# Are U.K. Citizens Satisfied With E-Government Services? Identifying and Testing Antecedents of Satisfaction

Vishanth Weerakkody, Zahir Irani, Habin Lee, Nitham Hindi & Ibrahim Osman

Taylor & Francis
Taylor & Francis Group

# Are U.K. Citizens Satisfied With E-Government Services? Identifying and Testing Antecedents of Satisfaction

Vishanth Weerakkody[a], Zahir Irani[a], Habin Lee[a], Nitham Hindi[b], and Ibrahim Osman[c]

[a]Business School, Brunel University London, Uxbridge, Middlesex, UK; [b]College of Business and Economics, Qatar University, Qatar; [c]Olayan School of Business, American University of Beirut, Beirut, Lebanon

**ABSTRACT**

Citizens' satisfaction is acknowledged as one of the most significant influences for e-government adoption and diffusion. This study examines the impact of *information quality, system quality, trust,* and *cost* on user satisfaction of e-government services. Using a survey, this study collected 1518 valid responses from e-government service adopters across the United Kingdom. Our empirical outcomes show the five factors identified in this study have a significant impact on U.K. citizens' satisfaction with e-government services.

## Introduction

Governments across the world have implemented e-government (hereafter, eGov) systems with the aim of realizing a host of benefits for themselves as providers of public services as well as the citizens who are largely the users of these services (Jaeger, 2003; Teo, Srivastava, & Jiang, 2008). eGov systems can be as simple as providing information through a web site to as complex as enabling the filing of taxes (Hu, Brown, Thong, Chan, & Tam, 2009). In the case of Western and economically advanced economies such as those found in Europe and America, there is a general sense of government acting on behalf of its citizens by providing or supporting various services. Although each country has its own specific form of government, with different levels of government intervention, including healthcare provision and regulation of industry, there is a general focus on public service inherent in all government activities (Mosse & Whitley, 2009).

It has been argued that previous eGov literature has paid more attention exploring eGov services from the supplier side; however, the citizen's or stakeholder's perspective has been overlooked, resulting in limited published work in this realm (Lee, Kim, & Ahn, 2011; Moon & Welch, 2005; Thomas & Streib, 2003, 2005). It is acknowledged that the supply side driven development might not result in the widely proclaimed outcomes where users' expectations and satisfaction are much higher on the priority list in eGov (Kunstelj et al., 2009). A fair number of studies (e.g., Floropoulos,

Spathis, Halvatzis, & Tsipouridou, 2010; Rana, Dwivedi, & Williams, 2013a, 2013b; Rana, Dwivedi, Williams, & Lal, 2014; Rana, Dwivedi, Williams, & Weerakkody, 2014; Teo et al., 2008; Wang & Liao, 2008) on eGov research have focused on the aspects of measuring user's satisfaction. But, most of these studies focused on evaluating the different IS success models (DeLone & McLean, 1992, 2003; Rai, Lang, & Welker, 2002; Seddon, 1997) without any variations or with the inclusion of some of the external variables (such as perceived ease of use, risk, trust, etc.).

However, none of such empirical research has examined trust as a predictor for the quality constructs (i.e., system quality and information quality) and cost as an antecedent of user satisfaction. The motivation for this study is to address this research gap by examining the importance of trust in relation to system quality and information quality of eGov systems and to what level cost (in terms of time and money) influences user's satisfaction to use eGov services in the United Kingdom. Examining such relationships along the IS success model will not only strengthen the theoretical foundations of the proposed research model in measuring the demand side perspective of user satisfaction, but also allow policy makers to understand the extended facets of user's satisfaction based on the trust and cost of the eGov services being facilitated by the U.K. government.

In order to address the research gap and realize the aim of the article, the remaining sections are structured as follows. In the next section, a brief overview of

**CONTACT** Vishanth Weerakkody ✉ vishanth.weerakkody@brunel.ac.uk 🖃 Business School, Brunel University, Uxbridge, Middlesex, UB8 3PH, UK.

related literature on user satisfaction studies in eGov is offered. This is followed by presenting the research model and hypotheses development for the study. A summary of the methodology used for the study is offered next, followed by the empirical results. Next, the article discusses the empirical results and outlines implications to theory and practice. Finally, the article concludes by acknowledging its limitations and identifying future research directions.

## Literature review

A number of studies (e.g., Chen, 2010; Cohen, 2006; Floropoulos et al., 2010; Gotoh, 2009; Hu et al., 2009; Rana et al., 2013a, Rana, Dwivedi, Williams, & Lal, 2014; Rana, Dwivedi, Williams, & Weerakkody, 2014; Teo et al., 2008; Zaidi, Siva, & Marir, 2014) on eGov services have used IS Success models to analyze user satisfaction. For example, Chen (2010) examined the quality antecedents (i.e., information quality, system quality, and service quality) on taxpayer satisfaction with online tax-filing systems. The results confirmed the quality antecedents strongly influenced taxpayer satisfaction with online tax-filing systems. Furthermore, the factors of information and system quality were found to be more important than the service quality in measuring taxpayer satisfaction. Similarly, Floropoulos et al. (2010) measured the success of the Greek taxation information system from the expert employees' perspective. They used the constructs including information quality, system quality, service quality, perceived usefulness, and user satisfaction—the results provided evidence that demonstrated strong connections between the five constructs. Interestingly, the impact of system quality on *perceived usefulness* was very low, and on user satisfaction was non-existent.

Cohen (2006) analyzed the survey of American citizens and suggested that only technology in itself was not accountable for the citizens' dissatisfaction; rather, prior beliefs, difficulty faced, and success using eGov services were also found to be significantly influencing satisfaction levels. Gotoh (2009) proposed a theoretical model for measuring the performance of eGov services in Japan and found that system quality had an indirect impact on user satisfaction. Further, P. J.-H. Hu et al. (2009) examined the determinants of service quality and continuance intention on the electronic taxation system in context of Hong Kong. The data analysis supported two service traits (i.e., security and convenience) and one technology trait (i.e., perceived ease of use) as the key determinants of the service quality. They also observed that perceived usefulness was not found as the strongest predictor of continuance intention, but service quality was.

Some recent publications (e.g. Rana et al., 2013a; Rana, Dwivedi, Williams, & Lal, 2014; Rana, Dwivedi, Williams, & Weerakkody, 2014; Zaidi et al., 2014) on eGov services satisfaction have explored the different variations of IS success models. Although some studies have considered trust as additional construct in their model development, none of them have attempted to explain quality constructs as the determining factors of trust and cost as the key factor of user satisfaction. For example, Teo et al. (2008) examined the research on role of trust over success of the eGov web site was almost untouched. Using DeLone and McLean's (2003) IS success model as a framework, the findings revealed trust in the government and not in technology was positively associated to trust in the eGov web site. Trust was further significantly associated to information quality, service quality, and system quality. Moreover, evaluating the validity of IS success models for an online public grievance system, Rana et al. (2013a) revealed information quality and system quality significantly influenced both behavioral intentions and user satisfaction. The study also proposed an integrated IS model and demonstrated the additional constructs such as perceived usefulness, complexity, facilitating conditions, and perceived trust worked well along the IS success model by DeLone and McLean (1992) and claimed to make the model more robust than merely with quality constructs. Further, Rana, Dwivedi, Williams, and Weerakkody (2014) used several external constructs including perceived usefulness, perceived ease of use, and perceived risk along with the updated DeLone and McLean (2003) IS success model. Hence, the current research would provide understanding of a system's success through risk associated with using and the overall quality of service provided by it.

Review of literature on eGov success analyzed across different services implies that no research has yet examined the impact of quality constructs on trust and also cost has not been considered along any models of IS success to understand its impact on user satisfaction. Realizing the lack of research in this direction, the current empirical research would be a timely and significant initiative to fill the existing research gap.

## Research model and hypotheses development

### Theoretical background—IS success models

There are primarily three theories offered in the area of IS success and these are all linked to DeLone and McLean's IS success model of 1992. The original IS success model was proposed by DeLone and McLean (1992) with six factors, namely system quality, information quality, use, user satisfaction, individual impact, and organizational

impact. In order to address criticism by several studies (such as Seddon & Kiew, 1996) relating to some of its constructs such as individual impact and organizational impact and use, Seddon (1997) introduced a re-specified model of DeLone and McLean (1992) where use of the system was considered to have results of various types; perceived usefulness was introduced in the model as an IS measure. Later DeLone and McLean discussed many of the significant IS research efforts that have applied, validated, challenged, and offered enrichments to their original model. This research resulted in an updated IS success model (DeLone & McLean, 2003) that incorporated a new construct service quality and substituted the variables, individual impact, and organizational impact, with net benefits which accounted for benefits at different levels of analysis.

## Overview of the proposed research model

The theoretical development in this study is based on the above described IS success models (DeLone & McLean, 1992, 2003; Seddon, 1997). Previous research on eGov, especially in the government-to-citizen (G2C) context has also emphasized the role of trust for user satisfaction under the IS success model (Balasubramanian, Konana, & Menon, 2003; Teo et al., 2008). In general, online trust has been found to be related to constructs such as information quality and system quality. Comparatively fewer studies have discussed the relationship between trust and satisfaction. Generally, satisfaction reflects the "affect status," which is shaped by user's previous experience with the web site, and trust shapes the user's expectations toward the user's behavior of the trustee (Kim, Xu, & Koh, 2004; Mayer, Davis, & Schoorman, 1995). Thus, satisfaction is sometimes regarded as an antecedent of trust. However, satisfaction has also been described as an outcome of trust (Teo et al., 2008). For example, Balasubramanian et al. (2003) found perceived trustworthiness of an online broker is directly related to the online investor's satisfaction. Yoon (2002) also argued satisfaction could be an outcome of online trust and suggested a positive correlation between trust and satisfaction.

eGov is now a significantly prominent aspect of governance, and the extent of citizen expectations regarding services, information provision, interaction with government officials, and access can be expected to contribute to important outcomes such as trust (Welch, Hinnant, & Moon, 2004). This is the reason why trust has been considered a prominent variable in the proposed research model. The proposed model considers an external variable, cost, which is indicative of the monetary value in terms of money and time spent by the users on availing eGov facilities.

The concept of cost has been used in certain other services including mobile messaging (Deng, Lu, Wei, & Zhang, 2010), e-commerce (Sohrabi, Yee, & Nathan, 2013), etc. However, its significance in the eGov context cannot be ignored. Based on the discussion of the importance of the IS success models and relevance of additional constructs, such as trust and cost, this study will posit the proposed research model consists of system quality, information quality, trust, cost, and user satisfaction. The proposed research model (see Figure 1) postulates system quality and information quality will have a positive and significant impact on both trust and user satisfaction. Also, trust will have a positive and significant impact whereas cost will have negative and significant impact on user satisfaction.

## Hypotheses development

As illustrated in Figure 1, a total of six hypotheses are proposed based on the relationships between five constructs.

### System quality

System quality is shaped through the interaction with the system when users complete a particular task. DeLone and McLean (1992, 2003) characterized system quality as the desired characteristics of the information system itself. More specifically, they incorporated five items into system quality: adaptability, availability, reliability, response time, and usability for measuring the e-commerce success. They hypothesize higher system quality is expected to lead to higher user satisfaction (DeLone & McLean, 2003). Seddon and Kiew (1996) surveyed users of the university accounting system and found significant relationship between system quality and user satisfaction. The prior empirical findings (Rai et al., 2002;
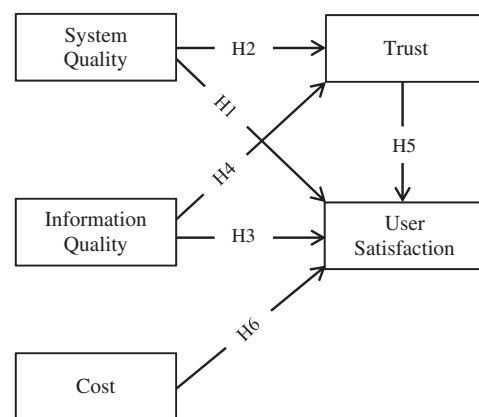


**Figure 1.** Proposed research model (DeLone & McLean, 1992, 2003).

Seddon, 1997; Seddon & Kiew, 1996; Wang & Liao, 2008) supported the impact of system quality on user satisfaction as discussed in DeLone and McLean's (2003) model. That indicates the higher levels of system quality are positively associated to higher levels of user satisfaction. For example, measuring the eGov system success using the validation of DeLone and McLean's (2003) model, Wang and Liao (2008) found a significant impact of system quality on user satisfaction. Therefore, we hypothesize:

H1: *System quality of eGov services in the United Kingdom has a positive and significant impact on user's satisfaction.*

Moreover, system quality attributes are relevant to the concept of trust because recent research suggests technical aspects of IT artefacts influence user willingness to trust (Gefen et al., 2006). For example, McKnight, Choudhury, and Kacmar (2002) found web site quality as the strong predictor of trusting beliefs. Similarly, examining trust in information technology artefacts, Vance, Elie-Dit-Cosaque, and Straub (2008) also found the system quality perceptions had a positive and significant impact on user's trusting beliefs. This research also believes higher system quality of eGov services used across the United Kingdom will improve user's trust. Therefore, we hypothesize:

H2: *Improved system quality of eGov services in the United Kingdom has a positive and significant impact on user's trust.*

## Information quality

A number of prior studies on IS success have established support for the argument that higher degree of information quality leads to enhanced user satisfaction (Floropoulos et al., 2010; Rai et al., 2002; Seddon, 1997; Seddon & Kiew, 1996; Wang & Liao, 2008). Petter and McLean's (2009) meta-analytic assessment of DeLone and McLean's (1992) model strongly supported the influence of information quality on user satisfaction. In context of eGov services, Wang and Liao (2008) presented and validated a model of eGov system success (using DeLone & McLean's [2003] IS success model), and found a significant influence of information quality on user satisfaction. Floropoulos et al. (2010) also obtained similar findings for a taxation system in Malaysian context. Therefore, we hypothesize:

H3: *Information quality of eGov services in the United Kingdom has a positive and significant impact on user's satisfaction.*

Moreover, improved information quality is expected to have positive influence on trust (Nicolaou, Ibrahim, & Van Heck, 2013). Attainment of accurate information indicates eGov service is able to provide accurate and up-to-date information and is a source of accurate information to achieve the desired outcomes. While examining the effect of information quality on trust in eGov systems transformation, A. Lee and Levy (2014) uncovered that citizens' perceived IQ factors determined trust in eGov systems. This research also believes higher accuracy, up-to-date timeliness, and exact relevance of information would lead to higher user trust in the eGov services. Therefore, we hypothesize:

H4: *Improved information quality of eGov services in the United Kingdom has a positive and significant impact on user's trust.*

## Trust

Trusting beliefs that an eGov service will act responsively when a citizen visits or transacts with it are central to the eGov services (Teo et al., 2008) being provided to the users. Sitkin and Roth (1993) defined trust as a set of expectations that tasks will be accomplished reliably. The government–citizen relationship plays a key role in the formation of trust in the government web services. Hence, citizen's trust in government should directly influence his or her trust in government web services. In other words, an eGov service is essentially a substitute for the government providing public services to citizens through traditional offline channels. Therefore, if a government demonstrates sincere care for the citizens and is able to effectually conduct its services, citizens are more likely to trust the eGov services established and are well-looked-after by the government to serve their needs. However, if the citizens' trust in the government and the eGov services provided by it is low, they will tend to distrust the policies made and actions taken by the government (Teo et al., 2008). Hence, we can argue higher trust in eGov services by U.K. citizens will lead to higher levels of satisfaction with it. Therefore, we hypothesize:

H5: *Improved levels of trust on eGov services experienced by the citizens of the United Kingdom will lead to higher degree of their satisfaction with such services.*

## Cost

Citizen-oriented eGov requires a number of planning and design processes to be successful; using such an

approach may, in fact, increase the costs of providing eGov services. The cost associated to an eGov service can well be associated with users as well. Users of eGov comprise of a number of groups—citizens employing government information and services, residents seeking various information related to all different government sectors and organizations, government employees using eGov in their job functions (Bertot, Jaeger, & McClure, 2008). Accessing the self-paid internet and eGov services could be little exasperating for citizens, particularly when it is not up to their expectations and consumes more time and expenses to get anything done online. Hence, this leads to a less satisfying experience for them. Considering the negative association of cost (in terms of time and money) with satisfaction, we hypothesize:

H6: *Higher degree of costs linked with using an eGov service has a negative, though significant, influence on user satisfaction.*

## Research methodology

This study adopted a survey-based approach (Choudrie & Dwivedi, 2005; Cornford & Smithson, 1996) to record the views of citizens across the United Kingdom The survey instrument was influenced by literature from the domains of eGov and information system satisfaction. There are various ways to capture survey data, however, the present survey was completed online and participation was voluntary. We used a system similar to the survey monkey approach to gather data from different geographical locations in the country. The data were then transferred into a SPSS file for quantitative analysis, storage, and retrieval purposes. Descriptive statistics were used to present the quantitative results. The online questionnaire consisted of a total of 19 different questions on five different constructs and five questions related to demographic traits of the respondents. A total of 1518 people took part in the survey and completed all the questions during the period September to November 2014.

All the questions related to constructs were multiple-type, closed-ended, and 7-point Likert scale type questions. Likert scales (1–7) with anchors ranging from 1 (strongly disagree) to 7 (strongly agree) were used for all non-demographic items. The demographic questions asked to respondents were related to their age groups, gender, education, internet usage, and usage of the eGov services. We used a specialist company and its database to identify and contact users who were already using several specific eGov services. The company then distributed the survey online to those identified users. The users of the survey were ensured about the anonymity of their personal identification.

## Results

### Respondents' demographic profile

Table 1 presents the respondents' demographic profiles. Of the overall respondents, the number of males (i.e., 51.1%) and females (i.e. 48.9%) are approximately equitably distributed. The data collected across respondents of different age groups indicate more than half of the sample size (i.e., 60%) was relatively younger generations of less than 45 years of age; however, close to 40% of the overall respondents were in the 45 years or above age group. As far as the educational qualifications are concerned, 52% of the population obtained undergraduates to doctorate degrees whereas about 36% of the respondents were at high school or lesser level of education. Moreover, 12.5% of the overall population possessed other professional qualification. The internet usage frequency of the users were found quite high, as more than 98% of the internet users were found to have 3 years or higher experience in it. This high internet usage frequency reported by the users could well be due to the very nature of the data collection process which only targeted those users who have access to the internet and computing systems. Therefore, the respondents to the online surveys would possibly have moderate to high level of experience with the use of internet-based transactions. However, the percentage of respondents exploring the eGov services is not proportional to the internet usage frequency where close to 27% of the

Table 1. Demographic characteristics of respondents (N = 1518).

| Characteristics | Frequency | % |
|---|---|---|
| Gender | | |
| Male | 776 | 51.1 |
| Female | 742 | 48.9 |
| Age (in Years) | | |
| Less than 24 | 146 | 9.6 |
| 25–34 | 452 | 29.8 |
| 35–44 | 325 | 21.4 |
| 45–54 | 319 | 21.0 |
| 55–64 | 275 | 18.1 |
| 65 and above | 1 | 0.1 |
| Education | | |
| Secondary or less | 136 | 9.0 |
| High school | 405 | 26.7 |
| Undergraduate education | 491 | 32.3 |
| Postgraduate education | 262 | 17.3 |
| Doctorate | 35 | 2.3 |
| Other professional qualification | 189 | 12.5 |
| Internet Usage | | |
| Beginner (<3 years) | 28 | 1.8 |
| Fair (3–6 years) | 176 | 11.6 |
| Good (6–10 years) | 519 | 34.2 |
| Excellent (Over 10 years) | 795 | 52.4 |
| eGov Service Usage | | |
| Everyday | 210 | 13.8 |
| Several times weekly | 213 | 14.0 |
| Several times a month | 158 | 10.4 |
| Once a month | 255 | 16.8 |
| Several times a year | 274 | 18.1 |
| Once a year | 408 | 26.9 |
| Total (For each characteristic) | 1518 | 100 |

overall respondents used the eGov services only once a year. As the data were gathered online from citizens across the different geographical locations in the United Kingdom on a random and voluntary basis, the sample can be considered as representative for the overall population.

## Descriptive statistics

Table 2 provides the mean, standard deviation (SD), and Cronbach's alpha (α) for all five constructs considered in the proposed research model. Reliability analysis was performed using Cronbach's alpha. It was used for determining the reliability of the scale, which provides an indication about the internal consistency of the items measuring the same construct (Hair, Anderson, Tatham, & Black, 1992; Zikmund, 1994). The reliability analysis for the eGov services indicates all the variables maintained either a high (with α > 0.70) or excellent (with α > 0.90) level of Cronbach's alpha (Gliem & Gliem, 2003). Cronbach's α of greater than 0.70 is considered to be good (Hair et al., 1992; Nunnaly, 1978). The possible reason for very high Cronbach's alpha for information quality and user satisfaction could be due to extremely strong internal consistency for the items specifically measuring these two constructs separately.

As far as means of the variables across positive constructs such as system quality, information quality, trust, and user satisfaction are concerned, they were found to be closed to the level of 5 or greater. This indicates the respondents responded favorably to the eGov services by and large. However, the overall lower mean of less than 4 for negative construct such as cost indicates respondents either felt negatively or remain neutral about the items related to this construct. SDs less than 1.5 for all positive constructs indicate respondents' responses did not fluctuate much across the mean values whereas a relatively large value of SD (i.e., close to 1.5) for cost indicates that users' responses were found to be a bit more fluctuating across mean values while responding to the items for this construct (see Table 2).

## Measurement model

The study tested the convergent and discriminant validity of the scales using confirmatory factor analysis.

**Table 2.** Mean and SD of items (N = 1518).

| Construct | Mean | SD | Cronbach's Alpha (α)[a] |
|---|---|---|---|
| System Quality (SYQ) | 4.69 | 1.27 | 0.881 (H) |
| Information Quality (IQ) | 5.36 | 1.29 | 0.942 (E) |
| Cost (CST) | 3.83 | 1.46 | 0.854 (H) |
| Trust (TRST) | 5.34 | 1.23 | 0.856 (H) |
| User Satisfaction (US) | 5.38 | 1.33 | 0.939 (E) |

[a]H: high, E: excellent.

Anderson and Gerbing (1988) recommended three ad hoc tests for convergent validity. Table 3 presents the standardized factor loadings (FLs), composite reliabilities (CRs), and average variance extracted (AVE) for this purpose. Standardized FLs are representative of the level of association between scale items and a single latent variable. The loadings are found highly significant in all cases. CRs, similar to Cronbach's alpha, were found well above the minimum limit of 0.70 (as recommended by Hair et al., 1992; Nunnaly, 1978) for each construct.

The AVE estimates are measures of the variation explained by the latent variable to random measurement error (Netemeyer, Johnston, & Burton, 1990) and ranged from 0.755 to 0.935 for all the constructs. These estimates are found to be at much greater levels than the recommended lower limit of 0.50 (Fornell & Larcker, 1981). Hence, all three tests related to convergent validity of the scales were supported.

Discriminant validity was also examined using the test suggested by Anderson and Gerbing (1988). To pass this test, the factor correlation between a pair of latent variables should be less than the square root of AVE of each variable as shown in Table 4 through factor correlation matrix. The evaluation of this validity indicates the square root of AVE shown in bold fonts across the diagonal of Table 4 for each variable is always greater than the correlation value for any pair of variables. For example, correlation between trust and user satisfaction is 0.767, which is less than the square root of AVE shown along the diagonal of both these variables (i.e., 0.908 and 0.965, respectively). In other words, a variable is considered to be different from

**Table 3.** Results of confirmatory factor analysis.

| Measure | FL | CR | AVE |
|---|---|---|---|
| **System Quality (SYQ)** | | | |
| SYQ1 | 0.81 | 0.873 | 0.813 |
| SYQ2 | 0.80 | | |
| SYQ3 | 0.81 | | |
| SYQ4 | 0.76 | | |
| **Information Quality (IQ)** | | | |
| IQ1 | 0.92 | 0.946 | 0.935 |
| IQ2 | 0.89 | | |
| IQ3 | 0.93 | | |
| IQ4 | 0.87 | | |
| **Cost (CST)** | | | |
| CST1 | 0.67 | 0.842 | 0.755 |
| CST2 | 0.80 | | |
| CST3 | 0.82 | | |
| CST4 | 0.73 | | |
| **Trust (TRST)** | | | |
| TRST1 | 0.87 | 0.926 | 0.825 |
| TRST2 | 0.87 | | |
| TRST3 | 0.73 | | |
| **User Satisfaction (US)** | | | |
| US1 | 0.78 | 0.943 | 0.930 |
| US2 | 0.94 | | |
| US3 | 0.92 | | |
| US4 | 0.92 | | |

**Table 4.** Factor correlation matrix.

| Variable | SYQ | IQ | CST | TRST | US |
|---|---|---|---|---|---|
| SYQ | **0.902** | | | | |
| IQ | 0.422** | **0.967** | | | |
| CST | 0.138** | −0.050ns | **0.869** | | |
| TRST | 0.558** | 0.693** | −0.035ns | **0.908** | |
| US | 0.530** | 0.644** | −0.080** | 0.767** | 0.965 |

Notes: Square root of AVE on diagonals in bold; ns: non-significant.
**$p < 0.01$.

other variables if the square root of the AVE for it is greater than its correlations with other latent variables (Barclay & Smith, 1997), which is satisfied for every variable of the proposed research model of the current study.

### *Structural model testing*

The overall model fit is reasonable as can be seen from Table 5. The test of the overall model fit resulted in a chi-squared ($\chi^2$) value of 373.382 with a degree of freedom value of 136 and a probability value of less than 0.001. The significant *p*-value indicates the absolute fit of the model is less than desirable (Belanger & Carter, 2008). However, as the chi-squared ($\chi^2$) test of the absolute model fit is receptive to sample size and non-normality, the better measure of fit is chi-squared ($\chi^2$) divided by the degree of freedom. The intended ratio (i.e., 2.745) of these two values is less than 3 and conforms to the recommended value of less than or equal to 3 (Chin & Todd, 1995; Gefen, 2000).

This research also reports a number of fit statistics to examine the comparative fit of the data to the model. Descriptive fit indices compare the specified model to the baseline model, specifically the independence model, in an endeavor to exhibit the dominance of the proposed research model (Belanger & Carter, 2008). Jaccard and Wan (1996) suggested the use of at least three fit tests. Therefore, this research reports the goodness-of-fit index (GFI), adjusted GFI (AGFI), and comparative fit index (CFI). The GFI and CFI compare the absolute fit of an individual model to the absolute fit of the independence model. The higher the value of divergence between the overall fit of these two models, the larger the values of these explanatory statistics

**Table 5.** Model fit summary for the research model.

| Fit statistics | Recommended value | Research model value |
|---|---|---|
| Chi-squared ($\chi^2$)/Degree of Freedom (DF) | ≤3.000 | 373.382/136 = 2.745 |
| Probability Value (p) | >0.05 | Non-significant |
| GFI | ≥0.900 | 0.975 |
| AGFI | ≥0.800 | 0.965 |
| CFI | ≥0.900 | 0.990 |
| TLI | ≥0.950 | 0.987 |
| RMSEA | ≤0.080 | 0.034 |

(Belanger & Carter, 2008). Gerbing and Anderson (1992) determined the CFI as one of the most established and vigorous fit indices. This research also reports root mean square error of approximation (RMSEA) to examine the inconsistency per degree of freedom.

The GFI should be greater than or equal to 0.900 (Hoyle, 1995), while AGFI should be at or above the level of 0.800 (Chin & Todd, 1995). Similar to GFI, the CFI value of greater than or equal to 0.900 was considered representative of a well-fitting model (Bentler, 1992; Bentler & Bonett, 1980; Byrne, 2010; Hoyle, 1995). Finally, the RMSEA value should be below 0.10 (Browne & Cudeck, 1993); however, the threshold value of 0.08 or less has been recommended as an indicator for a very good fit (Belanger & Carter, 2008; Browne & Cudeck, 1993; Byrne, 2010). It is considered an indicative of good fit between the hypothesized model and the observed data if it is below the more restrictive threshold of 0.06 (L. T. Hu & Bentler, 1999).

As far as the fit statistics of the proposed model for this research is concerned, GFI (i.e., 0.975) and AGFI were found to be at the much higher level than their recommended values of 0.900 and 0.800 respectively. Moreover, CFI and Tucker–Lewis Index (TLI) were found at even better levels with their index values of 0.990 and 0.987, which are very close to absolute value of 1.0. As far as the RMSEA value of the model is concerned, it was found to be much below (i.e., 0.034) than the expected level of 0.08. The fit statistics of the proposed research model indicates that all the indices were found adequately fit for the data collected.

Having established the relatively reasonable model fit, it is quite appropriate to examine specific path coefficients corresponding to the proposed hypotheses of the research model. The results of the structural model testing are presented in Table 6. The proposed research model for this research is primarily based on the constructs of the IS success model (DeLone & McLean, 1992, 2003). All the hypotheses were supported by the data collected to validate this model from the eGov service users in the United Kingdom The results indicate SYQ → TRST ($\gamma = 0.344$, $p < 0.001$), SYQ → US ($\gamma = 0.119$, $p < 0.001$), IQ → TRST ($\gamma = 0.600$, $p < 0.001$), IQ → US ($\gamma = 0.080$, $p < 0.01$), and TRST → US ($\gamma = 0.705$, $p < 0.001$) exhibited positive and significant relationships whereas CST was found to have a negative, though significant, impact ($\gamma = −0.077$, $p < 0.001$) on US.

Figure 2 shows the validated research model with path coefficients and significance of each relationship. It also demonstrates the variance of the model shown

**Table 6.** Path coefficients and hypotheses testing.

| Construct relationship | Path coefficient | Critical ratio (CR) | Significance (p) | Hypothesis-supported (YES\|NO) |
| --- | --- | --- | --- | --- |
| SYQ → TRST | 0.344*** | 14.074 | $p < 0.001$ | H1—YES |
| SYQ → US | 0.119*** | 4.584 | $p < 0.001$ | H2—YES |
| IQ → TRST | 0.600*** | 24.619 | $p < 0.001$ | H3—YES |
| IQ → US | 0.080** | 2.730 | $p = 0.006$ | H4—YES |
| TRST → US | 0.705*** | 17.197 | $p < 0.001$ | H5—YES |
| CST → US | −0.077*** | −4.264 | $p < 0.001$ | H6—YES |
| $R^2$ (TRST) | 0.67 | | | |
| $R^2$ (US) | 0.71 | | | |

Note: CR: critical ratio.
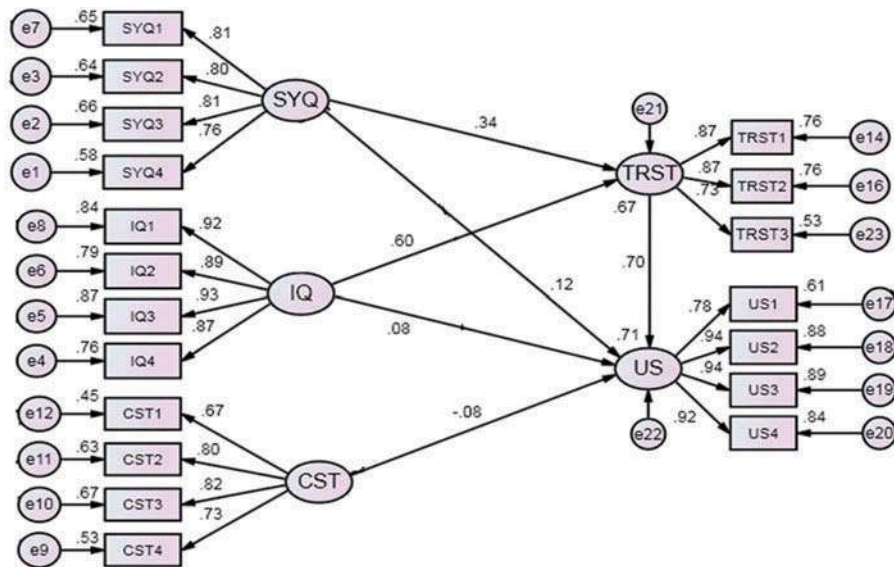Significance: $**p < 0.01$, $***p < 0.001$.



**Figure 2.** Validated research model (CST: cost, IQ: iInformation quality, SYQ: system quality, TRST: trust, US: user satisfaction).

on each of the two dependent variables (i.e., trust and user satisfaction). The variance of the research model shown on satisfaction (i.e., 71%) indicates variables such as system quality, information quality, cost, and trust are some of the most suitable constructs to analyze U.K. users' satisfaction.

## Discussion

The purpose of this study is to measure users' trust and satisfaction on eGov services in the United Kingdom. The proposed research model is primarily based on the IS success model (DeLone & McLean, 1992), along with some external constructs including trust and cost. The research model combined five constructs including information quality, system quality, cost, trust, and user satisfaction. The hypothesis testing results indicated there are significant links between the five constructs supporting six hypotheses. The results indicate both information quality and system quality have a positive and significant impact on trust and user satisfaction; trust has a positive and significant impact on

user satisfaction, whereas cost incurs a negative and significant influence on user satisfaction.

The positive and significant impact of information and system quality on user satisfaction indicates the better the quality of information provided through the eGov system and the overall enhanced quality of the web site results in higher user satisfaction with eGov services. A number of studies (e.g., Floropoulos et al., 2010; Teo et al., 2008; Wang & Liao, 2008) exploring the IS success models to measure satisfaction with eGov services have also shown support for these relationships. The findings clearly indicate the total effects of system quality on user satisfaction are marginally higher than the impact of information quality on user satisfaction. That is, in the context of eGov services, beliefs about system quality have a more dominant influence on user satisfaction than beliefs about information quality. This indicates eGov authorities should pay more attention toward promoting the information quality of eGov systems. Moreover, even though system quality exhibits higher impact on user satisfaction in comparison to information quality, it is not strong as

far as its path coefficient is concerned. In other words, the path coefficient of system quality on user satisfaction, although significant at $p < 0.001$, its empirical value was found only as 0.119. This also indicates quality of the eGov system should be given more importance so far as satisfying the users' needs are concerned.

Hence, those responsible for designing, implementing, and managing eGov systems should be responsible for considering the current status of system quality and work toward enhancing it. This could probably be achieved by focusing more on the degree of ease associated to use the appropriate web sites intended to provide specific service. This ease of use of the web sites could well be related to features such as, being able to easily find the relevant web site, easy access to current and previous transactions performed through the web site, or related to the ease of understanding its structure. Teo et al. (2008) also supported the significant relationship between system quality and user satisfaction and argued that the system quality of the web site is linked to the deeper and continued use of the online facility.

Although both information quality and system quality were found to be the significant predictors of trust in the present study, the results indicated information quality as the strong predictor of trust than system quality. The findings suggest that users of eGov services possess stronger trust in the quality of the information provided through the services than the system-web site itself. Such findings indicate that those responsible for implementing and maintaining eGov systems should be focusing more on accurate, updated, and easily accessible information to be embedded in the web site. As this whole process of crafting the relevant information is deeply linked to the quality of the web site itself, the designers of such eGov web sites should develop it in a simplistic manner. Trust is definitely very important for eGov web sites. The government needs to build trust in users by addressing their needs and by establishing a sound legal environment (Teo et al., 2008) to make sure that breach of trust is taken very seriously.

The strong and significant impact of trust on user satisfaction clearly indicates higher trust in eGov services would lead to better satisfaction with such services. The findings suggest building trust is necessary for keeping the users satisfied with the eGov services (Teo et al., 2008), and hence promoting such services for better serving the citizens in the country. The significance of this relationship also indicates users may be satisfied as long as they feel online services meet their needs well (Teo et al., 2008). For example, if the eGov users want to pay the vehicle tax through the vehicle certification agency web site of the government, then they would feel satisfied when their trusting beliefs, among other important factors including information quality and system quality, affect their satisfaction. Moreover, the significant and negative impact of cost on user satisfaction indicates higher costs associated with accessing and using eGov services will reduce user satisfaction. The government should make sure eGov services are so efficiently designed that it loads as soon as the URL is written on the web browser. Also, the links in the web site should work properly and perfectly. The cost of internet subscription should also be kept reasonable so every citizen not only has the facilities to explore it through the system, but also through the mobile services. In sum, the overall costs associated to the use of eGov services should be kept in check to optimize the user satisfaction.

## Implications for theory

This study has contributed to theory by extending the IS success model to include constructs such as trust and cost and testing it in a new (eGov) context. First, this study reveals trust will be affected by system quality and information quality. As government is proving all different types of online services to its citizens, understanding trust serves a very important aspect of any eGov research. In other words, it is necessary to understand investment in building citizen trust is important for utilization of all eGov services. Second, the present study is among a very few, which has analyzed the concept of costs in terms of user's time and money along the IS success model. This would allow researchers to understand the significance of cost associated with using eGov services. Only reasonable costs involved in gaining access to any eGov service can keep the users satisfied and hence would maintain their continuing positive attitude and intention toward using it in the future.

## Implications for practice

The results also have implications for U.K. government agencies providing various eGov services. A relatively weak though significant relationship for both information quality and system quality with user satisfaction indicates the government should put in all its efforts to make the system easily accessible with up-to-date and accurate information. Similarly, the significant influence of information quality and system quality on trust also indicates initiatives taken to enhance the

information quality and system quality will also result in high trusting beliefs among citizens. Also, a negative, though significant, impact of cost on user satisfaction indicates the government should make all its efforts to optimize the expenses of accessing eGov services and time spent on it by the users. The high speed internet and relatively inexpensive subscription fee with efficient web sites provided by the government to its citizens will encourage them toward its continuous use.

## Conclusion

This study examined the effect of information quality and system quality of eGov services on trust and user satisfaction in the context of the United Kingdom. The study also examined whether the cost associated with using the service has any impact on user's satisfaction. In order to do that, we proposed a research model based on IS success model (DeLone & McLean, 1992) to understand user satisfaction toward eGov services. A total of 1518 valid responses were collected from the users of eGov services across the United Kingdom to validate the model. The results supported all six hypotheses formulated between five constructs. Our findings indicated both information quality and system quality had a positive and significant impact on trust and user satisfaction. Also, trust was found to be positively associated with user satisfaction whereas cost was found to exert a negative, though significant, influence on user satisfaction. The overall higher variance (i.e., 71%) explained by the model on user satisfaction indicates the importance of trust and costs associated with the quality constructs of the IS success model. The outcomes of this study will help researchers appreciate how the trust and cost based success model may relate to other developed and developing countries' contexts.

## Limitations and future research

First, this research has collected data largely from the existing users of eGov services in the United Kingdom. Such data are not able to capture the beliefs of those who are new to such systems and hence caution should be expressed while generalizing the outcomes of this research in the later perspective. Second, the outcome of this research is analyzed on the basis of the measures defined on the Likert scale of 1–7. Hence, the findings from such questions may not reveal the feelings of the users, which probably could have been better explained using a qualitative methodology such as interviews. Therefore, future research could focus on extending this study to a broader random sample of citizens to capture non-users and/or potential eGov users. Future research

should also employ qualitative approaches such as conducting interviews with few experienced users to explore why trust and cost are so very important toward user satisfaction. Finally, the data for this research were gathered from the citizens of the United Kingdom. Such data may not deliver the reflection of what professionals think about the quality of the online services provided by their government and whether their stand is different to the generic perception of citizens. In this respect, future research can validate the proposed research model by seeking the opinions of employees and analyzing this against citizens' perceptions. Another avenue that would be worth exploring is citizens' perception of trust and cost on satisfaction for the same public services offered using more traditional means (such as face to face and/or telephone) against their online or eGov versions. Such comparisons would offer more insights into the unique characteristics of certain public service processes that influence perception on trust, cost and satisfaction.

## Funding

## Notes on contributors

*Vishanth Weerakkody* is a Professor of Digital Governance at Brunel University. Prior to his academic career, he worked in a number of multinational organizations. He is currently involved in several R&D research projects at the European and international levels on such themes as Information and Communication Technology-enabled process transformation, social innovation, eGov, digital inclusion, and citizens' engagement in public sector policy-making processes. He has published many peer-reviewed articles, guest-edited special issues of leading international journals, and edited several books on these themes. A Chartered IT Professional, he combines over 25 years of practical industry-based knowhow with academic and teaching experience.

*Zahir Irani* is Professor of Operations and Information Management at Brunel University. He has held several senior positions at Brunel, including head of Brunel Business School and Department of IS and Computing. He has a PhD in the area of investment evaluation, and his research interests are multidisciplinary in nature, developed from early work in the area of evaluating investments in manufacturing information systems through to more recent works in transformational government. He has received significant levels of funding from across the world and publishes in leading scholarly journals resulting in an H-index of almost 60.

*Habin Lee* is Professor of Analytics and Operations Management at Brunel University. He received his PhD in Management Engineering and his MEng in Management Science from Korea Advanced Institute of Science and Technology. Before joining Brunel, he worked at Paichai University in Korea and BT Group

CTO. He has secured R&D funding from the EU and international bodies in the area of information systems and operations management. He has extensive experience in applying quantitative methods, including agent-based simulation, fuzzy cognitive maps, and structural equation modeling to support decision makers and has published widely in these areas.

*Nitham Hindi*, CMA, is Professor of Accounting and Associate Vice President for Academic Planning and Development at Qatar University. He received his Masters in accounting from University of Alabama and his Doctorate in accounting from Mississippi State University. As a certified management accountant, he is an active member of the Institute of Management Accountant and serves on the editorial advisory board of Strategic Finance and Management Accounting Quarterly. He is a productive researcher. His publications appeared in many international journals. He is a member of the American Accounting Association and the Institute of Management Accountants.

*Ibrahim Osman* is Associate Dean for Research and Professor of Business Information and Decision Systems at the Olayan School of Business and Advisor to the Prime Minister Office on Public Reforms and e-Government Services. His research interests include model building and solving in managerial decision making, and performance measurement and management of organizations, people, and systems. He co-edited several books on meta-heuristics, published a large number of research articles, received ANBAR citations of research excellence, and was awarded a number of external research grants from funding agencies including European Commission Framework 7 (EU-PF7), Qatar National Research fund (QNRF), and French National Centre for Scientific Research (CNRS).

## References

Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, *103*(3), 411–423. doi:10.1037/0033-2909.103.3.411

Balasubramanian, S., Konana, P., & Menon, N. M. (2003). Customer satisfaction in virtual environments: A study of online investing. *Management Science*, *49*(7), 871–889. doi:10.1287/mnsc.49.7.871.16385

Barclay, D. W., & Smith, J. B. (1997). The effects of organizational differences and trust on the effectiveness of selling partner relationships. *Journal of Marketing*, *61*(1), 3–21. doi:10.2307/1252186

Belanger, F., & Carter, L. (2008). Trust and risk in e-government adoption. *The Journal of Strategic Information Systems*, *17*(2), 165–176. doi:10.1016/j.jsis.2007.12.002

Bentler, P., & Bonett, D. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, *88*(3), 588–606. doi:10.1037/0033-2909.88.3.588

Bentler, P. M. (1992). On the fit of models to covariances and methodology to the bulletin. *Psychological Bulletin*, *112*(3), 400–404. doi:10.1037/0033-2909.112.3.400

Bertot, J. C., Jaeger, P. T., & McClure, C. R. (2008). *Citizen-centered e-government services: Benefits, costs, and research needs*. Proceedings of the 2008 International Conference on Digital Government Research (pp. 137–142), Montreal, Canada.

Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 136–162). Newbury Park, CA: Sage.

Byrne, B. M. (2010). *Structural equation modeling with AMOS: Basic concepts, applications, and programming* (2nd ed.). New York, NY: Psychology Press, Routledge.

Chen, C.-W. (2010). Impact of quality antecedents on taxpayer satisfaction with online tax-filing systems - An empirical study. *Information & Management*, *47*(5–6), 308–315. doi:10.1016/j.im.2010.06.005

Chin, W. W., & Todd, P. A. (1995). On the use, usefulness, and ease of use of structural equation modeling in MIS research: A note of caution. *MIS Quarterly*, *19*(2), 237–246. doi:10.2307/249690

Choudrie, J., & Dwivedi, Y. K. (2005). Investigating the research approaches for examining technology adoption issues. *Journal of Research Practice*, *1*(1), Article–D1.

Cohen, J. (2006). Citizen satisfaction with contacting government on the internet. *Information Polity*, *11*(1), 51–65.

Cornford, T., & Smithson, S. (1996). *Project research in information systems*. London, UK: Macmillan Press.

DeLone, W. H., & McLean, E. R. (1992). Information systems success: The quest for the dependent variable. *Information Systems Research*, *3*(1), 60–95. doi:10.1287/isre.3.1.60

DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: A ten-year update. *Journal of Management Information Systems*, *19*(4), 9–30.

Deng, Z., Lu, Y., Wei, K. K., & Zhang, J. (2010). Understanding customer satisfaction and loyalty: An empirical study of mobile instant messages in China. *International Journal of Information Management*, *30*(4), 289–300. doi:10.1016/j.ijinfomgt.2009.10.001

Floropoulos, J., Spathis, C., Halvatzis, D., & Tsipouridou, M. (2010). Measuring the success of the Greek taxation information system. *International Journal of Information Management*, *30*(1), 47–56. doi:10.1016/j.ijinfomgt.2009.03.013

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39–50. doi:10.2307/3151312

Gefen, D. (2000). E-commerce: The role of familiarity and trust. *Omega: The International Journal of Management Science*, *28*(6), 725–737. doi:10.1016/S0305-0483(00)00021-9

Gefen, D., Pavlou, P. A., Benbasat, I., McKnight, D. H., Stewart, K., & Straub, D. W. (2006). Should institutional trust matter in information systems research? *Communications of the AIS*, *19*(7), 205–222.

Gerbing, D. A., & Anderson, J. C. (1992). Monte Carlo evaluations of goodness of fit indices for structural equation models. *Sociological Methods and Research*, *21*(2), 132–160. doi:10.1177/0049124192021002002

Gliem, J. A., & Gliem, R. R. (2003). *Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales*. Midwest Research-to-Practice Conference in Adult, Continuing, and Community Education, Columbus, OH.

Gotoh, R. (2009). Critical factors increasing user satisfaction with e-government services. *Electronic Government, an International Journal*, 6(3), 252–264. doi:10.1504/EG.2009.024943

Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1992). *Multivariate data analysis with readings* (3rd ed.). New York, NY: Macmillan Publishing Company.

Hoyle, R. H. (1995). *The structural equation modeling approach: Basic concepts and fundamental issues*. Thousand Oaks, CA: Sage Publications.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55. doi:10.1080/10705519909540118

Hu, P. J.-H., Brown, S. A., Thong, J. Y. L., Chan, F. K. Y., & Tam, K. Y. (2009). Determinants of service quality and continuance intention of online services: The case of eTax. *Journal of the American Society for Information Science and Technology*, 60(2), 292–306. doi:10.1002/asi.20956

Jaccard, J., & Wan, C. K. (1996). *LISREL approaches to interaction effects in multiple regression*. Newbury Park, CA: Sage Publication.

Jaeger, P. T. (2003). The endless wire: e-Government as global phenomenon. *Government Information Quarterly*, 20(4), 323–331. doi:10.1016/j.giq.2003.08.003

Kim, H. W., Xu, Y., & Koh, J. (2004). A comparison of online trust building factors between potential customers and repeat customers. *Journal of the AIS*, 5(10), 392–420.

Kunstelj, M., Jukic, T., & Vintar, M. (2007). Analysing the demand side of e-government: what can we learn from Slovenian users? *Lecture Notes in Computer Science*, 4556, 305–317.

Lee, A., & Levy, Y. (2014). The effect of information quality on trust in e-government systems' transformation. *Transforming Government: People, Process and Policy*, 8(1), 76–100. doi:10.1108/TG-10-2012-0011

Lee, J., Kim, H. J., & Ahn, M. J. (2011). The willingness of e-Government service adoption by business users: The role of offline service quality and trust in technology. *Government Information Quarterly*, 28(2), 222–230. doi:10.1016/j.giq.2010.07.007

Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An integration model of organizational trust. *Academy of Management Review*, 20(3), 709–734.

McKnight, D. H., Choudhury, V., & Kacmar, C. (2002). The impact of initial consumer trust on intentions to transact with a Web site: A trust building model. *The Journal of Strategic Information Systems*, 11(3–4), 297–323. doi:10.1016/S0963-8687(02)00020-3

Moon, M. J., & Welch, E. W. (2005). Same bed, different dreams? A comparative analysis of citizen and bureaucrat perspectives on e-government. Review of Public. *Personnel Administration*, 25(3), 243–264. doi:10.1177/0734371X05275508

Mosse, B., & Whitley, E. A. (2009). Critically classifying: UK e-government website benchmarking and the recasting of the citizen as customer. *Information Systems Journal*, 19(2), 149–173. doi:10.1111/isj.2009.19.issue-2

Netemeyer, R. G., Johnston, M. W., & Burton, S. (1990). Analysis of role conflict and role ambiguity in a structural equations framework. *Journal of Applied Psychology*, 75(2), 148–157. doi:10.1037/0021-9010.75.2.148

Nicolaou, A. I., Ibrahim, M., & Van Heck, E. (2013). Information quality, trust, and risk perceptions in electronic data exchanges. *Decision Support Systems*, 54(2), 986–996. doi:10.1016/j.dss.2012.10.024

Nunnaly, J. (1978). *Psychometric theory*. New York, NY: McGraw-Hill.

Petter, S., & McLean, E. R. (2009). A meta-analytic assessment of the DeLone and McLean IS success model: An examination of IS success at the individual level. *Information & Management*, 46(3), 159–166. doi:10.1016/j.im.2008.12.006

Rai, A., Lang, S. S., & Welker, R. B. (2002). Assessing the validity of IS success models: An empirical test and theoretical analysis. *Information Systems Research*, 13(1), 50–69. doi:10.1287/isre.13.1.50.96

Rana, N. P., Dwivedi, Y. K., & Williams, M. D. (2013a). Evaluating the validity of IS success models for the electronic government research: An empirical test and integrated model. *International Journal of Electronic Government Research*, 9(3), 1–22. doi:10.4018/IJEGR

Rana, N. P., Dwivedi, Y. K., & Williams, M. D. (2013b, June 27–29). Examining the factors affecting intention to use of, and user satisfaction with online public grievance redressal system (OPGRS) in India. In Y. K. Dwivedi, H. Zinner Henriksen, D. Wastell, & R. De' (Eds.), *Proceedings of IFIP WG 8.6 international conference on transfer and diffusion of IT (TDIT 2013)* (pp. 240–260). Bangalore, India: Grand Successes and Failures in IT, Public and Private Sectors; Berlin, Heidelberg: Springer.

Rana, N. P., Dwivedi, Y. K., Williams, M. D., & Lal, B. (2014). Examining the success of the online public grievance redressal systems: An extension of the IS success model. *Information Systems Management*. doi:10.1080/10580530.2015.983019

Rana, N. P., Dwivedi, Y. K., Williams, M. D., & Weerakkody, V. (2014b). Investigating success of an e-government initiative: Validation of an integrated IS success model. *Information Systems Frontiers*, 1–16. doi:10.1007/s10796-014-9504-7

Seddon, P. B. (1997). A re-specification and extension of the DeLone and McLean model of IS success. *Information Systems Research*, 8(3), 240–253. doi:10.1287/isre.8.3.240

Seddon, P. B., & Kiew, M. Y. (1996). A partial test and development of the DeLone and McLean model of IS success. *Australasian Journal of Information Systems*, 4(1), 90–109. doi:10.3127/ajis.v4i1.379

Sitkin, S. B., & Roth, N. L. (1993). Exploring the limited effectiveness of legalistic "remedies for trust/distrust." *Organization Science*, 4(3), 367–392. doi:10.1287/orsc.4.3.367

Sohrabi, M., Yee, J. Y. M., & Nathan, R. J. (2013). Critical success factors for the adoption of e-banking in Malaysia. *International Arab Journal of E-Technology*, 3(2), 1–7.

Teo, T. S., Srivastava, S. C., & Jiang, L. (2008). Trust and electronic government success: An empirical study. *Journal of Management Information Systems*, 25(3), 99–132. doi:10.2753/MIS0742-1222250303

Thomas, J. C., & Streib, G. (2003). The new face of government: Citizen-initiated contacts in the era of e-government. *Journal of Public Administration Research & Theory*, 13(1), 83–102. doi:10.1093/jpart/mug010

Thomas, J. C., & Streib, G. (2005). E-democracy, e-commerce, and e-research: Examining the electronic ties

between citizens and governments. *Administration & Society*, *37*(3), 259–280. doi:10.1177/0095399704273212

Vance, A., Elie-Dit-Cosaque, C., & Straub, D. W. (2008). Examining trust in information technology artifacts: The effects of system quality and culture. *Journal of Management Information Systems*, *24*(4), 73–100. doi:10.2753/MIS0742-1222240403

Wang, Y.-S., & Liao, Y.-W. (2008). Assessing eGovernment systems success: A validation of the DeLone and McLean model of information systems success. *Government Information Quarterly*, *25*(4), 717–733. doi:10.1016/j. giq.2007.06.002

Welch, E., Hinnant, C., & Moon, J. (2004). Linking citizen satisfaction with e-government and trust in government. *Journal of Public Administration Research and Theory Advance*, *15*(3), 371–391. doi:10.1093/jopart/mui021

Yoon, S. J. (2002). The antecedents and consequences of trust in online purchase decision. *Journal of Interactive Marketing*, *16*(2), 47–63. doi:10.1002/dir.10008

Zaidi, S. F. H., Siva, S., & Marir, F. (2014). Development and validation of a framework for assessing the performance and trust in e-government services. *Development*, *7*(4), 28–37.

Zikmund, W. G. (1994). *Business research methods* (4th ed.). New York, NY: The Dryden Press.