



COBRA framework to evaluate e-government services: A citizen-centric perspective



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ABSTRACT

E-government services involve many stakeholders who have different objectives that can have an impact on success. Among these stakeholders, citizens are the primary stakeholders of government activities. Accordingly, their satisfaction plays an important role in e-government success. Although several models have been proposed to assess the success of e-government services through measuring users' satisfaction levels, they fail to provide a comprehensive evaluation model. This study provides an insight and critical analysis of the extant literature to identify the most critical factors and their manifested variables for user satisfaction in the provision of e-government services. The various manifested variables are then grouped into a new quantitative analysis framework consisting of four main constructs: cost; benefit; risk and opportunity (COBRA) by analogy to the well-known SWOT qualitative analysis framework. The COBRA measurement scale is developed, tested, refined and validated on a sample group of e-government service users in Turkey. A structured equation model is used to establish relationships among the identified constructs, associated variables and users' satisfaction. The results confirm that COBRA framework is a useful approach for evaluating the success of e-government services from citizens' perspective and it can be generalised to other perspectives and measurement contexts.

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1. Introduction

E-government services influence many stakeholders including citizens, government employees, information technology developers, and policy makers. Each stakeholder has different interests and objectives that may have an impact on the success and take-up of e-government services (Osman, Anouze, Irani, Lee, & Weerakkody, 2011; Lee, Irani, Osman, Balcı, Ozkan, & Medeni, 2008; Osman et al. (2013); Osman, Anouze, Hindi, Irani, Lee and Weerakkody, 2014). In the literature, there have been a large number of models and frameworks to evaluate e-government service success for different purposes or from different perspectives (Jaeger & Bertot, 2010). Although, these models aim to help policy makers and practitioners to evaluate and improve the provision of e-services, little effort has been made to develop a holistic model to evaluate e-government services and their interactions with users

(Wang, Bretschneider, & Gant, 2005). However, the success of e-government services is a complex concept, and its measurement should consider being multi-dimensional factors (Irani, Elliman, & Jackson, 2007; Irani, Love, & Jones, 2008; Wang & Liao, 2008; Weerakkody & Dhillon, 2008). Therefore, in this study, a new conceptual model to measure e-service success from diverse stakeholders' perspectives is proposed.

The model development methodology follows a grounded theory approach in which an extensive literature review on existing e-service assessment models is conducted to identify the various fragmented success factors (or key performance indicators, KPIs). The identified KPIs are then classified into four main groups: *cost*; *benefit*; *risk*; and *opportunity*. Accordingly, users' satisfaction is measured in terms of the cost-benefit and risk-opportunity analysis for engaging with an e-service. This analysis has its roots in social science theories, and is in line with the recent e-service evaluation literature (Millard, 2008; Osman, Anouze et al., 2011; Weerakkody, Irani, Lee, Osman, & Hindi, 2013). Thus, the objectives of this paper are threefold. Firstly, the paper develops a comprehensive model to evaluate users' satisfaction with

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e-government services; secondly, the paper develops tests, refines and validates a scale to evaluate users' satisfaction; and finally, it validates the relationships between constructs in the proposed model, associated manifest variables and users' satisfaction. By doing so, this research will open up new directions for future research in evaluating an e-government services.

In the following sections, we first present a theoretical background on the evaluation of e-service success and introduce a new conceptual model along with associated assessment components. Section 3 discusses the model scale development stages that include data collection and data analysis on a selected sample of e-government services in Turkey. The final section concludes with theoretical and managerial implications, limitations, and suggestions for further research directions.

2. Theoretical background and model development

2.1. Theoretical background

There have been numerous attempts by e-government researchers and practitioners alike to present comprehensive models to assess the success of e-government services from a user perspective. An investigation of the literature on conceptual models/frameworks to evaluate user satisfaction with e-government services reveals a number of studies

[see for example Irani et al. (2008); Jaeger and Bertot (2010); Rowley (2011); Verdegem and Verleye (2009); Carter and Weerakkody (2008); Venkatesh (2006)]. However, these models are adapted versions of Information Systems (IS) or e-commerce adoption models. In particular, *SERVQUAL* (Parasuraman, Zeithaml, & Berry, 1988), the *National Customer Satisfaction Indices (NCSI)*, the *Information Systems (IS) success model* (DeLone & McLean, 1992, 2003) and the *Value Measurement Model (VMM)* serve as an outline for these models. Nonetheless, the e-government services evaluation process differs significantly from the traditional IS or e-commerce process (Osman, Anouze et al., 2011). Thus, the proposed existing models, as illustrated in Table 1, are insufficient for comprehensively assessing the multidimensional and multi-stakeholder influences that e-government services encapsulate. Furthermore, the limited scope of analysis (e-service quality, IS success constructs) and the resulting context-specificity significantly reduces the possibility of generalizability of these models in an e-government service context. Consequently, there is an urgent need to develop a model that systematically and psychometrically measures e-government service success from a user perspective, as the *SERVQUAL*, *NCSI*, and *IS success models* do for e-commerce. Academic researchers in different fields (IT, operations management, and public administration) have attempted to identify criteria to be used in evaluating e-services. On the basis of a synthesis of the extant literature, these criteria are reviewed as follows.

Table 1
Summary of previous literature.

Study	Measurement type	Performed methodology	Models and associated variables
Alanezi, Kamil, and Basri (2010)	Service quality	Conceptual model	Modified version of <i>SERVQUAL</i> that includes seven dimensions and 26 items. The seven dimensions in this scale are: website design, reliability, responsiveness, security/privacy, personalisation, information and ease of use.
Batini, Viscusi, and Cherubini (2009)			<i>GovQual</i> considers a wide set of quality dimensions: efficiency; effectiveness; accessibility; and accountability
Henriksson, Yi, Frost, and Middleton (2007)		Conceptual model	The instrument questions in the e-government website (eGwet) are grouped into six categories to evaluate the quality of government websites: security/privacy; usability; content; services; citizen participation; and features (the presence of commercial advertising, external links and advanced search capabilities)
Horan and Abhichandani (2006)		Structured equation model	<i>EGOVSAT</i> model consists of: utility; efficiency, customisation, reliability (whether the website functions appropriately in terms of technology as well as accuracy of the content) and flexibility.
Kaisara and Pather (2011)		Descriptive statistics	The e-service quality (eSQ) model includes factors (Information quality, security/trust, communication, site aesthetics, design, access)
Lee, Kim, and Ahn (2011)		Logistic regression	The model includes: tangible factors (i.e. equipment); reliability; responsiveness; assurance; empathy; promptness of service and overall satisfaction with the filing process to measure the offline service quality. They include 6 control variables.
Lin, Fofanah, and Liang (2011)		Structured equation model	<i>TAM</i>
Magoutas and Mentzas (2010)		Two-sample Z-test	<i>SALT</i> model includes the following factors: Portal's usability, Forms interaction, Support mechanisms and Security
Magoutas, Schmidt, Mentzas, and Stojanovic (2010)		Two-Sample one-tailed Z-test	Model for Adaptive Quality Measurement (<i>MAQM</i>): The model includes 6 quality factors and 33 quality dimensions.
Papadomichelaki and Mentzas (2012)		Structured equation model	<i>e-GovQual</i> : Includes 21 quality attributes classified under four quality dimensions: efficiency; trust; reliability; and citizen support.
Rotchanakitumnuai (2008)		Content analysis	<i>E-GOVQUAL-RISK</i> model includes service quality (service design; website design; technology support; and user support) perceived risk (performance risk; privacy risk; social risk; time risk and financial risk)
Papadomichelak and Mentzas (2009)		Structured equation model	<i>e-GovQual</i> model includes 25 quality variables (55 questions) classified under 4 quality factors: reliability, efficiency, citizen support and trust.
FreshMinds (2006)	Traditional National Satisfaction Index	Surveys and statistical analysis	<i>ACSI</i> : American customer satisfaction index
Kim, Im, and Park (2005)		Statistical reporting and tools	<i>g-CSI</i> model is based on customer satisfaction index of e-government model. It is an integrated model of customer satisfaction index in Korea and American customer satisfaction index. It is based on perceived quality (information, process, customer service, budget execution, and management innovation) and user expectation to contribute to user satisfaction as a moderator for subsequent user complaints and trust and re-use.
Shyu and Huang (2011)	E-government Success	Case study	Perceived enjoyment; Perceived e-government learning value; Perceived usefulness; Perceived ease of use; Attitude; Behavioural intention; and Actual usage
Verdegem and Verleye (2009)		Structured equation model	<i>E-government acceptance model</i> ; Communication about services; currency of information; security; help or guidance; personal contact and centralisation/integration. The indicators are clustered into three groups: 1) access to service; 2) use of service; and 3) impact of service.

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