework, leadership, investment, workforce capability, internal IT infrastructure, information safety, and legal and regulatory environment.

4.4 Designing Assessment Instruments

The assessment framework was then turned into questionnaires for assessment. Two questionnaires were developed for different samples. Questionnaire A was designed for leaders and staff from IT department with a focus on IT infrastructure-related data, and Questionnaire B was designed for business leaders and staff from business department to investigate factors that are not directly related to IT infrastructure and are more associated with institutional, organizational and social factors.

Semi-structured questions were also designed into the questionnaires to assess the readiness of City Z with a qualitative approach. The same set of interview questions used in 4.2 was included into the questionnaire, and was also used for conducting interviews and focus groups with leaders and staff respectively in each participating agency. The questionnaires developed were then tested with the four agencies to examine their applicability and feasibility, and were modified and improved accordingly.

4.5 Carrying Out the Formal E-Government Readiness Assessment

In the formal assessment, all thirty four participating agencies and districts were asked to fill up the questionnaires. Interviews and focus groups were also conducted with relevant leaders, manager and staff respectively in each participating agency.

In addition to primary data, secondary data were also collected from City Z to investigate the city's e-government strategies, priorities and current status, such as the City Z Statistics Year Book, E-government development plans, and other government reports related to e-government initiatives.

The data collected for assessment was analyzed with qualitative and quantitative methods. Based on the analysis, a final report was developed and submitted to the government of City Z.

4.6 Lessons Learned

Some lessons are learned through the process of testing the method in City Z in China. Accordingly, some suggestions about adjusting and improving assessment methods are raised.

First, the assessment team found some discrepancy in results between the qualitative data collected through questionnaires and quantitative data collected through interviews and focus groups. The qualitative data seems to more close to the truth, especially when the topic or issue is sensitive. The possible reason is that even though participants had been informed at the beginning of the assessment that the survey is anonymous, many participants were still very cautious about the consequence of telling the truth and regarded the assessment as a ranking of agencies' e-government development, so many participants tended to score their agency highly when filling up the questionnaires. The effect is especially obvious when participants were required to fill up the questionnaire before the focus group discussion started. The assessment team also noticed that usually after an interview or focus group started for about 15-20 minutes, participants started to talk in a more comfortable and relaxed way and were willing to tell more truth. This may explain why the qualitative data collected through interviews and focus groups seem to be more real than the quantitative data collected through the questionnaire. Therefore, in future assessment, we suggest asking participants to fill up the survey questionnaires after the interview and focus groups are finished when participants feel more relaxed and comfortable.

Second, we suggests separating agency leaders from their subordinates during focus group discussions, as it is observed that

Table 1: E-government readiness assessment indicators developed in City Z

	First-level Indicators	Second-level Indicators	
External Environment Readiness	Social ICT infrastructure	penetration of PCs	
		penetration of cell phones	
		penetration of fixed telephone	
		penetration of broadband usage	
		penetration of internet	
		density of internet cafe	
	Social and Human Environment	coverage of mobile telecommunication	
		Average education level of citizens	
		Illiteracy rate	
		Availability of IT courses offered at primary and secondary schools	
Internal government Readiness	Managerial framework	Availability of IT training centers in society	
		Age structure of citizens	
		Leadership	Governance structure
			Availability of Information department
			Availability of Information leaders
	Role and Responsibility of Information department and leaders		
	Staff number of Information department		
	Investment	Leader's Perception and Knowledge of Information-related work	
		Leaders' Implementation Capability	
	Workforce Capability	Source of Investment	
		Execution of Investment	
		Technological and Professional Capability of IT workforce	
	Internal IT infrastructure	Perception and Capability towards Information of Staff in business departments	
		Effectiveness of IT Training	
		Penetration of PCs	
		Network Coverage	
	Information Safety	Broadband Width	
		Infrastructure Maintenance and Upgrade	
		Staff Perception towards information Safety	
	legal and regulatory environment regarding information	Policy for Safety and Confidentiality	
Technological Infrastructure for safety			
Open Government Status			
	Conflicts between laws related to information		
	Implementation of other information-related Laws		

subordinates tended not to speak up when their leaders were presented in the same room. During the data collection procedure, it occurred that some leaders presented at the focus group which was originally arranged for general staff. During such situations, the head of the assessment team stood up and invited the leaders

to a separate room for individual interview. The team head explained to the leaders that some special questions to the leader needed to be asked separately in an individual interview. During the assessment, most leaders accepted such invitations and left the room following the assessment team head. The rest of the

assessment team then stayed with the general staff to continue the focus group discussion.

4.7 Discussions and Conclusions

After systematic analysis, the final indicators' framework developed from the field in City Z turned out to be a quite comprehensive set of assessment criteria, which addresses both external social environment and internal government environment, covers technological, managerial, legal and social factors, and considers both attitude and capability of leaders and staff. It should also be emphasized that the framework developed in City Z in Table 1 is just an example of the result developed by this method in City Z, rather than a fixed all-size-fits-all criteria for all situations.

The results of the assessment method in City Z suggest that this bottom-up assessment method could serve as a quite useful, flexible and applicable tool for a specific local government to measure its e-government readiness according to its own e-government goals and priorities. The method does not intend to give a "fish", a set of fixed predefined indicators; instead, it is aimed at developing a set of "fishing" skills that could be used by any local governments to assess their e-government readiness by creating a set of by-the-local and for-the-local assessment indicators. Therefore, this local-specific and bottom-up assessment approach is significantly different from other top-down and universal assessment methods. However, this approach also has some limitations. For example, it is more time-consuming and effort-consuming compared to a top-down approach, and the assessment indicators developed out of a location-specific context may not be generalizable to different conditions.

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