

Digital Governance Worldwide: A Longitudinal Assessment of Municipal Web Sites

Tony Carrizales, Marist College, USA

Marc Holzer, Rutgers University - Campus at Newark, USA

Seang-Tae Kim, Sungkyunkwan University, South Korea

Chan-Gon Kim, Sungkyunkwan University, South Korea

ABSTRACT

This article highlights the research findings of a digital governance survey conducted in the fall of 2005. The study replicates a 2003 survey of large municipalities worldwide. This longitudinal assessment, based on the Rutgers-SKKU E-Governance Performance Index, focused on the evaluation of current practices in government, with emphasis on the evaluation of each Web site in terms of digital governance. Specifically, we analyzed security, usability, content of Web sites, the type of online services currently being offered, and citizen response and participation through Web sites established by city governments. Based on the 2005 evaluation of 81 cities, Seoul, New York, Shanghai, Hong Kong, and Sydney represent the highest performing cities in digital governance. There were only slight changes in the top five cities when compared to the 2003 study. Moreover, there continues to be a divide in terms of digital governance throughout the world among the 30 developed nations belonging to the Organization for Economic Cooperation and Development (OECD) and non-OECD member nations.

Keywords: citizen participation; digital democracy; digital divide; e-government; usability

INTRODUCTION

The following research highlights the results of an international survey conducted in the fall of 2005 evaluating the practice of digital governance in large municipalities. A similar study was conducted in 2003 (Holzer & Kim, 2004; Melitski, Holzer, Kim, Kim, & Rho, 2005) which provided

one of the most exhaustive studies of municipal e-government ever conducted. The research was replicated two years later through collaboration between the E-Governance Institute at Rutgers, Newark, and the Global E-Policy E-Government Institute at Sungkyunkwan University in Seoul. The joint study again produced a

wealth of information that contributes to the growing field of digital government. In particular, we focus on the changes over two years in this longitudinal assessment of municipal Web sites.

LITERATURE REVIEW

A review of digital governance literature includes numerous areas of research, all highlighting the potential of technology under terms such as: e-government, e-democracy, e-participation, and digital democracy. In particular, the literature below indicates potential for improved government services and online democratic practices. Our survey research evaluates municipal Web sites in these areas, and the data presented reflects the current practice of e-governance throughout the world.

Numerous researchers have highlighted the potential for e-governance. In order for good governance to be achieved, Cloete (2003) argues for an acceptance of technological innovations, suggesting that Internet-based services and other technological service delivery applications will be the only way governments can meet their own service delivery goals. A 2003 survey by the Pew Internet & American Life Project attempted to determine how Americans contact government. Their study found that e-government is an increasingly popular tool for Internet users, with a primary purpose of getting information and sending messages to the government (Horrihan, 2004). West (2004) highlights a study of chief information officers, where the respondents felt positive about the capacity for the Internet to transform government, however, argues that e-government "has fallen short of its potential to transform government" in the areas of service delivery and trust in government (16).

E-government initiatives, specifically the Internet, must go beyond the static listing of information to more "intentions-based" design so that citizens can more effectively utilize Web portals (Howard, 2001). Recent advances in e-services include the personalization of government Web pages. Virginia's "MyGov" allows an individual to format Web pages around their interests from options such as public meeting announcements, interactive government services, legislative sites, local government, local media, public schools, lottery numbers, press releases, state government, and traffic information (Eggers, 2005). These developments in e-services are well intentioned but misdirected, suggests Eggers (2005), because they are under-utilized and rarely involve transactions, adding little to no value for individuals and businesses. Individuals still do not visit government Web sites enough to make services such as personalized Web pages a common locus for e-government initiatives.

Moreover, a relatively new aspect of digital governance, e-democracy, is in reality a concept with a history dating to the 1960's in which scholars, activists, and politicians were forecasting technological utopias (Bryan, Tsagarousianou, & Tambini, 1998). The current interest in e-democracy can in part be attributed to the lack of performance in old technologies used for democracy (Shane, 2002). Early discussions of the technology-democracy relationship highlighted the potential of telecommunications, with emphasis on cable television and telephone conferencing (Arterton, 1987, 1988; Becker, 1993; Christopher, 1987; McLean, 1989). However, the focus has now significantly shifted to the Internet (Bellamy & Taylor

1998; Browning, 2002; Gattiker, 2001; Kamarck & Nye, 1999, 2003; Loader, 1997; Westen, 1998, 2000; Wilhelm, 1998; Witschge, 2002).

Unlike other mediums, citizens are now able to demand and obtain content when going online (Browning, 2002). Korac-Kakabadse and Korac-Kakabadse (1999) point out that ICTs provide the possibility for direct-democracy on a larger scale. They define e-democracy as the capacity for ICTs to enhance the degree and quality of public participation in government. Proponents argue that e-democracy will allow for greater government transparency and openness, which leads to a better-informed citizenry. The openness of government can lead to increased accountability and reduced government corruption. The case of Seoul's **Online Procedures Enhancement for Civil Application (OPEN)** system has demonstrated a successful practice of transparency and decreased corruption in government via the use of the Internet (Holzer & Kim, 2004).

Online discussion boards are another example of an opportunistic use of technology for developing e-democracy. Online discussion boards allow for political discussions without requiring participants to share space and time, leading to increased access to political debate (Malina, 1999). The potential for citizen participation in decision and policy-making is growing, albeit slowly, through initiatives such as *regulations.gov* (Skrzycki, 2003a, 2003b). Some municipalities have already begun to practice aspects of e-democracy, which include information disclosure pertinent to government decision-making as well as mediums for two-way communication. The following data will also reflect the changes

in online citizen participation among municipalities worldwide.

Scholars have outlined the potential of digital governance, but little can be said about the state of current e-government's practices in municipalities worldwide. International studies, as this research is, are critical contributions to the overall literature of digital governance. To better understand how various regions of the world differ in the area of e-governance, comprehensive studies of regions throughout the world are necessary for a basis of comparison. More importantly, regional studies provide regional benchmarks and best practices that allow for increased performance in digital governance over time for those municipalities still in the earliest developments.

A review of the literature also suggests that our survey instrument is one of the most thorough in practice for e-governance research today. With 98 measures and five distinct categorical areas of e-governance research, the survey instrument is unlike any other. In studies of e-governance practices worldwide, our Performance Index differs quite significantly from other survey instruments. The following section reviews four of the most prominent and encompassing longitudinal worldwide e-governance surveys. The critiques of the Annual Global Survey at Brown University's Taubman Center for Public Policy (West, 2001, 2004, 2005), the United Nations Global E-Government Report (UNPAN, 2003, 2004, 2005), the Accenture E-government Leadership Survey (Accenture, 2002, 2004) and Capgemini's European Commission Report (Capgemini, 2001-2005) are intended to highlight the distinct differences between the survey instruments and results. The findings and

rankings of e-governance worldwide can best be understood by highlighting the distinct differences among the survey instruments.

The Taubman Center's Global E-Government Survey is one of the only international e-government studies that have been conducted on an annual basis for the past five years (see, for example, West, 2001, 2004, 2005). Since 2001, the researchers at the Taubman Center have utilized an index instrument that measures the presence of Web site features. That instrument is geared toward specific Web functions, with limited attention to addressing privacy/security or usability. The e-governance area of Citizen Participation is only measured by one item. Moreover, their survey instrument has changed substantially from year to year. One of the problems with a rapidly-evolving instrument is in the applicability of comparisons over the years. Our survey instrument has also changed with the inclusion of new questions, specifically in the Citizen Participation section. However, the Taubman Center's survey instrument has decreased its measurement criteria over the years. In 2001 and 2002, the numbers of measures were 24 and 25, respectively. In 2003, 2004, and 2005, the number of measures decreased to 20, 19, and 19, respectively. For 2005, its measures are broken down into two groups, with 18 primary measures and one bonus measure encompassing 28 possible points. The final overall scores are converted for a possible total score of 100. We also use a final possible score of 100, with each of our five categories allowing for a possible score of 20.

In all, the number of measures in the Taubman survey is limited, with only 19 metrics. A final score of e-governance performance is reflective of the specific

questions focused on Web features that are captured by those 19 measures. One of the consequences of this methodology is the limited differentiation in performance of e-governance among countries. As a result, many of the countries received the same scores. In addition, there is an inconsistency in the annual rankings, specifically in the non-English Web sites. For example, the Republic of Korea has fluctuated in rankings as follows: 45th in 2001, 2nd in 2002, 87th in 2003, 32nd in 2004, and 86th in 2005. In other international findings, however, such as the United Nations Global E-government Survey, the Republic of Korea has consistently been recognized as one of the best in e-governance performance (4th in 2004 and 2005). One other example is Bolivia, which has also significantly fluctuated over the years in rankings. Bolivia was ranked 18th in 2001, 164th in 2002, 119th in 2003, 20th in 2004, and 225th in 2005. These significant variations in rankings can, in part, be attributed to the limited number of measures, allowing for shifting variations in overall scores. However, this can also be attributed to the method of not using native speakers when evaluating all the Web sites. In some cases, researchers at the Taubman Center have utilized language translation software available online, such as <http://babelfish.altavista.com>. Online translation software, however, can misinterpret specific languages and phrases.

The United Nations Global E-Government Report is also one of the few longitudinal studies of Web presence throughout the world (see, for example, UNPAN, 2004, 2005). The UN has two specific studies that it produces: an e-government Readiness index and an e-participation index. The e-government Readiness index incorporates Web measures, telecommunication infrastructure, and human capital.

Their Web measure index is a quantitative measure, evaluating national Web sites. Their evaluation is based on binary values (presence/absence of a service). Their e-participation index is a qualitative study, with 21 measures used to assess the quality, relevance, usefulness, and willingness of government Web sites in providing online information and service/participation tools for citizens. The UN Global E-Government Report takes methodological precautions to ensure accuracy and fairness. The surveying of Web sites is done within a 60-day "window", and Web sites are reevaluated by senior researchers for purposes of consistency. In addition, the survey incorporates native language speakers when necessary in an effort to review every Web site in the official language. However, this survey does differ from our research in that the UN studies central government Web sites, while we focus on large municipal Web sites throughout the world.

Accenture conducts a third global e-government study. Accenture's annual E-Government Leadership report highlights the performance of 22 selected countries (see, for example, Accenture, 2002, 2004). The most recent report (2004) measured 206 services when assessing national government Web sites. The 206 national government services were divided between 12 service sectors: e-democracy, education, human services, immigration, justice and security, postal, procurement, regulation, participation, revenue and customs, and transport. As an effort toward reliability, the research was conducted in a two-week period. The Accenture report, however, only focuses on 22 countries. The Accenture study omits numerous countries throughout the world, as well as many of the top performing governments in e-governance. Similarly, a study conducted

by Capgemini, on behalf of the European Commission, is limited in international focus (Capgemini, 2005). This study is limited to nations in the European Union and only utilizes 20 basic public services as measures in the research study. The methodology is split between studying services to citizens (12) and services to businesses (8). Similar to the UN and Taubman Center studies, the Accenture and Capgemini studies focus on national government Web sites, a distinguishing aspect from our research.

DESIGN AND METHODOLOGY

As stated above, previous e-governance research varies in the use of scales to evaluate government Web sites. For example, one researcher uses an index consisting of 25 dichotomous (yes or no) measures (West, 2001); other assessments use a more sophisticated four-point scale (Kaylor, Deshazo, & Van Eck, 2001) for assessing each measure. We have developed the Rutgers-SKKU E-Governance Performance Index for evaluating city and municipal Web sites, consisting of five components: security and privacy; usability; content; services; and citizen participation. Our 2005 survey instrument utilizes 98 measures, of which 43 are dichotomous. For each of the five e-governance components, our research applies 18 to 20 measures, and for questions which were not dichotomous, each measure was coded on a four-point scale (0, 1, 2, 3; see Table 1 below). Furthermore, in developing an overall score for each municipality, we have equally weighted each of the five categories so as not to skew the research in favor of a particular category (regardless of the number of questions in each category). The dichotomous measures in

Table 1. E-governance scale

Scale	Description
0	Information about a given topic does not exist on the Web site
1	Information about a given topic exists on the Web site (including links to other information and e-mail addresses)
2	Downloadable items are available on the Web site (forms, audio, video, and other one-way transactions, popup boxes)
3	Services, transactions, or interactions can take place completely online (credit card transactions, applications for permits, searchable databases, use of cookies, digital signatures, restricted access)

the “service” and “citizen participation” categories correspond with values on our four-point scale of “0” or “3”; dichotomous measures in “security/ privacy” or “usability” correspond to ratings of “0” or “1” on the scale.

In this research, the main city homepage is defined as the official Web site where information about city administration and online services are provided by the city. The city Web site includes Web sites about the city council, the mayor, and the executive branch of the city. Based on the concept above, this research evaluated the official Web sites of each city selected. Nineteen of 100 cities, however, do not have official city Web sites or were not accessible during the survey period: ten in Africa (71%), seven in Asia (22%), and two in North America (20%). As a result, this research evaluated only 81 cities of the 100 cities initially selected. Our research examined local government services using an e-governance model of increasingly sophisticated e-government services. Moon (2002) developed a framework for categorizing e-government models based on the following components: information dissemination, two-way communication, services, integration, and political par-

icipation. Our methodology for evaluating e-government services includes such components; however, we have added an additional factor, security.

That additional e-governance factor was grounded in recent calls for increased security, particularly of our public information infrastructure. Concern over the security of the information systems underlying government applications has led some researchers to the conclusion that e-governance must be built on a secure infrastructure that respects the privacy of its users (Kaylor et al., 2001).

The 2005 E-Governance Performance Index differs slightly from the one used in 2003. The most significant change was in the Citizen Participation component, where six new research questions were added. These new questions are, in part, recognition of the growing literature focusing on the various methods for more digitally-based democracy. These new questions survey the presence and functions of municipal forums, online decision-making (e-petitions, e-referenda), and online surveys and polls. The new questions for the Citizen Participation component bring the total number of questions to 20, with a total possible raw score of 55. In addition,

one question was removed from the Security and Privacy component. That question focused on the scanning of viruses during downloadable files from the municipal Web site. This aspect was found to be more dependent on personal computers than as a function of a municipal Web site. The removal of the question for the Security and Privacy component brings the total number of questions to 18, with a total possible raw score of 25. The final change to the E-Governance Performance Index was a question added to the Content component. The additional question focuses on the number of possible downloadable documents from a municipal Web site. The new question for Content brings the total number of questions to 20, with a total possible raw score of 48.

The changes to the E-Governance Performance Index have helped make this ongoing survey of municipal Web sites

one of the most thorough in the field of e-governance research. The Index now has a total of 98 questions, with a total possible raw score of 219. Given the changes to the survey instrument between 2003 and 2005, the method of weighting each component for a possible score of 20 and a total score of 100 allows for a consistency in comparisons over time. Table 2, E-Governance Performance Measures, summarizes the 2005 survey instrument, and in Appendix A we present an overview of the criteria used during the evaluation.

Similar to our 2003 study, to ensure reliability each municipal Web site was assessed in the official language by two evaluators. Many of our evaluators were either doctoral students or researchers in the area of digital governance. In addition, all of the evaluators were provided with comprehensive written instructions for assessing Web sites. The instructions and

Table 2. E-governance performance measures

E-governance Category	Key Concepts	Raw Score	Weighted Score	Keywords
Security/ Privacy	18	25	20	Privacy policies, authentication, encryption, data management, and use of cookies
Usability	20	32	20	User-friendly design, branding, length of homepage, targeted audience links or channels, and site search capabilities
Content	20	48	20	Access to current accurate information, public documents, reports, publications, and multimedia materials
Service	20	59	20	Transactional services involving purchase or register, interaction between citizens, businesses, and government
Citizen Participation	20	55	20	Online civic engagement, Internet-based policy deliberation, and citizen-based performance measurement
Total	98	219	100	

survey instrument itself included detailed examples for associated scores for each question. The two adjusted scores for each Web site were then compared and evaluated for consistency in evaluation. The evaluations were done via a preset spreadsheet instrument that alerted researchers when errors were made. Also, the instrument allowed for specific comments associated with each question, so that researchers can review in cases of evaluator discrepancy. Each Web site evaluation was done independent of one another, and in cases where significant variation (+ or - 10%) existed on the weighted score between evaluators, Web sites were analyzed a third time. The only Web site requiring a third evaluator for the 2005 survey was Brussels, Belgium. The three evaluations for Brussels were then reviewed and scores averaged to represent a municipal score. A framework of the survey instrument which was utilized is included in Appendix A.

International Municipalities

Both the 2003 and 2005 studies focused on the evaluation of current practices in government, and the emphasis in the research was on the evaluation of each Web site in terms of digital governance. Simply stated, digital governance includes both digital government (delivery of public service) and digital democracy (citizen participation in governance). Specifically, we analyzed security, usability, content of Web sites, the type of online services offered, and citizen response and participation through Web sites established by city governments.

This research examines cities throughout the world based on their population size, and the total number of individuals using the Internet. In the 2003 survey, data from the International Telecommunication

Union (ITU), an organization affiliated with the United Nations (UN), was used to determine the 100 municipalities to be studied. Of 196 countries for which telecommunications data was reported, those with a total online population over 100,000 were identified. As a result, the most populated cities in 98 countries were selected to be surveyed (along with Hong Kong and Macao). For the 2005 worldwide survey, the most recent available ITU-UN data was used. These updated figures produced slightly different results from the previous survey in 2003. Countries with an online population over 100,000 increased to 119. Therefore, we set a new cut-off mark at countries with an online population over 160,000. This resulted in 98 countries which met the new mark. With the inclusion of Hong Kong and Macao, as in 2003, a total of 100 cities were identified for the 2005 survey. Hong Kong and Macao were added to the 98 cities selected, since they have been considered as independent countries for many years and have high percentages of Internet users.

The rationale for selecting the largest municipalities stems from the e-governance literature, which continues to suggest a positive relationship between population and e-governance capacity at the local level (Moon, 2002; Moon & deLeon, 2001; Musso, Weare, & Hale, 2000; Weare, Musso, & Hale, 1999). In 2003, the most populated city in each country was identified using various data sources. In cases where the city population data that was obtained utilized a source dated before 2000, a new search was done for the most recent population figures. All city population data was updated to reference 2000-2005 figures.

Six countries that were identified in 2003 do not have online populations of

over 160,000. These countries and their most populated cities are: Manama, Bahrain; Port Louis, Mauritius; Port-of-Spain, Trinidad & Tobago; Asuncion, Paraguay; Sarajevo, Bosnia; and Havana, Cuba. Of these six cities, only five were surveyed, with Havana having an unidentified official

government Web site. As none of the five surveyed cities listed above was ranked in the top 25th percentile of rankings, their exclusion from the 2005 worldwide survey was not found to be significant enough to retain. The six new cities are: Abidjan, Cote d'Ivoire; Accra, Ghana; Chisinau, Mol-

Table 3. 100 cities selected by continent (2005)

Africa (14)		
Abidjan (Cote d'Ivoire)*	Casablanca (Morocco)*	
Accra (Ghana)*	Dakar (Senegal)*	Lome (Togo)*
Algiers (Algeria)*	Dar-es-Salaam (Tanzania)*	Nairobi (Kenya)
Cairo (Egypt)	Harare (Zimbabwe)*	Omdurman (Sudan)*
Cape Town (South Africa)	Lagos (Nigeria)	Tunis (Tunisia)*
Asia (31)		
Almaty (Kazakhstan)*		
Amman (Jordan)	Hong Kong SAR (Hong Kong)	
Baku (Azerbaijan)*	Istanbul (Turkey)	Quezon City (Philippines)
Bangkok (Thailand)	Jakarta (Indonesia)	Riyadh (Saudi Arabia)
Beirut (Lebanon)	Jerusalem (Israel)	Seoul (Republic of Korea)
Bishkek (Kyrgyzstan)*	Karachi (Pakistan)	Shanghai (China)
Colombo (Sri Lanka)	Kuala Lumpur (Malaysia)	Singapore (Singapore)
Dhaka (Bangladesh)	Kuwait City (Kuwait)*	Tashkent (Uzbekistan)
Dubai (United Arab Emirates)	Macao SAR (Macao)	Tehran (Iran)
Halab (Syria)*	Mumbai (India)	Tripoli (Libya)*
Ho Chi Minh (Vietnam)	Muscat (Oman)*	Tokyo (Japan)
	Nicosia (Cyprus)	

• Official city Web sites unavailable

Table 3. continued

Europe (34)		
Amsterdam (Netherlands)	Kiev (Ukraine)	
Athens (Greece)	Lisbon (Portugal)	
Belgrade (Serbia and Montenegro)	Ljubljana (Slovenia)	Rome (Italy)
Berlin (Germany)	London (United Kingdom)	Sofia (Bulgaria)
Bratislava (Slovak Republic)	Luxembourg City (Luxembourg)	Stockholm (Sweden)
Brussels (Belgium)	Madrid (Spain)	Tallinn (Estonia)
Bucharest (Romania)	Minsk (Belarus)	Vienna (Austria)
Budapest (Hungary)	Moscow (Russian Federation)	Vilnius (Lithuania)
Chisinau (Moldova)	Oslo (Norway)	Warsaw (Poland)
Copenhagen (Denmark)	Paris (France)	Zagreb (Croatia)
Dublin (Ireland)	Prague (Czech Republic)	Zurich (Switzerland)
Helsinki (Finland)	Reykjavik (Iceland)	
	Riga (Latvia)	
North America (10)		
Mexico City (Mexico)	Panama City (Panama)	
Guatemala City (Guatemala)	San Jose (Costa Rica)	Tegucigalpa (Honduras)
Kingston (Jamaica)*	San Salvador (El Salvador)	Toronto (Canada)
New York (United States)	Santo Domingo (Dominican Republic)*	

• *Official city Web sites unavailable*

Table 3. *continued*

South America (9)		
Buenos Aires (Argentina)	La Paz (Bolivia)	Santa Fe De Bogota (Colombia)
Caracas (Venezuela)	Lima (Peru)	Santiago (Chile)
Guayaquil (Ecuador)	Montevideo (Uruguay)	Sao Paulo (Brazil)
Oceania (2)		
Auckland (New Zealand)	Sydney (Australia)	

• *Official city Web sites unavailable*

dova; Omdurman, Sudan; Halab, Syria; and Libya, Tripoli. In 2003, 80 of the 100 cities identified were surveyed (by two surveyors) and were included in the overall rankings. For the 2005 data, 81 of the 100 cities were included in the overall rankings, excluding municipalities where no official Web site was obtainable. Table 3 is a list of the 100 cities which were selected.

Findings and Longitudinal Assessment

The rankings in Table 4 reflect the top twenty municipalities in overall score based on the five e-governance component categories. The highest possible score for any one city Web site is 100. Seoul received a score of 81.70, the highest-ranked city Web site for 2005. Seoul's Web site was also the highest ranked in 2003, with a score of 73.48. New York City had the second-highest ranked municipal Web site, with a score of 72.71. New York City moved up two places from its fourth-place ranking in 2003. Similarly, Shanghai, China, moved up two places in ranking since 2003, with the third-ranked score of 63.93 in 2005. Hong Kong and Sydney, Australia, complete the top five ranked municipal Web sites with scores of 61.51 and 60.82, respectively. Hong Kong was also ranked in the top five in 2003; however, Sydney

significantly increased its score and ranking from 2003 (ranked 19th with a score of 37.41).

Privacy and security results indicate that Seoul, Sydney, Zurich, New York, and Hong Kong are top-ranked cities in this category. New to the top five are Sydney and Zurich. Sydney was ranked 11th in 2003 with a score of 6.79, but has improved to second overall with a score of 16.80 in 2005. Zurich was ranked 20th in 2003 with a score of 3.57, but has improved to third overall with a score of 16.40 in 2005. The average score in this category is 4.17, an increase from a score of 2.53 in 2003. Thirty-one cities evaluated earned 0 points in this category, a decrease in the total number of municipalities that earned 0 points in 2003 (36). Many cities still have not properly understood the importance of a privacy and security policy, a very important deficiency in the development of digital governance.

Usability results indicate that New York, Shanghai, Seoul, Sydney, and Riga are top-ranked cities in this category. New to the top five are New York, Sydney, and Riga. New York was ranked 11th in 2003 with a score of 15.63, but has improved to first overall with a score of 19.06 in 2005.

Sydney was ranked 34th in 2003 with a score of 12.19, but has improved to fourth overall with a score of 17.81 in 2005. Riga was ranked 51st in 2003 with a score of 10.00, but has improved to fifth overall with a score of 17.50 in 2005. The average score in this category is 12.42, an increase from a score of 11.45 in 2003. One of the best practices in the category of usability is New York, scoring 19.06. The Web sites for New York are very “user-friendly.” For example, all pages use consistent color, formatting, “default colors”, and underlined text to indicate links. There are consistent uses of navigation bars and links to the homepage on every page. The Web sites contain very advanced forms, allowing citizens to submit pertinent information.

Results for content indicate that Seoul, New York, Tallinn, Zurich, Hong Kong, and Riga are the top-ranked cities in this category. New to the top five are Tallinn, Zurich, and Riga. Tallinn was ranked 6th in 2003 with a score of 12.55, but has improved to third overall with a score of 14.79 in 2005. Zurich was ranked 28th in 2003 with a score of 7.66, but has improved to fourth overall with a score of 13.96 in 2005. Riga was ranked 51st in 2003 with a score of 4.26, but has improved to fifth overall with a score of 13.75 in 2005. The average score for the top five cities has only slightly increased from 2003. The average score for the top five ranked cities in 2005 is 14.66, while the average score for the top five ranked cities in 2003 was 14.08. However, the overall average increase for this category is second largest of the five categories. The average score in this category is 7.63, an increase from a score of 6.43 in 2003.

The results for online services indicate that Seoul, New York, Singapore,

Hong Kong, and Warsaw are the top-ranked cities in this category. New to the top five are New York and Warsaw. New York was ranked sixth in 2003 with a score of 12.28, but has improved to second overall with a score of 15.76 in 2005. Warsaw was ranked 62nd in 2003 with a score of 1.93, but has improved to fifth overall with a score of 11.86 in 2005. The average score in this category is 5.32, an increase from a score of 4.82 in 2003. Only two cities evaluated earned 0 points in this category, a decrease from the three municipalities that earned 0 points in 2003. The average score for the top five ranked cities in 2005 is 14.51, while the average score for the top five ranked cities in 2003 was 13.69.

The results for citizen participation indicate that Seoul, Warsaw, Bratislava, London, and Prague are the top-ranked cities in this category. New to the top five are all of those cities except Seoul, which repeats as the top-ranked city in the category. Warsaw was ranked 74th in 2003 with a score of 0.00, but has improved to second overall with a score of 12.55 in 2005. Bratislava was not ranked in 2003, but has received a third overall ranking with a score of 10.91 in 2005. London was ranked 51st in 2003 with a score of 1.54, but has improved to fourth overall with a score of 10.55 in 2005. Prague was not ranked in 2003 but has received a fifth overall ranking with a score of 10.18 in 2005. The average score in this category is 3.57, an increase from a score of 3.26 in 2003. The category of citizen participation resulted in the smallest overall increase in performance. This can be attributed in part to the additional questions added to the survey instrument to better survey citizen participation online. However, the results can also be attributed, in part, to the lack of support for such online practices.

Table 4. Top 20 cities in digital governance (2005)

Ranking	City	Score	Privacy	Usability	Content	Service	Participation
1	Seoul	81.70	17.60	17.81	16.04	16.61	13.64
2	New York	72.71	16.00	19.06	14.79	15.76	7.09
3	Shanghai	63.93	12.00	18.75	13.13	11.69	8.36
4	Hong Kong	61.51	15.60	16.25	13.75	13.73	2.18
5	Sydney	60.82	16.80	17.81	12.50	8.98	4.73
6	Singapore	60.22	10.40	15.94	11.67	14.58	7.64
7	Tokyo	59.24	12.00	16.25	12.29	10.34	8.36
8	Zurich	55.99	16.40	14.69	13.96	9.49	1.45
9	Toronto	55.10	11.20	14.06	11.46	9.83	8.55
10	Riga	53.95	6.80	17.50	13.75	6.44	9.45
11	Warsaw	53.26	0.00	15.31	13.54	11.86	12.55
12	Reykjavik	52.24	11.60	13.13	13.54	10.34	3.64
13	Sofia	49.11	8.00	13.44	11.67	7.46	8.55
14	Prague	47.27	0.00	16.88	10.21	10.00	10.18
15	Luxembourg	46.58	7.20	15.31	11.88	7.29	4.91
16	Amsterdam	46.44	10.40	12.50	9.79	5.93	7.82
17	Paris	45.49	8.80	15.94	11.46	4.75	4.55
18	Macao	45.48	10.40	13.44	13.13	5.42	3.09
19	Dublin	44.10	8.00	16.88	11.04	4.92	3.27
20	Bratislava	43.65	0.00	15.94	11.04	5.76	10.91

Table 5. Top 10 cities in privacy and security (2005)

Rank	City	Country	Score
1	Seoul	Republic of Korea	17.60
1	Sydney	Australia	16.80
3	Zurich	Switzerland	16.40
4	New York	United States	16.00
5	Hong Kong	Hong Kong	15.60
6	Rome	Italy	13.20
7	Berlin	Germany	12.80
8	Shanghai	China	12.00
8	Tokyo	Japan	12.00
10	Reykjavik	Iceland	11.60

Table 6. Top 10 cities in usability (2005)

Rank	City	Country	Score
1	New York	United States	19.06
2	Shanghai	China	18.75
3	Seoul	Republic of Korea	17.81
3	Sydney	Australia	17.81
5	Riga	Latvia	17.50
6	Oslo	Norway	17.19
7	Dublin	Ireland	16.88
7	Prague	Czech Rep.	16.88
7	Jerusalem	Israel	16.88
10	Hong Kong	Hong Kong	16.25

Table 7. Top 10 cities in content (2005)

Rank	City	Country	Score
1	Seoul	Republic of Korea	16.04
2	New York	United States	14.79
2	Tallinn	Estonia	14.79
4	Zurich	Switzerland	13.96
5	Riga	Latvia	13.75
5	Hong Kong	Hong Kong	13.75
7	Warsaw	Poland	13.54
7	Reykjavik	Iceland	13.54
9	Shanghai	China	13.13
9	Macao	Macao	13.13

Table 8. Top 10 cities in service delivery (2005)

Rank	City	Country	Score
1	Seoul	Republic of Korea	16.61
2	New York	United States	15.76
3	Singapore	Singapore	14.58
4	Hong Kong	Hong Kong	13.73
5	Warsaw	Poland	11.86
6	Shanghai	China	11.69
7	Tokyo	Japan	10.34
7	Reykjavik	Iceland	10.34
9	Prague	Czech Rep.	10.00
10	Toronto	Canada	9.83

Table 9. Top 10 cities in citizen participation (2005)

Rank	City	Country	Score
1	Seoul	Republic of Korea	13.64
2	Warsaw	Poland	12.55
3	Bratislava	Slovak Republic	10.91
4	London	United Kingdom	10.55
5	Prague	Czech Rep.	10.18
6	Riga	Latvia	9.45
7	Toronto	Canada	8.55
7	Sofia	Bulgaria	8.55
9	Shanghai	China	8.36
9	Tokyo	Japan	8.36

The comparisons between the findings from the 2003 evaluation and the findings of the 2005 evaluation indicate an overall average score increase from 28.49 in 2003 to 33.11 in 2005. This would be the expectation for municipalities increasingly seeking ways to utilize technology to increase effectiveness and efficiency. The Internet is an ideal medium for meeting such goals. Table 10 highlight these increases by continent. All six identified

regions have collectively improved in their e-governance performance.

The results, when analyzed by the Organization for Economic Cooperation and Development (OECD) and non-OECD member countries, highlight a growing gap between the two groups. In all, 30 countries represent OECD member countries, and the largest municipality for each of these countries was evaluated and included in the results. Fifty-one non-

Table 10. Average score by continent for 2005 and 2003

	Oceania	Europe	Average	Asia	North America	Africa	South America
2005 Overall Averages	49.94	37.17	33.11	33.05	30.21	24.87	20.45
2003 Overall Averages	46.01	30.23	28.49	30.38	27.42	17.66	20.05

OECD member countries are also included in the evaluations. Seoul, Korea, was the highest-ranked municipality for OECD member countries, and Shanghai, China, was the highest-ranked municipality for non-OECD member countries. OECD member countries have a combined average of 44.35, well above the overall average for all municipalities, which is 33.11. Non-OECD member countries have an overall average of 26.50. The increase for OECD member countries from 2003 was 8.01 points, and for non-OECD member countries there was an increase of only

2.24 from 2003. More importantly, the gap between OECD and non-OECD member countries increased since the 2003 evaluation. The difference in 2003 between the average scores of OECD and non-OECD member countries was 12.08. Based on the 2005 evaluations, the gap has increased to 17.85. The increase in the overall average of scores has been predominately a result of OECD member countries improving overall municipal Web site performance. The following Figure 1 reflects the average scores of OECD member and non-member countries, as well as the average score for

Figure 1. Average score by e-governance categories in OECD member and non-member countries (2005)

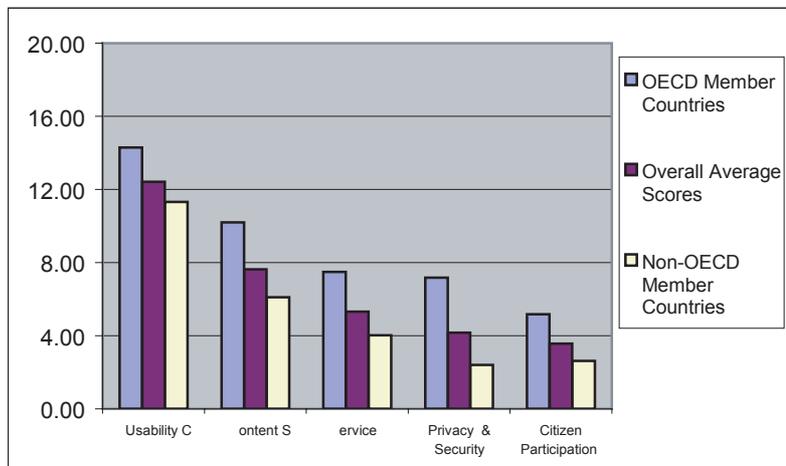


Table 11. Average score by e-governance categories in 2005 and 2003

	Usability	Content	Service	Privacy & Security	Citizen Participation
2005 Average Scores	12.42	7.63	5.32	4.17	3.57
2003 Average Scores	11.45	6.43	4.82	2.53	3.26

each of the five e-governance categories. The Figure highlights the gap between OECD member and non-member countries across all categories.

Specific increases in the five e-governance categories have been discussed above, but it is important to note that the most significant improvement in average score is in the area of privacy and security. Municipalities have recognized Web site security and citizen privacy as key components to effective and efficient Web sites. The category with the smallest increase in average score is citizen participation. Municipalities still have not found that citizen participation in government is a critical component for online functions. Table 11 highlights these findings.

In addition, some of the changes in the individual municipal rankings from 2003 to 2005 are of note. Table 12 shows the rankings of the top 10 municipalities based on the 2005 evaluations, as well as their change in ranking position. In general, Web sites would not be expected to decrease in score or ranking significantly, as a reduction or elimination in Web site services and functions is not common practice. For the most part, ranking changes were three places or less; however, there are significant changes in a few Web sites

that have improved over the two years between evaluations. Those Web sites that have improved significantly, as is apparent by their increase in overall ranking, are Sydney, Zurich, and Riga. Sydney moved up 14 places in ranking to a fifth-place ranking in 2005. Zurich moved up 27 places to eighth overall. Riga represented the most significant increase in rankings from those municipal Web sites evaluated in 2003. Riga moved up 52 places to tenth overall in the 2005 evaluation.

CONCLUSION

The study of municipal e-governance practices throughout the world is an area that clearly requires ongoing research. Our studies in 2003 and 2005 have produced findings that contribute to the e-governance literature, in particular in the areas of Web site privacy/security, usability, content, services, and citizen participation. The 2005 study highlights the increased attention spent on privacy and security and the need for further attention in the area of citizen participation via municipal Web sites.

In addition, the gap between OECD and non-OECD member countries in average scores has increased since 2003. Although overall average scores have improved for non-OECD member

Table 12. Change in rank between 2003 and 2005 evaluations

Ranking	City	Country	2003	2005	Rank (2003)	Rank 2005	Change in Rank
1	Seoul	Korea	73.48	81.70	1	1	0
2	New York	United States	61.35	72.71	4	2	+2
3	Shanghai	China	58.00	63.93	5	3	+2
4	Hong Kong	Hong Kong	66.57	61.51	2	4	-2
5	Sydney	Australia	37.41	60.82	19	5	+14
6	Singapore	Singapore	62.97	60.22	3	6	-3
7	Tokyo	Japan	46.52	59.24	9	7	+2
8	Zurich	Switzerland	28.59	55.99	35	8	+27
9	Toronto	Canada	46.35	55.10	10	9	+1
10	Riga	Latvia	17.12	53.95	62	10	+52

countries, they have not done so at the rate of OECD member countries. As we concluded in 2003, since there is a gap between developed and less-developed countries, it is very important for international organizations such as the UN and cities in advanced countries to attempt to bridge the digital divide. We recommend developing a comprehensive policy for bridging that divide. That comprehensive policy should include capacity building for municipalities, including information infrastructure, content, and applications and access for individuals.

With the growing research and development of e-governance emerging throughout the world, as well as the importance of information and communication technologies, we expect that the gap discussed above will be beginning to close. The continued study of municipalities worldwide, with a third evaluation planned in 2007, will

further provide insight into the direction of e-governance and the performance of e-governance throughout regions of the world. This second study of worldwide digital governance has allowed for initial assessments in the direction of e-governance performance via a two-year comparison. With forthcoming studies, already in the planning, the data will become critical in evaluating whether the gaps highlighted here continue to increase. Moreover, every region has examples of best practices for overall performance and in each specific e-governance category. As municipalities seek to increase their municipal Web site performance, searching within their region offers opportunities to identify e-governance benchmarks. Those municipalities that serve as top performers in their respective regions can then look at the top-ranked cities in municipalities throughout the world. Although the 2005 study highlights increases in e-

governance performance throughout the world, continuous improvement should be the norm for every municipality.

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APPENDIX A. SURVEY FRAMEWORK

Privacy/Security	
1-2. A privacy or security statement/ policy	12. Secure server
3-6. Data collection	13. Use of "cookies" or "Web Beacons"
7. Option to have personal information used	14. Notification of privacy policy
8. Third party disclosures	15. Contact or e-mail address for inquiries
9. Ability to review personal data records	16. Public information through a restricted area
10. Managerial measures	17. Access to nonpublic information for employees
11. Use of encryption	18. Use of digital signatures

Usability	
19-20. Homepage, page length.	25-27. Font color
21. Targeted audience	30-31. Forms
22-23. Navigation bar	32-37. Search tool
24. Site map	38. Update of Web site
Content	
39. Information about the location of offices	49. GIS capabilities
40. Listing of external links	50. Emergency management or alert mechanism
41. Contact information	51-52. Disability access
42. Minutes of public	53. Wireless technology
43. City code and regulations	54. Access in more than one language
44. City charter and policy priority	55-56. Human resources information
45. Mission statements	57. Calendar of events
46. Budget information	58. Downloadable documents
47-48. Documents, reports, or books (publications)	
Service	
59-61. Pay utilities, taxes, fines	
62. Apply for permits	72. FAQ
63. Online tracking system	73. Request information
64-65. Apply for licenses	74. Customize the main city homepage
66. E-procurement	75. Access private information online
67. Property assessments	76. Purchase tickets
68. Searchable databases	77. Webmaster response
69. Complaints	78. Report violations of administrative laws and regulations
70-71. Bulletin board about civil applications	

Citizen Participation	
79-80. Comments or feedback	90-91. Online survey/polls
81-83. Newsletter	92. Synchronous video
84. Online bulletin board or chat capabilities	93-94. Citizen satisfaction survey
85-87. Online discussion forum on policy issues	95. Online decision-making
88-89. Scheduled e-meetings for discussion	96-98. Performance measures, standards, or benchmarks

Tony Carrizales is an assistant professor of Public Administration at Marist College, School of Management. Dr. Carrizales is an associate director for the E-Governance Institute at Rutgers University - Newark and Managing Editor for the Journal of Public Management and Social Policy. Dr. Carrizales received his master of Public Administration from the Cornell Institute of Public Affairs and his Phd in Public Administration from Rutgers University - Newark.

Marc Holzer is the dean and a Board of Governors Professor in the School of Public Affairs and Administration at Rutgers University - Newark. Dr. Holzer is the executive director of the National Center for Public Productivity and the E-Governance Institute. Dr. Holzer is a Past President of the American Society for Public Administration and a fellow of the National Academy of Public Administration. Dr. Holzer Holds the Phd in Political Science and the master of Public Administration, both from the University of Michigan.

Seang-Tae KIM is the dean and a professor in the Graduate School of Governance, Sungkyunkwan University, South Korea, and the President of the Global e-Policy & e-Government Institute. Dr. Kim is a past president of the Korea Association for Regional Information Society. Dr. Kim is a well-known policy advisor to the South Korean Government and National Assembly. As a member of the Presidential Special Commission of E-Government 2001-2003, he advised South Korea's President. Dr. Kim received his master in Political Science from the University of Wisconsin, Madison and his Phd in Public Administration from the University of Georgia.

Chan-Gon Kim is the Vice Mayor of the Guro District in Seoul, South Korea. Dr. Kim was the associate director of the E-governance Institute at Rutgers University - Newark. Dr. Kim holds the Phd in Public Administration from Rutgers University - Newark and the Master of Public Administration from the University of Georgia.