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Pilar Gonzalez

*University of Gijon*, pilargt@epsig.uniovi.es

B. Adenso-Diaz

*University of Oviedo*, adenso@epsig.uniovi.es

Leopoldo A. Gemoets

*University of Texas at El Paso*, lgemoets@utep.edu

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# **A Cross-National Comparison E-government Success Measures: A Theory-Based Empirical Research**

<p><b>Leopoldo A. Gemoets</b> Department of Information and Decision Sciences University of Texas at El Paso El Paso, Texas 79968, USA lgemoets@utep.edu</p>	<p><b>M. Adam Mahmood</b> Department of Information and Decision Sciences University of Texas at El Paso El Paso, Texas 79968, USA mmahmood@utep.edu</p>
<p><b>B. Adenso-Diaz</b> Engineering School at Gijon University of Oviedo, Spain adenso@epsig.uniovi.es</p>	<p><b>Pilar Gonzalez</b> Engineering School at Gijon University of Gijon, Spain pilargt@epsig.uniovi.es</p>

## **ABSTRACT**

The continuing rapid convergence of government and e-technologies presents new opportunities for research to investigate the ways citizens interact with e-government. The literature in the area is, however, still in its infancy with little or no theoretically grounded empirical research conducted in the area. The present research investigates citizen experience with e-government in the United States and Spain by utilizing difference tests. Results of the difference tests show that the Spanish e-government citizens put more emphasis on information quality in terms of relevance, reliability, timeliness, clarity, conciseness, and currency. Results of the difference tests also show that for the system usage construct, e-government citizens on both side of the Atlantic agree that their e-government should provide superior user training, facilitate use of extranets to communicate with governmental agencies, allow automated transmitting and processing of data, and allow real time monitoring of citizen request for information in an e-government integrated with governmental agencies environment.

**Keywords**

E-government success, reducing risk in e-government, theory-based research, e-government citizen satisfaction, e-government quality, and study of e-governments in a multicultural environment

**INTRODUCTION**

The research in the e-government area has exploded over the last decade or so. What is e-government? Why so much interest is in e-government? The Congress has defined e-government “as the use by the Government of Web-based applications and other information technologies combined with processes that implement these technologies to enhance access to and delivery of Government information and services to the public, other agencies, and Government entities.” (Public Law 107-347-DEC 17 2002, 116 Stat. 2899, p. 2902).

Historically, citizens’ perception of services provided by government has not been very complimentary (Silcock, 2001). Davison and Wagner (2009) believe transition from government to e-government around the world is inevitable. The literature in the area is, however, still in its infancy (Aldrich et al., 2002) with little or no theoretically grounded empirical research being conducted (Danziger and Anderson, 2002). Bailur (2007, p. 262) emphasize this by stating “...use of any theory will boost ... its [e-government’s] knowledge building and academic legitimacy.” In addition, most of the research studies in the area used qualitative data and did not provide recommendations for practitioners (Heeks and Bailur, 2007). Given this lack of empirical data and theoretical underpinning, e-government “research neither learns much from practitioners’ experiences nor inspires changes in practice.” (Rose and van Rossum, 2005).

The development of e-government at the local, state, and federal levels utilizing e-technologies (e.g., Internet, World Wide Web, intranets, and extranets) has created many opportunities for government agencies to efficiently and effectively deliver their services to citizens. Very few studies have, however, been conducted to date on the extent to which these technologies have been utilized to bring about improvements in managing service delivery to citizens by reducing, for example, transaction costs and increasing operational efficiencies. Equally important is whether e-government initiatives have been culturally sensitive, overcome initial citizen resistance, and changed the way citizens and governments relate to each other. The effectiveness of the studies conducted in the area is, therefore, not clearly established. In order to remedy this situation, Yildiz (2007) suggested for the “production of more grounded, empirical studies that would create new theoretical arguments, and provide new concepts and categories to enhance our understanding of policy processes and actors.”

The objective of the present research is to investigate the impact of using e-government on local, state, and federal government efficiencies and effectiveness and, in the process, help understand the relationship between e-technologies and e-government success using quantitative data from the United States (USA) and Spain. (SPA). The use of different research methods, researchers, and data collected at multiple sites increases the legitimacy of the research studies (Miles and Huberman, 1994; Yildiz, 2007). The present research will also use the Delone and McLean theory of information systems success. Theory-based e-government research that uses quantitative data will boost knowledge-building and academic legitimacy for the area (Heeks and Bailur, 2007). Understanding and reducing risk in e-government initiatives is crucial for both researchers and managers (Gil-Garcia and Pardo, 2005). Miles and Huberman (1994, p.267) state “use of different data sources, methods, researchers, and data types which are collected at multiple sites increase the rigor of the studies.” Yildiz (2007) asked for “more grounded empirical studies that would create new theoretical arguments and provide new concepts and categories.

The rest of the manuscript is structured as follows: the next section reviews relevant literature in the e-government area. Section 3 presents theoretical background, hypotheses, and the proposed model for the study. Section 4 provides research methods. Partial results are offered in Section 5. Section 6 discusses the partial results. Section 7 concludes the manuscript by presenting suggestions for future research.

## **E-GOVERNMENT LITERATURE REVIEW**

There are essentially three streams of research on e-government: the first stream deals with e-government survey studies in the area. The second stream consists of case studies. The third and final stream presents empirical studies.

### **E-Government Survey Studies**

Several e-government survey studies show the development of e-government initiatives at the local level. Moon (2002), for example, using data obtained from the 2000 e-government survey conducted by the International City/County Management Association (ICMA) and Public Technology Inc (PTI) examines the current state of e-government implementation by different municipalities and assesses its effectiveness. The author concludes by stating that even though many local municipalities have implemented e-government, its potential in terms of cost savings and smaller governments has not been fully realized. This is mainly because of the barriers, the author states, created by financial, technical, personnel, and legal issues.

Edmiston (2003) extends the analysis of Moon (2002) by examining the state of e-government at the local, state, and federal levels using data collected through e-government surveys conducted by PTI (2000) and ICMA (2000). Many local governments, according to the author, did not make sufficient progress towards implementing e-government. He cites staffing, privacy, and security issues; and infrastructure, funding, and lack of support from elected officials as the main barriers to e-government initiatives at the local level. The author concludes by stating that federal and state governments had made much more progress in implementing e-government initiatives than local governments.

In another study of e-government at the federal level, Jaeger and Thompson (2004) investigated as to why citizens use federal e-government. The authors argue that in the past authors such as Hamilton (2002), Stowers (2002) and West (2002), among others, emphasized access to and availability of resources for e-government initiatives. They suggest emphasis should really be placed on social and behavioral reasons such as information poverty and normative behavior. The authors also suggest these new perspectives can increase citizens' involvement in and use of e-governments.

In another study of e-government at the local level, Kaylor, Deshazo, and Eck (2001) suggest the present e-government literature does not provide an adequate benchmark for municipalities to measure web-enabled functions and services. The authors have created a rubric using a broad range of functional dimensions which the cities can use to measure their progress towards achieving these functions and services. The rubric can be used to assign "e-scores" to municipalities. These e-scores, the authors claim, can be used to benchmark e-government implementations at the municipalities level.

Opportunities for citizens to be able to access e-government resources and, at the same time, use these resources have been a matter of debate for quite sometime. E-government resources have provided local, state, and federal governments with an opportunity to provide high quality functions and services and simultaneously achieve cost savings (Garson, 2004; Gartner 2000). The digital divide can, however, diminish this opportunity by hindering access, education, and use. It is disconcerting to know that the digital divide is quite a bit pronounced among the state of Georgia e-government visitors (Thomas and Streib, 2003). Helbig, Gil-Garcia, and Ferro (2009) claimed to have found way for e-government and the digital divide to co-exist and even complement each other. The authors draw policies and implications from the digital divide literature and suggest how these can be helpful for e-government research and practice.

The review of the existing survey literature on e-government indicated that the federal government, many state, and some local governments have implemented digital governments but the full potential of e-government has not been fully

realized because of the digital divide, information poverty, and normative behavior. The e-government case studies are examined next.

### **E-Government Case Studies**

There have been a few case studies done on e-government. One of the first case studies in the area was conducted by Devadoss, Pan, and Huang (2002). The authors discuss how a government agency developed and implemented an e-procurement system. They focused, more specifically, on factors that contribute to the development of e-government initiatives. They found, as expected, human and social factors contribute at every step to the development of these initiatives. The authors conclude by providing a framework for analyzing requirements for transition to an e-government initiative.

Gupta and Jana (2003) have also suggested a framework for e-government undertakings. The framework allows governments to choose an appropriate strategy to measure tangible and intangible benefits derived from e-government initiatives. The authors show the efficacy of the framework by using it for evaluating a municipal corporation in India. The authors conclude by suggesting that in order to properly evaluate tangible and intangible benefits derived from an e-government endeavor, it must be at a mature stage.

In another international setting, Shakleton, Fisher, and Dawson (2004) evaluated 20 local e-government sites in Australia using a two-stage model. In stage 1 of the model, the authors conducted a quantitative study to identify common features and the maturity levels of these sites. In stage 2, the authors used these features to conduct a detailed case study of a local municipality in Victoria, Australia. The authors concluded that local governments in general did not make a significant progress in delivering e-services to its citizens.

The case study conducted by Ferro and Sorrentiono (2010) sheds new light on the e-government research in the sense that it discusses inter-municipal collaborations that facilitate the use of the same software resources and allow an efficient use of federal government resources. They do, however, caution that these collaborations may not necessarily guarantee an automatic adoption of decisions on e-government initiatives made at the central level by remote municipalities.

A case study conducted in the area by Jones, Irani, and Sharif (2007) is interesting in the sense that it is a summary of three case studies performed by other authors. The authors suggest a framework based on the findings of these studies that includes quantitative and qualitative issues as related to decision making, performance assessment, evaluation methods, and practitioner concerns. The authors claim these can be used to improve e-government evaluation practices.

Case study research has been subjected to various criticisms for a number of reasons: first, because of its dependence on a single case makes it incapable of providing conclusions that can be generalized. Hamel (1993) and Yin (1994) argue that case methodology is “microscopic” in nature. Second, case research is not rigorous because many of the variables may not be mathematically quantifiable and independently verifiable. Tellis (2009) suggest this is mainly because researcher subjectivity is involved in this type of studies. Third, case research cannot test hypotheses. Flyvbjerg (2006) suggest case studies are good for generating hypotheses but not for testing hypotheses. The e-government empirical research studies are discussed next.

### **E-Government Empirical Research**

A few empirical research studies have also been conducted in the e-government area. One study was done by Welch, Hinnant, and Moon (2004) that uses secondary data collected by the Council for Excellence in Government (Hart/Teeter2001). The authors, using regression analyses, were able to show that citizens’ use of e-government is positively related to their satisfaction with both the site and the government itself. The authors also found that satisfaction with e-government is positively associated with trust in government in general.

Parent, Vandebeek, and Gemino (2005) extend the work done by Welch, Hinnant, and Moon (2004) by showing how citizens’ trust in government can be built through e-government. Using an Internet-based survey of 182 Canadian voters, the authors were able to show that the use of e-government is significantly and positively related to trust and political efficacy in the government itself. The authors also found that the internal political efficacy (e.g., power a citizen feels he or she has over government after the election has taken place) was more important than the quality of interaction with e-government in determining the trust level. Interestingly the quality of interaction was not found to be related to external political efficacy (e.g., a citizen’s perception of the government’s overall responsiveness to their needs).

In another e-government services study, Carter and Belanger (2005) delve into six issues (e.g., perceived ease of use, image, relative advantage, compatibility, trustworthiness, and intent to use) previously identified as critical for successful e-government initiatives. Using multiple regression analysis on a sample of 105 citizens at a community concert, the authors found perceived ease of use, compatibility, and trustworthiness to be significant predictors of citizens’ intention to use e-government. The authors provide rationales for non-contributing factors.

A couple of additional empirical research studies use theories but these studies are “microscopic” in nature. Hung, Chang, and Yu (2006), for example, uses a

Theory of Planned Behavior model to determine the factors that affect users' acceptance of government tax services. Dimitrova and Chen (2006) used technology acceptance model to examine non-demographic characteristics that affect taxpayers' intention to file taxes online.

Most of the e-government studies to date, to summarize, have been descriptive in nature and have been limited to case studies and survey research studies based on data from one source. While these studies report benefits provided by e-governments and some problems encountered by these e-governments, they do not provide theory-based results mainly because they do not use theories and test theories. Of the eighty-four e-government papers analyzed by Heeks and Bailur (2007) only one paper used theory. Heeks and Bailur (2007) suggest that use of any theory will boost e-government's knowledge-building and academic legitimacy. In addition most of the studies are not empirical in nature. Ildiz (2007, p. 661) calls for a "more grounded, empirical studies that would create new theoretical arguments and provide new concepts and categories to "enhance our understanding of e-government policy processes and actors." Lofstedt (2005) also calls for empirical studies to investigate the state of development in e-government. The objective of the present research is to fill this void in the e-government literature by conducting a cross-cultural empirical research that is theory-based, uses primary data collected from the United States and Spain, and provides recommendations for managers. The need for such a research, given the aforementioned e-government research scenario, can not be overemphasized. The research methods used to conduct the present research are outlined in the following section.

## **THEORETICAL BACKGROUND**

The DeLone and McLean (1992) information systems (IS) success model is used to measure e-government success. DeLone and McLean (1992) synthesized six categories of IS success measures from the multitude of success measures that have been used in the literature and suggest a model of interdependencies among these categories. The categories include system quality, information quality, user satisfaction, system usage, and organizational success. The DeLone and McLean model assumes volitional usage. The model has been widely tested in the literature. Seddon and Kiew (1994), for example, report a partial test of the DeLone and McLean (1992) model. Leidner (1998) also reports a partial test of the model. Hunton and Flowers (1997) and Rai, Lang, and Welker (2002) also test the full model. They all found support for the relationships among different variables included in the model.

The DeLone and McLean (1992) model has been used in the present research to measure e-government success as described in Figure 1. The model assumes that e-government system quality and information quality affect e-government citizen satisfaction and usage. E-government citizen satisfaction and e-



government usage, in turn, affect e-government success. E-government citizen satisfaction also affects e-government usage. The specific constructs, included for measuring e-government success, are summarized below.

The level of citizen confidence in e-government is an important criterion for many users of e-government (Seifert, 2002). E-government system quality should help towards increasing citizen confidence in e-government. E-government system quality was measured in the present research, following the guidelines set in the information systems literature for information quality, by ease of use (Chin and Todd, 1995; Hendrikson et al., 1992; Doll and Torkzadeh, 1988; DeLone and McLean, 1992); ease of learning (Belardo et al., 1982; DeLone and McLean, Jiang, Klein, and Discenza, 2001), ease of learning (DeLone and McLean, 1992; Jiang, et al. 2001), useful features and functions (DeLone and McLean, 1992; Lehman, 1986), response time (DeLone and McLean, 1992; Bailey and Pearson, 1983; Conklin et al., 1982; Srinivasan, 1985), convenient access (DeLone and McLean, 1992, Srinivasan, 1985; Bailey and Pearson, 1983) and system accuracy (DeLone and McLean, 1992; Jiang et al., 2001).

E-government information quality was measured in terms of relevance (DeLone and McLean, 1992; Jiang et al., 2001; Bailey and Pearson, 1983; Miller and Doyle, 1987), reliability (DeLone and McLean, 1992; Bailey and Pearson, 1983; Jiang et al., 2001; Srinivasan, 1985), timeliness (DeLone and McLean, 1992; Mahmood, 1987; King and Epstein, 1983; Miller and Doyle, 1987), clarity (DeLone and McLean, 1992; King and Epstein, 1983; Doll and Torkzadeh, 1988), conciseness (DeLone and McLean, 1992; Bailey and Pearson, 1983), and currency (DeLone and McLean, 1992; Jiang et al., 2001; Bailey and Pearson, 1983; Doll and Torkzadeh, 1988).

E-government citizen satisfaction was measured in terms of information needs (Doll and Torkzadeh, 1988), communication needs (DeLone and McLean, 1992) and overall satisfaction (DeLone and McLean, 1992; Mahmood, 1987; Ginzberg, 1981; Rushinek and Rushinek, 1985).

E-government system usage was measured in terms of volitional and non-volitional system usage (Grover et al., 1996), user training (Grover et al., 1996), use of extranets to communicate with governmental agencies (Barua et al. 2001), automated transmitting and processing of data (Barua et al. 2008), real time monitoring of citizen request for information (Barua et al, 2001), and e-government integrated with governmental agencies (Barua et al. 2001 and Teo et al, 1995).

E-government success was measured in terms of system effectiveness (Leonard, 1999; Teo et al., Johnston and Vitale, 1988; 1995; Johnston and Vitale, 1988; Rivard and Huff, 1984), efficiency (Leonard, 1999; Teo et al., 1995; Johnston

and Vitale, 1988), performance (Mahmood and Mann, 2005; Johnson and Vitale, 1988; Rivard and Huff, 1984; Jiang et al., 2001; Benbasat and Dexter, 1985), and productivity (Mahmood and Mann, 2005; Johnson and Vitale, 1988

## **HYPOTHESES AND THE PROPOSED MODEL**

The DeLone and McLean (1992) model has been used to measure, as stated earlier, e-government success (see Figure 1). In the present section, we ground the hypotheses used in this model.

The premise that increases in system quality increases user satisfaction has been studied fairly extensively by a number of researchers. Seddon and Kiew (1994), for example, found a significant relationship between system quality and user satisfaction.

We propose, based on the aforementioned discussion, the following hypothesis:

*[H1] E-government system quality will positively and significantly influence e-government user satisfaction.*

Igbaria et al. (1997), using the Technology Acceptance Model (TAM), found system quality to have a significant influence on system usage. Taylor and Todd (1995) applied TAM and a decomposed variation of TPB in evaluating usage of a student computer lab. They found a significant impact of system quality on system usage, with the latter measured in terms of perceived usefulness and ease of use.

The foregoing discussion leads us to our second hypothesis.

*[H2] E-government system quality will positively and significantly lead to eSCM system usage.*

The IS success literature is replete with research studies that empirically validate the relationship between information quality and user satisfaction as specified in the D&M model. Hunton and Flowers (1997), Seddon and Kiew (1994), Rai et al. (2002), for example, find support for the relationship between information quality and user satisfaction. Kuan et al. (2005) also find empirical support for information quality positively influencing user satisfaction with the system. We accordingly propose a third hypothesis based on the aforementioned relationship.

*[H3] E-government information quality will positively and significantly influence e-government user satisfaction.*

Current literature shows that the higher the quality of information provided by a system, the greater the successful use of the system (Palmer, 2002; Seddon, 1997). Kuan et al. (2005) ascertain empirical support for information quality positively influencing the usage of the system.

We put forward, based on the aforementioned discussion, a fourth hypothesis.

*[H4] E-government information quality will positively and significantly guide to e-government system usage.*

The early literature provides evidence of linear correlation between system usage and user satisfaction even though the relationship between the two was conducted primarily in the mainframe environment. Likewise, Khalil and Elkordy (1999) found a positive correlation between user satisfaction and system usage in a sample of Egyptian bank employees. Simmers and Anandarajan (2001) examined user satisfaction and system usage in an Internet anchored workplace and ascertained a strong correlation between two.

On the basis of the aforementioned discussion, we propose a fifth hypothesis.

*[H5] E-government user satisfaction will positively and significantly lead to e-government system usage.*

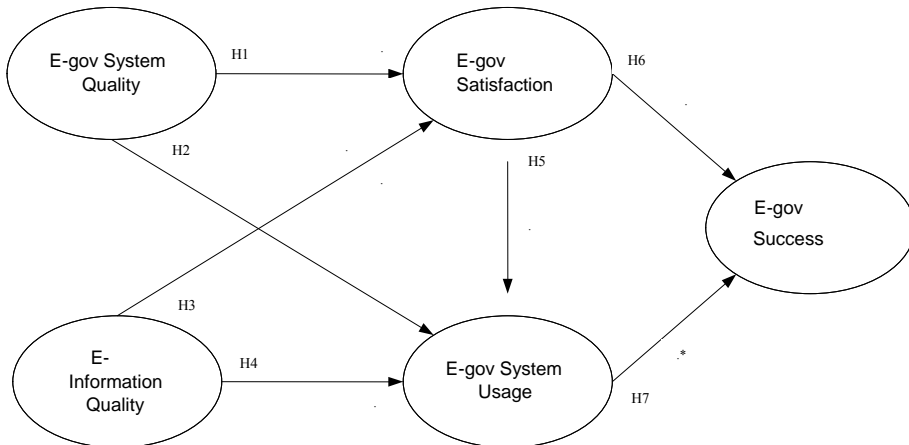
Etezadi-Amoli and Farhoomand (1996) find a strong relationship between user satisfaction and organizational performance. Gelderman (1998) also finds a positive and significant relationship between user satisfaction and organizational performance and goes so far as to say that user satisfaction is the best indicator of system success..

The foregoing discussion leads us to our sixth hypothesis.

*[H6] User satisfaction with the e-government system will positively and significantly influence e-government success.*

It is suggested in the information systems literature that informed and effective systems use is an important indication of information systems success. Systems usage is especially important in the e-commerce context since this kind of usage is largely volitional in nature (Molla and Licker, 2001). Etezadi-Amoli and Farhoomand (1996) find a strong relationship between system usage and organizational performance in the e-commerce environment. We present a seventh hypothesis.

On the basis of the seven hypotheses stated above, we derive a proposed model for e-government success as presented in Figure 1.



## SAMPLE AND DATA COLLECTION

The present research uses a cross-national field study using an instrument-based data collection procedure. The instrument was designed using the Delone and McLean (2004) taxonomy of information systems success. The reason for selecting this constructs is that they have been used frequently in IS research as a measure of IS success (Rai, Lang, and Welker, 2002). A representative sample of e-governments was collected from the United States and Spain using a 47-item instrument. The instrument was designed to measure e-government success stemming from e-government system quality, e-government information quality, e-government citizen satisfaction, e-government system usage, and e-government impact. These constructs are described in Section 3. A seven-point Likert-type scale (strongly agree = 7, agree = 6, somewhat agree = 5, neutral = 4, somewhat disagree = 3, disagree = 2, and strongly disagree = 1) was used for each item in the instrument.

In the United States, a total of 280 government agencies participated in the research. In Spain, a representative sample of 176 municipalities was obtained throughout the entire territory of Spain. All of these agencies are using e-government technologies for delivery of services.

**RESULTS**

**Reliability**

The data analysis for the present research was conducted using the SPSS 14.0 and AMOS 5.0 SEM software tools applying the maximum likelihood estimation method. Cronbach’s alpha was used to measure internal consistency reliability of all constructs. The main diagonals along Table 1A (USA) and 1B (SPA) show Cronbach’s alpha values for the five constructs ranging between 0.900 and 0.978, as determined using AMOS 5.0. All are well over the 0.72 threshold specified by Nunally (1978). These results indicate high internal consistency for each construct in the model.

Construct	SQ	IQ	SU	US	OI
SQ	0.934				
IQ	0.768***	0.978			
SU	0.512***	0.464***	0.900		
US	0.748***	0.684***	0.551***	0.952	
OI	0.437***	0.373***	0.667***	0.572***	0.916

Cronbach's  $\alpha$  values for the constructs are shown along the main diagonal.  
Sample correlations between constructs are reported below the main diagonal.  
\*\*\* p-value < 0.01

**Table 1a. (USA). Cronbach’s Values and Correlations**

Construct	SQ	IQ	SU	US	OI
SQ	0.933				
IQ	0.751***	0.919			
SU	0.692***	0.601***	0.906		
US	0.727***	0.558***	0.833***	0.933	
OI	0.639***	0.448***	0.659***	0.703***	0.922

Cronbach's  $\alpha$  values for the constructs are shown along the main diagonal.  
Sample correlations between constructs are reported below the main diagonal.  
\*\*\* p-value < 0.01

**Table 1b. (USA). Cronbach’s Values and Correlations**

**Convergent and Discriminant Validity**

We use factor analysis to validate constructs for the present research. Kerlinger (1973) points out that factor analysis is one of the most powerful methods for

construct validation. Convergent validity of the items included in the instrument was ascertained by assessing the factor loadings and by calculating variance extracted. A single confirmatory factor analysis for each of the constructs was performed. Tables 2A (USA) and 2B (Spain) report, for each construct, the mean, standard deviation, item factor loadings, and variance extracted for each country. As shown in Tables 2A and 2B, all factor loadings are between 0.60 and 0.94. All model items loaded well, exceeding the 0.50 threshold level recommended by Hair et al. (1998).

The discriminant validity was assessed by computing the correlations between items in all constructs. Tables 1A and 1B report pair wise correlations between constructs for the USA and Spain respectively. Correlations between all pairs of items were below the threshold value of 0.90 recommended by Hair et al. (2006). The variance extracted from all the constructs exceeded 0.50, again the threshold recommended by Hair et al. (2006). Hence the convergent and discriminant validity of the constructs in the model are established.

Construct	No. of Items	Mean	Standard Deviation	Factor Loadings	Variance Extracted
SQ	7	6.06	1.04	0.84, 0.84, 0.81 0.84, 0.71, 0.75, 0.70	0.86
IQ	6	6.31	0.98	0.85, 0.89, 0.91, 0.93, 0.93, 0.94	0.82
SU	11	5.05	1.20	0.81, 0.81, 0.73, 0.74, 0.75, 0.79, 0.84, 0.77, 0.78, 0.83, 0.69	0.77
US	7	5.77	1.21	0.78, 0.74, 0.82, 0.83, 0.85, 0.84, 0.81	0.88
OI	16	4.82	0.98	0.77, 0.57, 0.78, 0.78, 0.80, 0.72, 0.76, 0.58, 0.64, 0.77, 0.78, 0.80, 0.60, 0.80, 0.84, 0.77	0.76

**Table 2a (USA). Construct Validation**

Construct	No. of Items	Mean	Standard Deviation	Factor Loadings	Variance Extracted
SQ	7	5.23	0.97	0.82, 0.84, 0.77 0.77, 0.82, 0.74, 0.76	0.86
IQ	6	5.46	0.84	0.80, 0.81, 0.83, 0.77, 0.67, 0.64	0.82
SU	11	4.84	1.07	0.90, 0.93, 0.72, 0.74, 0.87, 0.71, 0.70, 0.87, 0.85, 0.84, 0.77	0.77
US	7	4.78	1.18	0.84, 0.84, 0.89, 0.86, 0.87, 0.80, 0.76	0.88
OI	16	4.59	0.96	0.77, 0.80, 0.66, 0.78, 0.85, 0.64, 0.72, 0.80, 0.85, 0.80, 0.87, 0.85, 0.84, 0.85, 0.86, 0.83	0.76

**Table 2b (Spain). Construct Validation**

### **Statistical Validation of the Proposed Models**

The fitness of the model will be verified later using AMOS/SEM utilizing the goodness-of-fit criteria which, in practice, indicate the degree of compatibility between the proposed model and the observed covariances and correlations of the data.

### **Structural Paths and Hypotheses Tests**

Resulting estimates and associated p-values corresponding to the relationships among constructs, as specified in our seven hypotheses, will be tested later for both USA and Spain. The similarities and dissimilarities between the two countries will be discerned.

**Difference Test Results**

It is reasonable to expect some differences between the USA and Spain data. Further analysis was, therefore, done using MANOVA and t-tests to discern these differences. The primary reason for conducting MANOVA is to determine if there are any group differences exist. The MANOVA results indicate that there are overall differences between USA and Spain data (please see Table 5). Once the group differences were established, a t-test was conducted to find the construct differences. The t-test assesses whether the means of two countries, for a particular construct, are *statistically* different from each other. This analysis is appropriate whenever one wants to compare the means of two groups, and is especially appropriate for the analysis of posttest-only two-group randomized experimental design. While there was not country differences in OI and SU, citizens from both counties did differ on US, SQ, and IQ with  $p < .001$ .

Effect (OI US SQ SU IQ)	Value	F	Hypothesis DF	Error DF	Significance
Intercept					
Pillai's Trace	0.978	2707.776	5.000	300.000	.000
Wilks' Lambda	0.022	2707.776	5.000	300.000	.000
Hotelling's Trace	45.130	2707.776	5.000	300.000	.000
Roy's Largest Root	45.130	2707.776	5.000	300.000	.000

**Table 5. Multivariate Tests**

Construct	t	DF	Significance (2-tailed)	Mean Difference	Std. Error Difference
OI	1.808	303	.072	.223	.124
US	6.115	303	.000	.931	.152
SQ	6.406	303	.000	.826	.129
SU	1.821	303	.070	.268	.147
IQ	7.109	303	.000	.851	.120

**Table 6. T-Test (Equal variances assumed)**

**DISCUSSION**

Results of the difference tests (see Table 6) do show that at least the information quality construct in this relationship is significantly different which implies that needs and values of American and Spanish e-government citizens are different at least in this regard. The Spanish e-government citizens put more emphasis on



information quality in terms of relevance, reliability, timeliness, clarity, conciseness, and currency (please see the definition of this construct under the Theoretical Background section).

Results of the difference tests (see Table 6) do, also show that at least for the system usage construct, e-government citizens on both side of the Atlantic agree that their e-government should provide superior user training, facilitate use of extranets to communicate with governmental agencies, allow automated transmitting and processing of data, and allow real time monitoring of citizen request for information in an e-government integrated with governmental agencies environment (again please see the definition of this construct under the Theoretical Background section).

## CONCLUSIONS

Since the development of e-government around the world by local, state, and federal governments is widely expected, understanding and reducing risk in e-government endeavors is imperative for both researchers and e-government managers. A primary contribution of our research is that we conducted a theoretically grounded empirical research using the Delone and McLeane IS success model (1992) in a multicultural environment and in the process, we hope, it moved the e-government area towards building more knowledge and academic legitimacy. Bailur (2007) stated that use of any theory would accomplish such knowledge and legitimacy.

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