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Abstract

The e-government websites (EGWS) provide comprehensive government information contents and online services for residents and become an important interactive platform between province authorities and residents. In this article, we construct a set of systematic, objective, effective, and service-oriented EGWS performance evaluation model, and utilize the quantization methods, analytic hierarchy process(AHP) to evaluate Chinese province EGWS. We have shown the applicability of the EGWS evaluating method using 31 provincial case study. The results indicate that there remains significant variation in the extent to which EGWS deliver government information, online service, interact with residents and using information technology. Furthermore, we utilized correlation analysis to determine whether the EGWS performance has any relations with the economic development level. This research provide e-government policy makers with the ability to make more informed decisions on these issues so residents can be better served.

Keywords: e-government websites, evaluation model, analytic hierarchy process, correlation study.

1 INTRODUCTION AND BACKGROUND

In recent years, information and communication technology (ICT) has radically transformed the way individuals, organizations, and governments used to work. The internet in today's information societies has become an essential channel that is used for dissemination of information and services. There are many benefits to transforming traditional government into e-government, such as cost-effective delivery of services, integration of services, reduction in administrative costs, a single integrated view of citizens across all government services and faster adaptation to meet resident's needs (Karunasena, Deng 2012) .Taking advantage of the electronic processes, EGWS is able to provide citizens and businesses with more convenient access to government information and services, to improve the quality of services, to update democratic mechanisms and provide more opportunities for public participation(Heeks, Bailur 2007) .

As the internet and web technologies have advanced from the pure information-sharing phase to interactive, transactional, and intelligent or integration phases, many Chinese province authorities see opportunities of offering web-based government services for improving government transparency, efficiency, and democracy by using the new generation information technologies. The original intention of the China's e-government project is to integrate internal and external resources to improve the efficiency of government works and provide convenient services to citizens. The EGWS has obtained notable achievement since1999. With the continuous development of e-government, Chinese governments have made impressive improvements in terms of infrastructure, office automation, and especially in government websites (Du, Wang 2007). Since the government websites have become more popular in China, government agencies are accessible, on-demand, and available to serve residents.

Since 2003, China Software Testing Center(CSTC) which belongs to Ministry of Industry and Information Technology began to evaluate more than seven hundreds of e-government websites every year and the work has lasted about ten years. However, There are 31 provinces (includes autonomous region, municipality directly under the central government), every province has its own e-government website. In recent years, although the central government has issued a series of policies to guide the construction of EGWS, the information sharing and business exchanges among provinces and different level authorities EGWS cannot be carried out effectively. Chinese provinces' e-governmental sites differ greatly from each other in terms of service quality and developmental levels due to the influences of political, economy, and culture or society environments.

The purpose of this study is to make a model for evaluating of EGWS and provide the administrators with the findings that they need for continuous improvement of EGWS. Because every province in China already has its own website, the findings of this study could help the provincial-government administrators compare their websites with the counterparts and identify opportunities for improvement to better serve their citizens. Therefore, measuring the success of the EGWS can help government agencies improve and fully exploit the potential of it as an innovative tool. This research generates additional insight the relationship between EGWS performance and economic development to help administrators develop and manage their websites.

2 LITERATURE REVIEW AND RESEARCH QUESTIONS

2.1 EGWS performance evaluation

From 2002, there are many institutions, such as the United Nations, the World Bank, Europe's Information Society, evaluate satisfaction and e-Government progress using various methods and indices such as, the American Customer Satisfaction Index, the European Customer Satisfaction Index and the Canadian Common Measurement Tool (CMT) of satisfaction(Anthopoulos, Gerogiannis et al. 2010). In China, there are several studies establishes the AHP structure model to evaluate the EGWS

performance based on a typical index system (Yuan, Yuan 2009). The research problem is that the user's satisfaction is a multi-dimensional construct combining technical, behavioural and marketing determinants. Therefore, it's difficult to collect data and utilize the research results. Furthermore, due to the vast diversity in the Chinese EGWS in different areas, these methods and indices maybe not fit for the reality of Chinese EGWS. From the central government administrators' point of view, it has become difficult to decide whose information contents and online-services are better and what is the basis for ranking. To this end, an imperative is assessing the development of systems for EGWS. This research intends to resolve these two research questions:

- What information and services has been provided on Chinese provincial EGWS and how many attributes can be used to evaluate provincial EGWS?
- How can we establish the relative importance weights (priorities) for each set of elements at each layer of hierarchy, collect the data from different EGWS and rank them?

2.2 The relationship between EGWS performance and economy development

The studies exploring the issues related to the development of EGWS have become increasingly important since many effects could influence the performance of EGWS. There are studies in American reported that a county's per capita personal income, economic prosperity and population had significant positive correlation with the quality of e-government websites. The research also indicates that such services strengthen economic competitiveness and prompt growth(Wilkinson, Cappel 2005) Other prior work has examined the capabilities and characteristics of the government sites of the 50 U.S. states and Washington, D.C. and their relationships with the economic competitiveness (Dunleavy, Margetts et al. 2006). Another study have indicated that significant differences existed between economically affluent states and less affluent ones in state e-government websites security measures in the Unites States(Zhao, Zhao et al. 2010). It is important to find out the relationships between the province EGWS performance and province economic development level in China. If the findings of this study suggest that the EGWS performance is a resource issue, policy makers might initiate efforts to provide supplemental funding to less affluent provinces to improve their EGWS performance. Therefore, the third question of this research is raised as follows:

- Are there any relationships between the province EGWS performance and province economic development level in China?

3 RESEARCH METHODOLOGY

EGWS provided users and government agencies with lots of tangible benefits, such as improved quality of information supply and service access, reduced work-process time and operational cost, and increased user satisfaction and work efficiency (Grant, Chau 2006). However, as discussed previously, EGWS have many attributes and sub-attributes which make the ranking process a complex task. Without a structured technique, the evaluation of the EGWS would be very difficult given the number of attributes involved. This problem in the literature is defined as multiple criteria decision making (MCDM). In addition, the challenge into compare each EGWS based on each attribute, how to quantify them and how to aggregate them in a meaningful metric. In general, such problems fall into the category of MCDM, where decision makers choose or rank alternatives on the basis of an evaluation of several criteria. The traditional weighted sum-based methods cannot be directly applied in such a hierarchical structure of attributes (Ramanathan 2001). Analytic Hierarchy Process (AHP) is one of the most widely used mechanisms for solving problems related to MCDM, which facilitates choosing among alternative action courses or designs in order to achieve the final goal and objectives.

AHP is a multiple criteria decision-making tool and a kind of assessment method that combines quantitative analysis with qualitative analysis by matrix calculation based on structure model (Saaty 2005). AHP gives a very flexible way for solving MCDM problems and can be adapted to any number of attributes with any number of sub-attributes. Furthermore, AHP based ranking mechanism could solve the problem of assigning weights to features considering the interdependence between them, is

providing a much-needed quantitative basis for the ranking of EGWS. For the basic principle of AHP, first is to find out relative factors about a complicated problem, and to make sure of their hierarchies, then to make certain of their comparative significance by comparing these factors each other, and finally give their weights. The advantages of AHP over other multi-criteria methods are its flexibility, intuitive appeal to the decision makers and its ability to check inconsistencies. Therefore, to evaluate EGWS based on multiple attributes, we propose a ranking mechanism based on AHP.

And then, we can conduct correlation studies to determine how EGWS performance relates with province economic development level. Correlation studies are used to look for relationships between variables. Use the correlation study could determine the extent to which changes in the value of an attribute are associated with changes in another attribute. There are three possible results of a correlation study: a positive correlation, a negative correlation, and no correlation.

4 THE EVALUATION MODEL FOR EGWS

The evaluation model for EGWS is one of the key problems to promote the construction and development of the e-government. We first establish the hierarchy of performance evaluation criteria for e-government website, this is the attribute system of hierarchical structure; then, based on the basic principle of the Analytic Hierarchy Process(AHP), we can get hierarchical arrangement; at last, We will establishes the model of integrated assessment of e-government website.

4.1 The performance evaluation attributes systems

The mission of the province authorities is to provide Chinese citizens top quality services by helping them understand and meet their responsibilities and enforce the law with integrity and fairness to all. The EGWS plays an important role in this process. In China, the EGWS is to make use of the information technique to reform government work. The Chinese government website performance evaluation report identified that the majority of the EGWS offered a series of online services such as government to education, employment, training, travel and transportation; government to citizens including marriage, family, health, and legislature; government to firms including start business, license application and so on (Yan 2012). The objective of EGWS is to make the public administration more scientific, reasonable, and efficient and provide citizens more transparent and convenient online services. The EGWS has become the best platform for the authorities to carry out the interactivity between the agency and citizens.

In the March of 2006， Chinese former premier Jia-bao, Wen said government should become more transparency， service oriented and democratic in a report to the National People's Congress of P.R.China. In this foundation, combining with the new information technology development and the features of the EGWS, this study establishes the performance evaluation attributes systems of EGWS. Table1 presents the EGWS hierarchy based on attributes. The aim layer is the analysis goals. The guideline layer estimates the performance of EGWS from four aspects, namely, the government data openness and transparency, the online service quantity and quality, the public participation and interactivity, and the application of new information technology. The Sub-guideline layer contains the values of all the EGWS for all the attributes in the hierarchy presented in the Guideline layer.

Aim layer (A)	Guideline layer attributes(B)	Sub-guideline layer attributes(C)
	The government data openness and transparency (B1)	The attributes of basic information includes about province, governors profile, province news, budget information, statistics data, development plans, bulletin. (C1)
		The attributes of openness of government information includes in the fields of agriculture, environmental, education, finance, business, policies and legislations. (C2)

Aim layer (A)	Guideline layer attributes(B)	Sub-guideline layer attributes(C)
The Performance of EGWS(A)	The online service quantity and quality(B2)	The comprehensive of online service includes education, transportation, medical, job& skills, accommodation, start business.(C3)
		The diversity of online services resources includes service guide, form downloads, online application, order function.(C4)
		The effective of online services includes stability, security, privacy protection and accuracy. (C5)
	The public participation and interactivity (B3)	Online consulting includes questions and answers, the hot questions assembly, and the introduction of call centre.(C6)
		Online mailbox for citizens complaints and suggestion.(C7)
		Online survey means to collecting of opinions and advices from citizens.(C8)
		Online interview means province authorities interactive and dialogue with citizens about hot topics. (C9)
	The application of new information technology (B4)	Mobile government includes mobile information inquiry, mobile online submission and location based service. (C10)
		Intellectual searching and big data analytical tool could satisfy for citizens individual search needs.(C11)
		The application of GOV2.0 includes BLOG, RSS, WIKI, and SNS in EGWS. (C12)

Table 1. Hierarchy of Performance Evaluation Criteria for EGWS

4.2 The weights of attributes

4.2.1 The Judgment matrix

Because of Each individual attribute affects the evaluation process, and its impact on overall ranking depends on its priority in the overall evaluation process. After building the hierarchy of performance evaluation criteria for EGWS, we should collect input data that would establish the relative importance weights (priorities) for each set of elements at each layer of the hierarchy. To compare EGWS, we need to assign weights to each attribute to take into account their relative importance.

Based on the hierarchical structure, Judgment matrix is the result matrix from the pair-comparison between elements in the same level and a certain attributes in the upper level and the accordingly compulsory assessment and judgment (Yuan, Yuan 2009). For example, if the attributes of aim layer A have relation to the attributes of lower layers B1, B2… Bt, the judgment matrix is shown in table2.

A	B1	B2	⋯	Bt
B1	P (1,1)	P (1,2)	⋯	P (1,t)
B2	P (2,1)	P (2,2)	⋯	P (2,t)
…	…	…	…	…
Bt	P (t,1)	P (t,2)	⋯	P (t,t)

Table 2. Judgment matrix of layer a and layer b

The scale of relative importance intensity of relative importance definition is given in table3. This methodology was proposed originally for calculating weights for each criterion in the AHP technique (Saaty 2005). A certain element P (i,j) in the judgment matrix expresses the relative importance of i and j to a certain element in the upper level. Some characteristics of the judgment matrix are as

follows: P(i , j) = P(j , i)$^{-1}$, P(i , i) = 1. When P (i, j) ≥ 1, we take 1, 2, 3… 9 and their reciprocals as its value (Du, Pang.2008). This can be used to assign weights to all the EGWS attributes.

Verbal Scale	Numerical Values
i and j are equally important	1
Intermediate values between 1 and 3	2
i is slightly more important than j	3
Intermediate values between 3 and 5	4
i is moderately more important than j	5
Intermediate values between 5 and 7	6
i is much more important than j	7
Intermediate values between 7 and 9	8
i is extremely more important than j	9

Table 3. Scale of relative importance intensity of relative importance definition

4.2.2 The calculation of the weights

Two administrators from central government, local government and one expert from e-government academic research institute were asked to take into account their own opinions and experiences when comparing criteria, and to compare the decision criteria with each other. The administrators and experts in the fields of e-government express their preferences for each attribute relative to other attributes and assigned weights using AHP's standard method. They can assign weights to each of the attributes using values in some scale, as suggested in the table3, to indicate the importance of one attribute over another. The table4 indicates the relative importance value of the guideline layer attributes of the government data opening and transparency (B1), the online service quantity and quality (B2), the public participation and interactivity (B3) and the application of new information technology (B4). The comparison matrix for Guideline layer attributes will be:

A	B1	B2	B3	B4
B1	1	1	3	2
B2	1	1	3	2
B3	1/3	1/3	1	1/2
B4	1/2	1/2	2	1

Table 4. The Guideline layer attributes relative importance value

Based on the data given in table4, we could compute the relative ranking vector from the comparison matrix for guideline layer attributes.

$$\overline{W_1} = \sqrt[4]{1\times1\times3\times2} = 1.565 \quad \overline{W_2} = \sqrt[4]{1\times1\times3\times2} = 1.565$$

$$\overline{W_3} = \sqrt[4]{\frac{1}{3}\times\frac{1}{3}\times1\times\frac{1}{2}} = 0.485 \quad \overline{W_4} = \sqrt[4]{\frac{1}{2}\times\frac{1}{2}\times2\times1} = 0.841$$

$$\sum_{i=1}^{4} \overline{W_i} = 4.456 \quad W_i = \frac{\overline{W_i}}{\sum_{i=1}^{n} \overline{W_i}}$$

$$W_1 = 0.351 \quad W_2 = 0.351 \quad W_3 = 0.109 \quad W_4 = 0.189$$

Now, we have the relative ranking vector $W = (0.351, 0.351, 0.109, 0.189)^T$ as the respective weight of B1, B2, B3, and B4.

4.2.3 The verification of consistency condition

In addition to final preference weights, the AHP permits calculation of a value called the consistency index. This index measures transitivity of preference for the person doing the pair wise comparisons. The AHP consistency index compares a person's informed preferences ratings to those generated by a random preference expression process. An arbitrary but generally accepted as tolerable level of inconsistent preference scoring with the AHP is less than or equal to 0.1(Saaty 2005).

$$\lambda_{\max} = \sum_{i=1}^{n} \frac{(AW)_i}{nW_i} = \frac{1.407}{4 \times 0.351} + \frac{1.407}{4 \times 0.351} + \frac{0.438}{4 \times 0.109} + \frac{0.758}{4 \times 0.189} = 4.011$$

We could calculate the consistency index: $C.I. = \frac{\lambda_{\max} - n}{n-1} = \frac{4.011 - 4}{4-1} = 0.004$

According to the table5 mean random consistency index, we could get the R.I=0.89 under the condition of n=4.

N	1	2	3	4	5	6	7	8
R.I	0	0	0.52	0.89	1.12	1.26	1.36	1.41

Table 5. The mean random consistency index

As consistency ratio CR is computed for each comparison matrix. In an interactive application of AHP a matrix classified as being inconsistent (CR > 0.1) was given back to the decision making for modification until it fulfils the consistency condition. All of them were less of 0.1. In this model, CR.=CI./R.I.=0.004/0.89=0.004<0.1. Therefore, the comparison matrix for Guideline layer attributes is acceptable and the weight is reasonable.

Similarly, we have the relative ranking vector of the Sub-guideline layer attributes. For the government data opening and transparency (B1), there are two attributes (C1and C2) which are further subdivided into sub-attributes, and the relative ranking vector $W_1 = (0.333, 0.667)^T$ as the weight of C1 and C2. For the online service quantity and quality (B2), the public participation and interactivity (B3) and the application of new information technology (B4), their respective relative ranking vector is $W_2 = (0.269, 0.614, 0.117)^T$, $W_3 = (0.263, 0.564, 0.118, 0.005)^T$ and $W_4 = (0.162, 0.529, 0.309)^T$.

5 DATA PREPARATION AND EVALUATION RESULTS

5.1 The data preparation

As to the end of 2013, in terms of Chinese EGWS, there are 31 at the province level (autonomous region, municipality directly under the Central Government, exclude Hong Kong, Macao and Taiwan). Province websites were located using the central government website of People's Republic of China, which contained links to provincial government websites. If the site of a certain province did not have a link, it was searched for using search engines such as Baidu and Google.

In this case study, the population of it was the 31 provincial EGWS. All the data were collected in December 2013. The website of each province included in the sample was examined using content analysis to determine its level of e-government performance. Two research assistants were trained to collect data from the provincial EGWS. To assure the validity and reliability of the data, the research assistants followed the data collection process as follows: the two assistants were assigned the same government website every day. From the same EGWS they collected data independently; then, they should compare their collected data and reaches agreement. When the research assistants encountered

any problems and could not come to agreement, they should meet with the researchers for problem solving and assurance of data quality.

5.2 The calculation and evaluation results

The calculation of the attributes was done using the collected data from these provincial EGWS. The collected data were then coded for statistical analysis. At first we could compute the government data opening and transparency relative ranking vector for B1 attributes, we have：

$$B1 = \begin{vmatrix} 7.0 & 7.3 \\ 6.7 & 8.5 \\ 8.2 & 7.6 \\ \cdots & \cdots \\ \cdots & \cdots \\ \cdots & \cdots \\ 3.8 & 2.9 \\ 3.0 & 3.3 \end{vmatrix} \begin{bmatrix} 0.333 \\ 0.667 \end{bmatrix} = \begin{bmatrix} 7.2 \\ 7.9 \\ 7.8 \\ \cdots \\ \cdots \\ \cdots \\ 3.2 \\ 3.2 \end{bmatrix}$$

In a similar way, we can compute the relative ranking vector of all other Guideline layer attributes, i.e., the online service quantity and quality (B2), the public participation and interactivity (B3) and the application of new information technology (B4). To get the final relative EGWS ranking vector, we multiply the above ranking vectors with the weights of the top level attributes. Therefore, the relative ranking of all the 31 EGWSs can be decided based on the resultant.

$$A = \begin{vmatrix} 7.2 & 7.9 & 9.3 & 8.0 \\ 7.9 & 7.1 & 7.3 & 7.0 \\ 7.8 & 6.9 & 7.9 & 6.6 \\ \cdots & \cdots & \cdots & \cdots \\ \cdots & \cdots & \cdots & \cdots \\ \cdots & \cdots & \cdots & \cdots \\ 3.2 & 1.3 & 4.4 & 3.1 \\ 3.2 & 0.9 & 1.3 & 2.7 \end{vmatrix} \begin{bmatrix} 0.351 \\ 0.351 \\ 0.109 \\ 0.189 \end{bmatrix} = \begin{bmatrix} 7.8 \\ 7.4 \\ 7.3 \\ \cdots \\ \cdots \\ \cdots \\ 2.6 \\ 2.1 \end{bmatrix}$$

The EGWS performance as shown in table 6, it indicates considerable variation with respect to the extent they delivered information, services and interactivity via the websites. While web technologies have been well established for many years, some provincial government websites are limited to more basic functions such as information dissemination. This raises a concern whether the variables of economic development level had any relations with the e-government performance.

6 THE ECONOMIC DEVELOPMENT LEVEL AND EGWS PERFORMANCE

With the development of more and more web-based technologies, governments of less affluent provinces in China adopted the new methods for improving levels of websites to become comparable with more affluent provinces, and importantly, for providing more extensive information and services. Research Question 3 asked, “Are there any relationships between the province EGWS performance and province economic development level in China?” Among different economic development levels, it might be expected that less affluent provinces would exhibit poorer in their EGWS performance than provinces that have more resources (Wilkinson, Cappel 2005). We had recorded and measured EGWSs data, and then calculated the ranking result. The province economic development level was defined by the province gross domestic product (GDP) and the per capita gross domestic product (PCGDP) for each province. Both of these two categories data for the provinces are from the most recent 2012. We obtained them by using the latest publicly available information at the website of National Bureau of Statistics of China.

Province	The government data opening and transparency (B1)	The online service quantity and quality (B2)	The public participation and interactivity (B3)	The application of new information technology (B4)	The perfor-mance of EGWS (A)	Per Capita Gross Domestic Product ($)	Gross Domestic Product (Millions$)
Beijing	7.2	7.9	9.3	8.0	7.8	14027	283208
Sichuan	7.9	7.1	7.3	7.0	7.4	4714	379442
Shanghai	7.8	6.9	7.9	6.6	7.3	13626	319805
Fujian	7.6	6.8	6.8	7.0	7.1	8426	313448
Hainan	7.6	7.2	8.2	3.6	6.8	5180	45426
Hunan	7.3	7.4	7.6	3.8	6.7	5344	352466
Hubei	7.2	6.2	6.6	6.6	6.7	6148	353992
Guangdong	7.8	6.2	8.6	3.6	6.5	8643	907930
Anhui	7.7	4.7	7.2	7.2	6.5	4588	273837
Shaanxi	7.2	4.6	6.8	2.7	5.4	6142	229913
Jiangsu	6.8	3.7	6.6	3.4	5.0	10888	860046
Zhejiang	5.3	3.1	4.7	6.3	4.7	10078	550574
Yunnan	5.1	4.5	3.9	3.1	4.4	3542	164025
Guangxi	4.8	3.4	6.1	3.5	4.2	4463	207319
Shandong	5.6	3.0	4.7	3.3	4.2	8257	795692
Hei-longjiang	4.7	3.1	6.9	3.4	4.1	5681	217828
Tianjin	5.9	3.2	3.4	2.9	4.1	15129	204998
Inner-Mongolia	5.5	2.6	4.8	3.4	4.0	10249	254369
Guizhou	5.0	3.3	3.9	3.5	4.0	3120	108221
Liaoning	4.3	3.5	5.3	3.5	4.0	9003	394580
Xinjiang	4.0	3.0	4.1	5.5	3.9	5377	118786
Shanxi	5.1	2.6	4.0	3.2	3.7	5363	192710
Chongqing	5.5	1.3	7.2	2.4	3.6	6246	182308
Jiangxi	4.8	2.7	3.8	3.1	3.6	4590	206006
Jilin	4.8	1.5	2.8	5.6	3.6	6909	189926
Qinghai	4.0	2.7	5.9	2.9	3.5	5279	29982
Gansu	4.4	2.6	3.4	3.4	3.5	3506	89893
Hebei	5.1	0.7	4.9	3.7	3.3	5839	422799
Henan	4.3	1.2	3.8	3.3	3.0	5052	474268
Ningxia	3.2	1.3	4.4	3.1	2.6	5793	37016
Tibet	3.2	0.9	1.3	2.7	2.1	3664	11066

Table 6. The performance of province EGWS and the data of economic development level

Therefore, Correlation analysis could test the strength of a relationship between these variables. Accordingly, this study will consider two hypotheses, stated in null form, below:

H1: There is no relationship between GDP and EGWS performance.

H2: There is no relationship between PCGDP and EGWS performance.

It has been recognized that SPSS is an excellent interactive program, which provides an excellent tool for us to use to calculate the correlation coefficient and P-value. The correlation coefficient is a

measure of correlation strength and can range from –1.00 to +1.00. The P-value is the probability that we would have found the current result if the correlation coefficient were in fact zero (null hypothesis). If this probability is lower than the conventional 5% (P<0.05), the correlation coefficient is called statistically significant (Cohen, Cohen et al. 2013). The results of the correlation analysis are presented in table 7.

Correlation Probability	EGWSP	GDP	PCGDP
EGWSP	1.000000 -----		
GDP	0.289218 0.1146	1.000000 -----	
PCGDP	0.347056 0.0558	0.390366 0.0299	1.000000 -----

Table 7. The correlation coefficient and P-value

As table 7 indicated, there is no significant relations existed between EGWSP and the GDP (correlation coefficient=0.289) as well as between EGWSP and PCGDP (correlation coefficient=0.347). Their respective probability value is 0.115 and 0.056, this probability is higher than the conventional 5% (P<0.05). Thus, both of the null hypotheses presented earlier are not rejected. In other words, the larger and more affluent provinces are in terms of GDP and PCGDP could not means that their EGWS tended to be better performance. Furthermore, it should be pointed out that even if correlation studies could suggest that there is a relationship between these variables; they cannot prove that one variable causes a change in another variable. Therefore, the findings also do not demonstrate causality, i.e., that lower GDP and PCGDP levels of a province cause it to have poor EGWS performance.

7 CONCLUSIONS

There are several phases in this study process. Firstly, the article constructs a performance evaluation attributes systems for EGWS. Secondly, considering the performance evaluation of EGWS is multi-factors, multi-goals and complexity, the article uses analytic hierarchy process (AHP) to confirm the weighing of all level attributes and make a mechanism to evaluate the performance of provincial EGWS. And then, the article takes 31 Chinese provincial EGWS as examples to make empirical analysis to confirm the evaluating model that be designed in article are effective. At last, this study utilized correlation analysis to determine whether the variables of economic development had any significant impact on the performance of provincial EGWS.

It should be stressed that while the data are fairly collected in the December 2013, they are nonetheless cross-sectional, i.e., collected at one point in time. It is possible that province will improve their EGWS in the future, and that follow-up studies could obtain somewhat different results. Furthermore, as a kind of subjectively assessing method, AHP analysis may lead to different results even when being used to same e-government website by different experts. However, this study presents an interesting benchmark of where Chinese province was in terms of their EGWS performance in the end of 2013.

It should also be emphasized that this is an exploratory study based on a limited sample size of provinces from China. Thus, its findings may not apply to other countries. So, in practical e-government website application of this method, it is suggested to consider the area of assessment sufficiently and enlarge sampling size in order to reduce the influence of its limitation. Since research

in this domain is relatively new, follow-up studies are encouraged to provide a greater understanding of other factors that influence EGWS performance.

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