

STATE E-GOVERNMENT SERVICE AND ECONOMIC COMPETITIVENESS: A RELATIONAL ANALYSIS

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ABSTRACT

This study examined the characteristics and capabilities of the e-government service sites of the 50 U.S. states and Washington, D.C. and their relationships with the economic competitiveness.

Keywords: E-government Service, E-government Characteristics, E-government Capabilities, E-government Economic Competitiveness

INTRODUCTION

E-government generally refers to the delivery of government services on the Internet for serving the constituents more effectively and efficiently. Strategically, e-government is also viewed as a key factor for leveraging economic competitiveness. For instance, while the European Commission considered e-government as a key element of Europe's competitiveness agenda [4], the U.S. federal government committed to expand e-government for being the best [5]. The use of information and communication technology is widely seen as the main factor for explaining the growing productivity gap between the European Union and the United States over the last decade, leading to an even wider gap in GDP growth, employment levels, and living standards [4], although no empirical data were found to support such viewpoint.

To identify the connection between e-government service and economic competitiveness, Wilkinson and Cappel [11] studied the relationship between economic prosperity and e-government involvement at the county level in Michigan and found that the median personal income and population size correlated significantly with the county e-government involvement. However, no similar empirical studies at the federal or state level have been identified in the literature. This research gap suggests a need for further research.

This study investigates the relationship between the state e-government service and economy

competitiveness. To conduct the investigation, we raised the following research questions:

What are the characteristics of the e-government service sites of the 50 U.S. states and D.C.?

What are the capabilities of the e-government service sites of the 50 U.S. states and D.C.?

How do the state e-government service capabilities correlate with the state per capita personal income and higher education attainment?

METHODOLOGY

Content analysis is commonly used in assessing organizations' Web contents, deliveries, and strategies [e.g., 2, 11, 13]. This method is ideal for making inferences by systematically and objectively recording the characteristics and capabilities of state e-government service sites and identifying whether a significant relationship exists between state e-government capabilities and economic competitiveness.

The population of this study was the official government Web sites of the 50 U.S. states and Washington, D.C. These 51 sites were all used in the study according to the sample-size requirement [3]. We developed an instrument based on the related literature for (a) recording the characteristics of state e-government sites, (b) measuring the capabilities of the sites, and (c) identifying whether the state economic competitiveness correlates significantly with the state e-government capabilities.

The e-government capabilities were measured in terms of Web page loading speed, site capacity, navigation convenience, and overall attractiveness to users on a four-point Likert scale based on the literature [e.g., 1, 6, 7, 8, 11, 12, 13]. For example, the page loading speed was rated on the broadband-connected PCs with (1) more than four seconds = not efficient, (2) three to four seconds = less efficient, (3) one to two seconds = efficient, and (4) less than one second = very efficient [e.g., 1, 13].

The site capacity was ranked with four evolutionary phases: (1) informational = allowing users to get information only; (2) interactive = enabling users to get or search for information, download forms, and send email; (3) transactional = allowing users to do business online such as filing tax documents, renewing licenses, and bidding contracts; and (4) intelligent = enabling users to create accounts and to personalize the site contents and services [e.g., 6, 7, 8, 11].

The state economic competitiveness was defined by the state per capita personal income of 2004 [9] and the percent of people 25 years or older who have a bachelor's degree or higher in each state by 2004 [10]. The higher the state per capita personal income and the percent of higher education degrees a state has, the more competitive the state is in economy. We recorded and measured data in the fall of 2005 (see Appendix A) and then conducted a correlation analysis to determine how state economic competitiveness relates with e-government capabilities. Doing so might help determine whether economically more competitive states provide better e-government service or better e-government sites enhance economic competitiveness.

FINDINGS

Research Question 1 asked, "What are the characteristics of the e-government service sites of the 50 U.S. states and D.C.?" As Table 1 shows, 90% of the 51 e-government sites presented their homepages within one to two screens to provide a complete picture of what the site is all about; in contrast, 10% of the sites required visitors to scroll down to the third or even fourth screen for viewing the whole homepage. Regarding the graphic usage, most sites used .jpg pictures (90%) and .gif files (57%); only a few sites used Flash movies (12%). These graphic images were of governors' portraits, state attractions, state logos, and welcome signs. Furthermore, over 60% of the sites provided the following four basic links: contact us, about the state, help center, and privacy/policy; only 49% offered site map link and 29%, state calendar link.

As Table 1 also indicates, the majority of the state e-government sites offered the following 12 service links: business/doing business in state (94%), government agencies (92%), site search (90%), online services (88%), education/training (80%), employment/unemployment (77%), travel/recreation/transportation (77%), news and events (75%), citizen/visitor's guide (71%), family/health/safety (69%), licenses/permits/

registration (57%), and law/justice/ legislature (53%). However, only a few sites also provided their sites in other languages: Spanish (18%), Chinese (8%), Korean (8%), Vietnamese (4%), and Russian (2%). Research Question 2 asked, "What are the capabilities of the state e-government service sites of the 50 U.S. states and D.C.?" Table 2 presents the site capabilities in terms of page loading speed, site capacity, navigation convenience, and overall attractiveness to users. The majority (74%) of the sites were very efficient or efficient, with 39% requiring less than one second for page loading and 35%, one to two seconds. In addition, while only four sites (8%) belonged to the most advanced intelligent sites enabling users to create accounts and personalize the site contents and services, 39 sites (76%) were transactional ones allowing users to do business online such as filing tax documents, renewing licenses, and bidding contracts. The remaining eight sites (16%) were just interactive ones, on which users could only get or search for information, download forms, and send email. No site was ranked as pure informational site.

Regarding the navigation convenience, most sites were ranked as either very convenient (27%) or convenient (63%); no site was rated as not convenient. Concerning the sites' overall attractiveness, 77% of the sites were ranked as either very attractive or attractive; by contrast, 20% of the sites were rated as less attractive and 4%, not attractive.

Research Question 3 asked, "How do the state e-government service capabilities correlate with the state per capita personal income and higher education attainment?" As the correlation analysis in Table 3 shows, while the state per capita personal income and higher education attainment correlated with each other significantly (0.83), they had very weak, insignificant correlations with the capabilities of state e-government sites in terms of loading speed (0.13, 0.06), site capacity (0.01, 0.01), navigation convenience (-0.13, -0.10), and overall attractiveness (0.09, -0.05). However, a moderate correlation (0.40) existed between navigation convenience and overall attractiveness.

CONCLUSIONS AND RECOMMENDATIONS

Most of the state e-government homepages were designed with an appropriate page length of one to two screens. This design approach is consistent with the homepage design principle of providing a complete picture of what the site is all about on the

first screen, or at least by the second, because Web visitors form their first impression of a Web site within just the first few seconds of clicking on [e.g., 1, 12]. However, the findings of the e-government services links on the state homepages have identified some weaknesses for improvement. For example, 10 sites failed to provide education/training links on the

homepage, thereby causing inconvenience to educators, students, and other users of the services in those states. Similarly, 12 e-government homepages did not offer links to employment/unemployment services. And 22 homepages failed to provide links to licenses/permits/registration services.

Table 1. Characteristics of State E-Government Service Sites (N = 51)

Characteristics	Frequency	Percent	Characteristics	Frequency	Percent
# of Screens per homepage			E-Gov. Service Links		
1 screen	23	45%	Business/doing business...	48	94%
2 screens	23	45%	Government agencies	47	92%
3 screens	4	8%	Site search	46	90%
4 screens	1	2%	Online services	45	88%
Graphic File Format			Education/training	41	80%
Jpg	46	90%	Employment/unemploy.	39	77%
Gif	29	57%	Travel/recrea./transport.	39	77%
Flash movie	6	12%	News and events	38	75%
Graphic Illustration			Citizen/visitor's Guide	36	71%
Governor's pic.	39	77%	Family/health/safety	35	69%
Attractions	33	65%	Licenses/permits/registra.	29	57%
State logo	26	51%	Law/justice/legislature	27	53%
Welcome sign	20	39%	State history/culture	22	43%
Basic Information Links			Agri./environ./resources	18	35%
Contact us	37	73%	Public/local assistance	17	33%
About state	36	71%	Technology	9	18%
Help center	34	67%	Site in Other Languages		
Privacy/policy	33	65%	Site in Spanish	9	18%
Site map	25	49%	Site in Chinese	4	8%
State calendar	15	29%	Site in Korean	4	8%
			Site in Vietnamese	2	4%
			Site in Russian	1	2%

Second, the majority of the 51 e-government sites had adequate capabilities in page loading speed (74%), site capacity (84%), navigation convenience (90%), and overall attractiveness (77%). All of the sites already evolved away from the pure informational phase into interactive, transactional, or

intelligent phases, with 76% in the transactional phase and 8% at the intelligent phase. These findings indicate that the state e-government sites on the whole are more advanced than the e-government sites at the city and county levels [e.g., 2, 7].

Moreover, the correlation analysis of this study identified very weak, insignificant correlations between the state e-government service capabilities and state per capita personal income and higher education attainment. These findings do not support the result of a previous study at the county level that the per capita personal income correlated

significantly with the e-government involvement [11]. This difference appears to explain that the state governments all realized the importance of e-government and committed proper resources to it even if their state per capita personal income and higher education attainment were lower than those of other states.

Table 2. Capabilities of State E-Government Service Sites (N = 51)

Capabilities	Frequency	Percent	Capabilities	Frequency	Percent
Loading Speed			Navigation Convenience		
4. <1 second	20	39%	4. Very convenient	14	27%
3. 1-2 seconds	18	35%	3. Convenient	32	63%
2. 3-4 seconds	8	16%	2. Less convenient	5	10%
1. >4 seconds	5	10%	1. Not convenient	0	0%
Site Capacity			Overall Attractiveness		
4. Intelligent	4	8%	4. Very attractive	10	20%
3. Transactional	39	76%	3. Attractive	29	57%
2. Interactive	8	16%	2. Less attractive	10	20%
1. Informational	0	0%	1. Not attractive	2	4%

Table 3. Correlation Analysis of State Economic Competitiveness and E-Government Service

	State Per Capita Personal Income (\$)	State Higher Ed. Degrees (%)	Site Loading Speed (4~1)	Site Capacity (4~1)	Navigation Convenience (4~1)	Overall Attractiveness (4~1)
State Per Cap. Per'l Income (\$)	1					
State Higher Ed. Degrees (%)	0.83	1				
Site Loading Speed (4~1)	0.13	0.06	1			
Site Capacity (4~1)	0.01	0.01	0.05	1		
Navigation Convenience (4~1)	-0.13	-0.10	0.20	0.19	1	
Overall Attractiveness (4~1)	0.09	-0.05	-0.05	0.26	0.40	1

Finally, the findings of this study could help the state e-government administrators compare their sites with the counterparts and identify opportunities for improvement to better serve their constituents. Further study should also be undertaken to investigate whether and how state e-government supports state economic competitiveness. In addition, a follow-up research needs to be conducted in a few years to further examine how the improved capabilities of state e-government correlate with state economic competitiveness.

REFERENCES

1. Awad, E. M. (2004). *Electronic commerce: From vision to fulfillment*. Upper Saddle River, NJ: Prentice Hall.
2. Campbell, D. & Beck, A. C. (2004). Answering allegations: The use of the corporate website for restorative ethical and social disclosure, *Business Ethics*, 13(2), 100.
3. Cochran, W. G. (1977). *Sampling techniques* (3rd ed.). New York, NY: John Wiley and Sons.

4. European Communities. (2005, February 14). E-government and competitiveness: identifying the connection. *eGovernment News*. Retrieved October 2, 2005, from http://europa.eu.int/idabc/jsps/documents/dsp_showPrinterDocument.jsp?docID=3863&lg=en
5. Executive Office of the President of USA. (2004). Expanding e-government: Partnering for a results-oriented government. Retrieved May 1, 2005, from <http://www.egov.gov/>
6. Koh, C. E. & Prybutok, V. R. (2003). The three ring model and development of an instrument for measuring dimensions of e-government functions. *Journal of Computer Information Systems*, 43(3), 34-39.
7. Koh, C.E., Ryan, S., & Prybutok, V. R. (2005). Creating value through managing knowledge in an e-government to constituency (G2C) environment. *Journal of Computer Information Systems*, 45(4), 32-41.
8. McCarty, R. V. & Aronson, J. E. (2000-2001). Activating consumer response: A model for Web site design strategy. *Journal of Computer Information Systems*, 42(2), 2-7.
9. U.S. Department of Commerce. (2005). State per capita personal income 2004. *Bureau of Economic Analysis*. Retrieved October 26, 2005, from http://www.bea.gov/bea/newsrel/spi_highlights.pdf
10. U.S. Census Bureau. (2005). Percent of people 25 years and over who have completed a bachelor's degree or higher by state: 2004. Retrieved October 26, 2005, from http://factfinder.census.gov/servlet/GRTTable?_bm=y&-geo_id=01000US&-box_head_nbr=R1402&-ds_name=ACS_2004_EST_G00_-&-format=US-30
11. Wilkinson, V. O. & Cappel, J. J. (2005). Impact of economic prosperity and population on e-government involvement. *Issues in Information Systems*, (6), 204-209.
12. Zhao, J. J. (2003). *Web Design and Development for E-Business*. Upper Saddle River, NJ: Prentice Hall.
13. Zhao, J.J. & Zhao, S. Y. (2004). Internet Technologies Used by INC. 500 Corporate Web Sites, *Issues in Information Systems*, (4), 366-372.

Appendix A

State Per Capita Personal Income, Higher Ed. Degrees, and E-Government Capabilities

	State Per Capita Personal Income (\$)	State Higher Ed. Degrees (%)	Loading Speed (4~1)	Site Capacity (4~1)	Navigation Convenience (4~1)	Overall Attractiveness (4~1)
1 Alabama	27630	22.3	4	3	4	3
2 Alaska	34085	25.5	3	2	3	3
3 Arizona	28609	28.0	3	2	3	3
4 Arkansas	25724	18.8	3	4	3	3
5 California	35172	31.7	4	3	4	4
6 Colorado	36109	35.5	2	3	3	2
7 Connecticut	45506	34.5	3	3	3	3
8 Delaware	35559	26.9	4	3	2	3
9 DC	52101	45.7	4	3	3	3
10 Florida	31460	26.0	4	3	4	3
11 Georgia	30074	27.6	4	3	3	2
12 Hawaii	32606	26.6	4	3	4	3
13 Idaho	26839	23.8	4	3	3	3
14 Illinois	34725	27.4	3	2	4	3
15 Indiana	30070	21.1	4	3	3	3
16 Iowa	30970	24.3	4	2	3	3
17 Kansas	31003	30.0	4	3	3	3
18 Kentucky	27151	21.0	3	3	3	3
19 Louisiana	27219	22.4	3	2	3	2
20 Maine	29973	24.2	1	3	2	3

21 Maryland	39629	35.2	2	3	2	3
22 Massachusetts	42102	36.7	4	3	3	3
23 Michigan	32052	24.4	3	3	3	4
24 Minnesota	36173	32.5	4	3	3	3
25 Mississippi	24379	20.1	2	3	3	4
26 Missouri	30516	28.1	4	3	4	3
27 Montana	27666	25.5	2	3	4	4
28 Nebraska	32276	24.8	4	3	3	3
29 Nevada	33783	24.5	1	3	3	3
30 New Hampshire	36676	35.4	1	3	3	3
31 New Jersey	41636	34.6	4	4	4	4
32 New Mexico	26154	25.1	3	3	3	2
33 New York	38333	30.6	4	3	3	3
34 North Carolina	29303	23.4	4	3	3	3
35 North Dakota	29247	25.2	3	3	3	2
36 Ohio	31135	24.6	4	4	4	4
37 Oklahoma	27819	22.9	3	3	3	2
38 Oregon	30584	25.9	2	3	3	4
39 Pennsylvania	33257	25.3	3	3	4	2
40 Rhode Island	34180	27.2	3	3	2	1
41 South Carolina	27153	24.9	1	3	3	3
42 South Dakota	30617	25.5	4	2	2	1
43 Tennessee	29806	24.3	1	3	3	2
44 Texas	30697	24.5	3	3	4	3
45 Utah	26946	30.8	3	3	4	2
46 Vermont	31737	34.2	3	3	3	2
47 Virginia	36175	33.1	2	3	3	4
48 Washington	35017	29.9	2	3	3	3
49 West Virginia	25681	15.3	3	4	4	4
50 Wisconsin	32063	25.6	2	2	4	4
51 Wyoming	34199	22.5	3	2	3	3