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# An assessment tool for EGS performance quality and its impact on citizens' obtained benefits: a citizen-centric e-government evaluation model

Shatha A. Al-Haddad

*University of Wollongong, sah579@uowmail.edu.au*

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**UNIVERSITY OF  
WOLLONGONG**



**School of Information Systems and Technology**

**An Assessment Tool for EGS Performance Quality and its Impact on  
Citizens' Obtained Benefits: A Citizen-Centric E-Government  
Evaluation Model**

**Shatha A. Al-Haddad**

Bachelor of Business Administration and Finance – Kuwait University

Master of Commerce in Information Systems and Technology – Macquarie University

This thesis submitted in fulfilment of the requirements  
for the award of the degree

**Doctor of Philosophy**

of the

**University of Wollongong**

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## **DEDICATION**

She was my inspiration.  
She taught me to be strong, believe in myself, and to be perseverant.  
She always assured me that I can do whatever I want if I put sincere  
effort in it.  
She always wanted to see me successful in my life and have my PhD.  
I wish she was here today to see that I finally did it.  
I dedicate this to my dear and beloved mother, Huda.

I love you

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I, finally, like to thank every member of my family and friends who encouraged me and said, "don't worry, you'll do fine".

## **CERTIFICATION**

I, Shatha Al-Haddad, declare that this thesis, submitted in fulfillment of the requirement for the award of Doctor of Philosophy, in the School of Information Systems and Technology, faculty of Engineering and Information Sciences, University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. The document has not been submitted for qualification at any other academic institution.

Shatha Al-Haddad

10<sup>th</sup> December 2013

## **Abstract**

The increasing number and sophistication of e-commerce sites has led many people to expect the same level of personalized services from their governments. As a consequence, governments have recently implemented e-government initiatives both to meet this expectation and to achieve significant potential benefits. One important benefit is the value that the public, and in particular citizens, receives. By adopting an e-government system (EGS), a government aims to meet its citizens' needs and to provide them with better services, through increasing their convenience and satisfaction, saving them time and effort, and reducing their costs and dependencies on others. Fulfilling this aim is considered to be a critical success factor for e-government initiatives. However, there is a need to ensure that this objective has been fulfilled. This can be achieved by using an assessment tool based on citizens' perceptions of the output quality of what they have received from the EGS, and the benefits they obtained as a consequence of their use of the system. However, there is a lack of a suitable, reliably validated tool which fits the e-government context.

Despite the existing arguments of the importance of EGS in saving citizens' time and effort, there is a lack of studies that explicitly incorporate citizens' obtained benefits, in particular the tangible ones, in their citizen-centric models. The assessment tools used from citizens' perspective mostly measure their behaviors, their behavioral intentions, and in some cases, their satisfaction. It appears that, there are no adequate validated models that explicitly investigate individuals' increased efficiency or the overall consequences of using an EGS. Therefore, we need to fill this gap by developing a comprehensive model that can be used with its measurement instrument to evaluate the success of an EGS by assessing the EGS output quality or effectiveness, citizens' obtained net benefit, their behavior, and behavioral intention to use an EGS. The developed model study can be used measure to directly evaluate citizens' benefits obtained from using an EGS while regarding the Tangible Benefits as the most influential concept that promotes EGS adoption and leads to Satisfaction. We also consider in our conceptual model other factors of individuals' attributes which impact their use intentions.

This study also contributes to theory in that it presents a detailed theoretical discussion to synthesize the literature and provide a macro-level view. It provides a comprehensive explanation of the e-government success literature in terms of what citizens obtain when using an EGS. It also helps in understanding the concept of success and its relationships with the other determining factors in an online ‘voluntary individual use’ environment in general and in the e-government context in particular. The proposed model, together with its measurement instrument, will act as an assessment tool to identify whether a government fulfilled its goals in providing a ‘good quality’, effective EGS.

Kuwait EGS is used as an example of developing countries EGSs. A developing country was chosen because, in general, developing countries have significant shortcomings in the quality of government services provided to citizens, such as excessive bureaucracy, administrative burdens, nepotism, lost or inadequately completed tasks, etc. It is envisaged that this model could be used for evaluating other EGS in developing and developed countries. Consequently, the change in citizens’ perceptions, brought about by introducing an EGS, is likely to be more obvious in such developing countries than elsewhere. The model is validated quantitatively using the Partial Least Squares (PLS) path modeling approach. The results show that our proposed conceptual model is by and large supported.

**KEYWORDS:** *e-government, e-government systems, assessment, evaluation, Kuwait, net benefits, citizens’ obtain benefits, user satisfaction, Tangible Benefits, IS performance, e-government system performance, e-government system quality, e-government system success, e-government system effectiveness, IS success, PLS path modeling.*



## ACRONYMS

ARR	Average Rate of Return
AVE	Average Variance Extracted
BP	Business Processes
CB-SEM	Covariance Based- Structural Equation Modeling
CEM	Citizen-Centric E-government Evaluation Model
CFA	Confirmatory Factor Analysis
CSC	Civil Service Commission
CSE	Computer Self-efficacy
CV	Cross-Validation
D&M	DeLone and McLean IS success Model
DOIT	Diffusion of Innovation Theory
DSC	Distributed Service Centers
DTPB	Decomposed Theory of Planned Behavior
DV	Dependent Variable
EDP	electronic data processing
Edu	Educational Institution
EFA	Explanatory Factor Analysis
EFA	Expletory Factor Analysis
EGS	E-government System
EUCS	End-user computer satisfaction
F <sup>2</sup>	Effect Size
G2B	Government to Business
G2C	Government to Citizens
G2E	Government to Employees
G2G	Government to Government (between government agencies)
GoF	Goodness-of-Fit
HR	Human Resources
ICT	Information and Communication Technology
IQ	Information Quality
IS	Information System
ISR	Information Systems Research
IT	Information Technology
IU	Intention to Use
IV	Independent Variable
JMIS	Journal of Management Information System
KU	Kuwait University
LV	Latent Variable
MEW	Ministry of Electricity and Water
MHE	Ministry of Higher Education
MISQ	Management Information Systems Quarterly
MOC	Ministry of Communication
MOE	Ministry of Education
MOI	Ministry of Interior

MOJ	Ministry of Justice
MPCU	Model of PC Utilization
MPW	Ministry of Public Work
MV	Manifest Variable
NB	Net Benefit
NPV	Net Present Value
OLS	Ordinary Least Square
OPSQ	Overall System Performance Quality
OSQ	Overall Service Quality
PAAET	Public Authority of Applied Education and Training
PACI	Public Authority of Civil Information
PAHW	Public Authority for Housing Welfare
PBC	Perceived Behavior Control
PCI	Perceived Characteristics of Innovating
PEU	Perceived Ease of Use
PLS	Partial Least Squares
POSQ	Perceived Overall System Quality
PP	Payback Period
PU	Perceived Usefulness
Q <sup>2</sup>	Prediction Relevance
R <sup>2</sup>	Explained Variance
ROI	Return on Investment
SCT	Social Cognitive Theory
SEM	Structural Equation Modeling
SP	System Performance
SQ	Service Quality
SSE	Squared of Prediction Errors
STQ	System Technical Quality
Use	System Use
T	Trust
TAM	Technology Acceptance Model
TB	Tangible Benefits
TBP	Theory of Planned Behavior
TRA	Theory of Reasoned Action
TTF	Task Technology Fit
UE	User Evaluation
UI	User Involvement
UIS	User Information Satisfaction
UP	User Participation
US	User Satisfaction
UTAUT	Unified Theory of Acceptance and Use of Technology
VIF	Variance Inflation Factor
WIS	Web-based Information System

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# 1 INTRODUCTION

## 1.1 Introduction

E-government initiatives are becoming increasingly popular around the globe. The literature has identified many significant potential benefits arising from these initiatives. At the broadest level, these benefits fall into two categories: internal benefits obtained directly by the government, its agencies, and its employees; and external benefits obtained by the citizens, residents, and private businesses that use these systems. The notion of e-government, which is a form of an information system, has been broadly defined as an inter-networked government using any kind of technology that helps to simplify and automate transactions between governments and citizens, businesses, or other governments.

In general, an **information system (IS)** is defined as an organized collection of interrelated components, including the technology, information, business processes, organizational environment, and the people who collect, process, store, and distribute information all designed to support decision making and control in an organization and transform inputs into outputs in order to achieve a goal (Laudon and Laudon 2005; Huber *et al.* 2008).

For the purpose of this study, an IS which is used for e-government is referred to as an **e-government system (EGS)**. In this study, the concept of EGSs is limited to a **Web-based Information System (WIS)**. It is important to note that this does not limit the study to the **information and communication technology (ICT)** components of such systems; it also includes the human aspects (such as government employees) that are needed to complete the **business processes (BP)**. Therefore, in the context of this study, an EGS refers to the:

*online interaction channel which includes the e-government portal and/or government agencies' websites that provide sufficient information and diverse e-service options to meet the different needs of the public (i.e. citizens and business entities), as well as the government employees who update the system with the necessary information about each user's status, and complete the needed business processes of the submitted online requests.*

As noted above, governments are adopting these EGSs because of their significant potential internal and external benefits. These benefits are discussed extensively throughout the literature (Koh and Prybutok 2003; Abanumy *et al.* 2005; Akman *et al.* 2005; Ancarani 2005; Gil-Garcia 2006; Kumar *et al.* 2007; Bertot and Jaeger 2008; Groznik *et al.* 2008; Luk 2009; Verdegem and Verleye 2009).

When determining EGS benefits, the *internal perspective* refers to benefits that are obtained by government employees and agencies, and the government as a whole. Possible potential internal benefits include: facilitating a better working environment for employees, which could enhance their efficiency; reducing costs; and integrating government agencies to ease information sharing, which in turn would reduce redundancy and inconsistency (Jaeger 2003; Wong *et al.* 2011). Together, these benefits may lead to enhanced performance and increased effectiveness and efficiency.

The *external perspective* of EGS benefits refers to the benefits that citizens, residents, and private businesses gain. For the sake of brevity, this thesis will use the term ‘citizens’ to describe both the citizens of the country and the country’s residents (i.e. non-citizens). The main goal for a government when implementing an EGS is usually to provide better services for its citizens through a high-quality, accessible tool (e.g., using an online channel) that offers diverse information and e-services to meet citizens’ needs while saving them time and effort, and increasing their convenience, efficiency, and independence (Torres *et al.* 2005). An e-service is any “interactive, content-centered, and Internet-based customer service that is driven by the customer and integrated with related organizational support processes and technologies with the goal of strengthening the customer-provider relationship” (de Ruyter *et al.* 2001) cited in (Ancarani 2005, p.7).

By providing an EGS to the public, users are able to accomplish several kinds of tasks. Common examples include: finding information related to policies, legislations, or procedures; accessing documents and forms required to complete a particular task; checking personal status with government related matters, such as residency information, expiry dates, sponsorships, infringement notices, or bills; making online payments such as tax payments, fines, or bills; lodging a request for an activity that must be completed

by specialized government employees, such as applying for a visa, or renewing an ID, passport, or license; and lodging an online application.

Of course, to achieve the potential benefits of an EGS, it must be used (DeLone and McLean 2003). Thus, in order to realize both the internal and external anticipated benefits all stakeholders (e.g., government employees and citizens) must continuously use the EGS for as many tasks as possible (Wang *et al.* 2005). A stakeholder is any group or individual who can affect or is affected by the achievements of the organization's objectives (Freeman 2002).

Even if stakeholders do use an EGS, there is no guarantee that the anticipated benefits will be realized. Consequently, a government must measure the extent to which the anticipated benefits are realized to determine if an EGS has been successful. Heeks (2008) identified three categories of e-government success and failure. The first category is total failure, where the EGS was never implemented, was implemented but immediately abandoned, or was implemented but achieved none of its goals. The second category, partial success/failure, refers to an EGS that did not achieve its major goals and/or produced significant undesirable outcomes. Such failures can relate to goals, sustainability, or a zero-sum outcome (i.e., the EGS succeeds for one stakeholder group but fails for another). The third category is success. Here, most stakeholder groups attained their major goals and did not experience significant undesirable outcomes. Based on this classification, EGS success is closely related to the accomplishment of goals.

The willingness of potential users to adopt an EGS can also be used as a success indicator. Their actual adoption may also contribute to that success. However, the complex and multi-faceted nature of EGS success makes the evaluation process more difficult (Wang and Liao 2008). Each perspective must be assessed separately; later, these assessments of success, drawn from numerous stakeholders' perspectives, can be compiled to determine the overall success of an EGS. Stakeholders have some interest vested in the intervention which to be evaluated (Vedung 2010).

This study is primarily concerned with understanding the citizens' perspective of EGS utilization and its impact on them, in particular the positive impacts (i.e., psychological

and tangible benefits). It is assumed that assessing the citizen-users'<sup>1</sup> obtained benefits will aid in determining whether the goal of providing a successful EGS that increases citizens' efficiency and satisfaction was accomplished. To understand the extent of benefits received by citizen-users, there is a need to identify the attributes that leads to the attainment of benefits from the citizens' perspective. This can be accomplished by developing and validating a model that serves this purpose. Therefore; our research question is stated as: ***“is there a valid model that can be used to assess an EGS performance and quality and the obtained psychological and tangible benefits for the citizens who use it?”*** Hence, the aim of this study is to develop and validate a model that can be used to assess an EGS from the citizens' perspective and their obtained psychological and tangible benefits. This assessment will address system attributes identified from the literature, namely, citizens' behavior and behavioral intention to use an EGS, the psychological attributes that influence citizens' adoption of an EGS, and the tangible and psychological benefits obtained by citizen-users.

## ***1.2 Background***

As mentioned briefly above, one important and frequent goal of implementing an EGS is to provide good or 'better' services to citizens (Sprecher 2000; Abanumy *et al.* 2005; Akman *et al.* 2005; Wang *et al.* 2005; Wangpipatwong *et al.* 2005; Conklin 2007; Kumar *et al.* 2007; Al Nagi and Hamdan 2009; Verdegem and Verleye 2009). 'Better' services can broadly be described as those that provide citizens with what they need, while saving them time, effort and cost.

Generally, from the citizens' perspective, citizens need to perceive an EGS as being a better option than the traditional offline, face-to-face<sup>2</sup> channel in order for them to use it and subsequently obtain the anticipated benefits (Voss 2000; Reddick 2005; Wangpipatwong *et al.* 2008). There are several factors that influence citizens' decisions

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<sup>1</sup> The expression “citizen-user” is explicitly introduced here rather than using the expression “user” or “citizen” to distinguish those citizens who use an EGS as opposed getting confused with “a user” who could also be a government employee or simply an ordinary citizen who does not necessarily use the EGS. The citizens-users are the focus of this study because only they can provide feedback on their perception on the perceived quality and their obtained benefits of the EGS.

<sup>2</sup> Traditional, offline, and face-to-face channel, refer to the same thing and can be used interchangeably throughout this thesis.

to use and continue to use an EGS. The following factors are some of the most important and commonly discussed in the literature:

1. The advantages and shortcomings of each service channel. For example, the output effectiveness or performance and benefits of an EGS compared to traditional, face-to-face interactions.
2. Citizens' circumstances, which lead citizens to believe that the EGS is useful. These circumstances may include work commitments, health issues, or being overseas, which make it difficult or impossible for a citizen to physically go to a government agency
3. Individuals' attributes such as an individual's technical competency or trust in the system. Individuals' trust is mostly related to:
  - The operational competency of the government, i.e. receiving the online requests and completing them adequately and in a reasonable time frame.
  - The security and privacy standards, i.e. trusting that the system is secure and that a citizen's confidential information, such as financial, credit card, and personal information, are well protected from being accessed (viewed or manipulated) by an unauthorized party.
4. System attributes, which are related to the system characteristics and qualities. The system attributes frequently found in the literature include:
  - Information quality, such as comprehensive, up-to-date, clear, and relevant.
  - Service quality, such as the diversity of e-services that citizens can use to complete tasks fully independently (e.g., tax or fine payment) or partially (e.g., passport or ID renewal) where the task is completed by government employees, while taking into consideration the performance quality of these employees (e.g., accurate and on-time completion).
  - Technical quality of the system including website characteristics. For example, loading time, 24/7 availability, acknowledged security and privacy standards, and clarity and ease of using the website in terms of the design, navigation and consistency of layout.

Theoretically, the broader the range and the more complex the available services in an EGS are, the greater the likelihood that citizens will obtain benefits. The complexity and variety of the available e-services reflects the degree of maturity of an EGS. Some



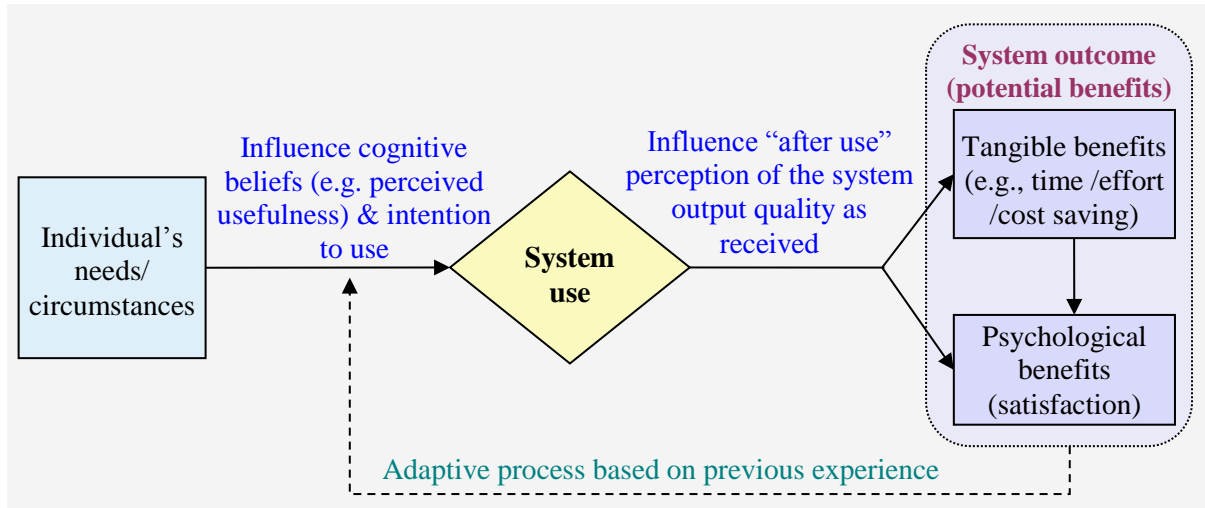
researchers use the maturity level as the basis for assessing an EGS (Layne and Lee 2001; Gupta and Jana 2003; Chee-Wee and Benbasat 2009).

Good-quality, effective systems are perceived as being useful when they can increase users' convenience and efficiency (i.e. saving time and effort) when performing a particular task, such as sparing users from having to physically travel to government agencies, wait in long queues, go through tedious, bureaucratic administrative processes, and complete routine paper work (Kumar *et al.* 2007; Wangpipatwong *et al.* 2008). Citizens' perceptions that a system is of a good quality, reliable, useful, and effective, such that it is considered as a better service option than the traditional face-to-face interaction channel, will most likely impact their level of satisfaction with the system's output quality (DeLone and McLean 2003; DeLone and McLean 2004; Teo *et al.* 2008).

Citizens' satisfaction will subsequently induce the behavior of adopting the system whenever needed (DeLone and McLean 2003; DeLone and McLean 2004; Reddick 2005; Kumar *et al.* 2007; Teo *et al.* 2008; Wang and Liao 2008; Verdegem and Verleye 2009). Ultimately, having adopted that 'good-quality' system, citizens will be able to obtain the anticipated psychological and tangible benefits of increasing their satisfaction and efficiency, respectively (DeLone and McLean 2003; Park 2008; Wang and Liao 2008). These final psychological and tangible benefits can also be referred to as system outcomes (Yildiz 2007) or as consequences of utilizing the system. The realization of the tangible benefits (saving time, effort, and cost) will also affect the level of the users' satisfaction (DeLone and McLean 2003; DeLone and McLean 2004; Teo *et al.* 2008; Alshawi and Alalwany 2009; Chae-Eon *et al.* 2009). The extent to which users are satisfied usually corresponds to the amount of benefits they have obtained.

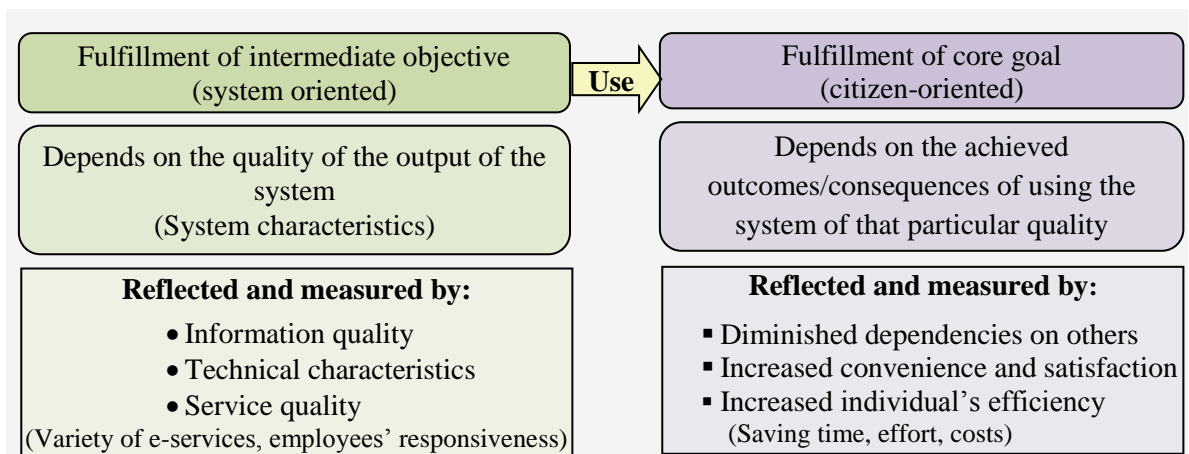
Although the obtained satisfaction and tangible benefits seem to be significantly interrelated, they are two different attributes and are reflected by different circumstances. Thus each should be investigated in its own right.

Figure 1-1 summarizes the concepts discussed above using a simplified diagram to show the factors associated with EGS adoption.



**Figure 1-1: The factors associated with user adoption of an EGS**

For a government to be able to increase citizens' satisfaction and efficiency, it needs to first consider fulfilling the intermediate objective (Wang and Liao 2008) of providing a high-quality system that citizens perceive as useful and effective in order for them to accept using it – (see Figure 1-2). That is, governments aim to provide a high-quality system, presumably to induce users' adoption of an EGS and subsequently to increase their convenience, satisfaction and efficiency (Prybutok *et al.* 2008), which is a core goal for a government in implementing an EGS (Park 2008).



**Figure 1-2: The relationship between the intermediate objectives and the core goal**

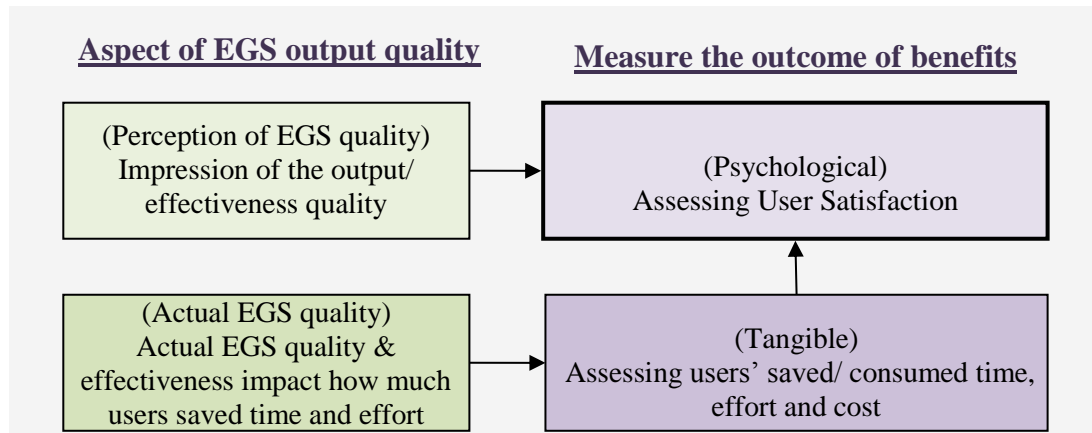
Though it can sometimes be inferred that citizens' use of an EGS, in preference to the face-to-face channel, might reflect that the implemented EGS is effective and of 'good quality', this is not necessarily true. Using an EGS does not always mean that it produces tangible benefits or that its users are satisfied with its output. For example, a citizen might

simply choose to use an EGS because he/she was forced to do so by external factors or another system. Or, a user might choose to use an EGS over the traditional face-to-face channel simply because he/she finds that using the EGS is relatively a better alternative than the traditional one considering that there is no other organization(s) that provide the same services.

In addition, a user who may save time and effort to some extent may still feel unsatisfied with the system, perhaps because he/she has compared it with another better system or had higher expectations of the system than the experience received. Conversely, a user might be pleased with an EGS with basic qualities simply because it is better than having no system or because he/she was influenced by other factors, such as personal characteristics, cognitive beliefs, or what others have said positively about the system, but not necessarily because of the tangible benefits it provides.

The tangible benefits can be regarded as a hard measure that relies on objective facts related to the system characteristics. They could be considered to be a good and the most important measure of the actual EGS output quality because users' increased efficiency in terms of the time, effort, and cost saved is very much dependent on the system effectiveness and output quality. The assessment of the obtained tangible benefits is considered as the most direct and realistic measure of an EGS quality and effectiveness. (It should be noted that the quantification of how much time/effort is saved compared to using the face-to-face channel cannot be calculated by ordinary citizen-users to give accurate figures. However, they can provide an estimate of whether they were able to save time/effort upon using an EGS compared to the face-to-face channel using a scale (e.g., a lot, little, no difference) or ranges of estimated time saved (e.g., 1-2 hrs, 3-4 hrs)). On the other hand, User Satisfaction, which is a psychometric measure reflecting the psychological value that citizens obtain, could be considered as a good measure of citizens' perception of the output (end product) quality they receive from an EGS and is also affected by the tangible benefits. User Satisfaction can be described in this context as a soft measure, because it is an indirect measure of the quality and effectiveness of the system and is influenced by individual differences and other psychometric and cognitive factors.

Figure 1-3 shows the aspects of EGS output quality and effectiveness and the suitable measure to be used to assess the output quality and effectiveness.



**Figure 1-3: Measures used for EGS output quality based on assessment of users' perspective**

Given that the implementation of an EGS aids in fulfilling the citizen-oriented goals that a government seeks to achieve (i.e., increasing satisfaction, efficiency, and convenience), and given that citizens who use an EGS are mainly concerned about increasing their convenience and efficiency, it is, therefore, essential to conduct a citizen-centric assessment that takes into account the attainment of these kinds of benefits. Continuous and systematic consideration of the feedback of the different types of customers' on the received service quality supports decision making and is regarded as an important determinant of effective service quality to be provided in future (Berry and Parasuraman 1997).

The concept of the final benefits (or "net benefits" – see Section (2.3.1)) which include both the citizen-users' psychological and tangible benefits, and most importantly the tangible ones, appear to be the most appropriate measure of EGS success from the citizen's perspective. Assessing these benefits indicate the degree to which the citizen-oriented goal, of providing better services to citizens in terms of increasing their efficiency, satisfaction and convenience, was fulfilled based on the provided system quality.

### 1.3 Research Focus

In the external-user context studies, System Use (Use) and User Satisfaction (US) were both commonly acknowledged by several researchers to be proxy measures for assessing system success. However, when users' tangible benefits of increased efficiency is a main variable that reflects the success of an EGS, as we previously proposed, neither Use nor US is entirely adequate on its own<sup>3</sup> (Yuthas and Young 1998; DeLone and McLean 2003). While the Tangible Benefits appear to be a better proxy for the success of an EGS than System Use or User Satisfaction alone<sup>4</sup> (Wang and Liao 2008), the previous discussion makes us conclude that to assess the success of an EGS, relying on a single measure on its own as success indicator is distorted and flawed.

We propose that both User Satisfaction and Tangible Benefits constitute the potential overall values or benefits that citizens obtain from using an EGS (Prybutok *et al.* 2008), and hence, both must be explicitly assessed simultaneously. This is necessary to provide a more accurate assessment of the level of an EGS success in terms of the quality, effectiveness, and benefits it provides to citizens (DeLone and McLean 2003).

In order to empirically assess citizens' perceptions of the overall EGS quality and effectiveness and their obtained benefits, it is also necessary to consider the factors that influence citizens' perceptions of the system and which encourage them to use it and hence to obtain these anticipated benefits. Thus, a suitable model of assessing EGS success in terms of citizens' perception of its quality, effectiveness and their obtained benefits would need to include variables related to four aspects, each of which includes two or more attributes as explained below:

- A. The system attributes that impact a citizen's perception of the systems' quality. These include:
  1. **information quality (IQ)** (e.g., relevance, comprehensiveness, currency and clarity of information),
  2. **system technical quality (STQ)** (e.g., design, easiness to learn and use, navigation, loading time, security, and availability), and the
  3. **service quality (SQ)** which includes two aspects:

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<sup>3</sup> A detailed discussion and explanation of the justification on why "System Use" and "User Satisfaction" is not a valid proxy for assessing EGS success from citizens' perspective is presented in Section (2.2.5).

<sup>4</sup> See Section (2.2.5) for the more explanation.

- the availability of diverse and needed e-service options on which citizens can rely to independently complete their tasks, and
- the services provided by government employees, which are assessed by their
  - promptness of receiving and completing online requests (e.g., passport issue or renewal) within an acceptable time frame
  - promptness of updating the system with a citizen's status information, and the availability of this information to citizens whenever they inquire online.

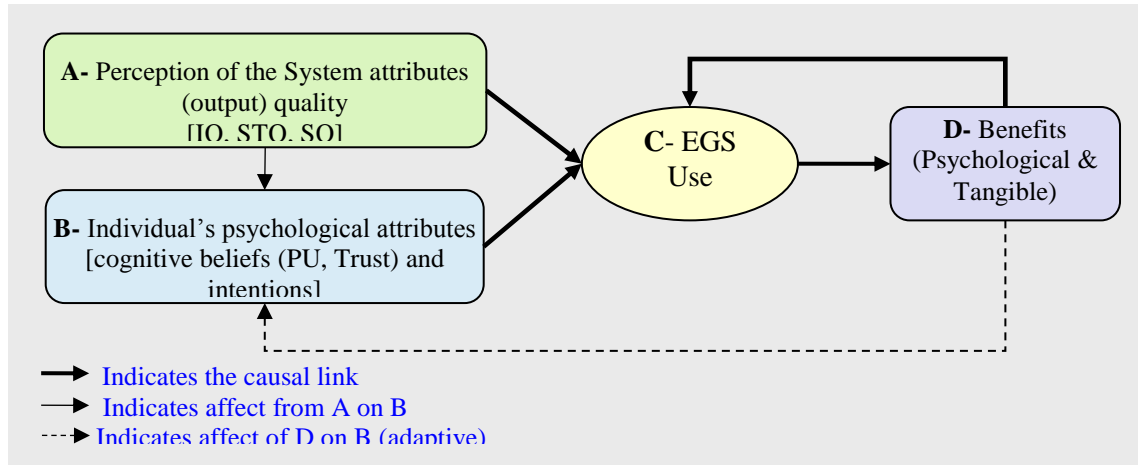
B. The citizen-users psychological attributes, which are related to individuals' cognitive beliefs such as (Trust, and Perceived Usefulness) and which influence their decision/intention to use an EGS. For example:

- A citizen would use an EGS if he/she believes that his confidential information is well protected and invulnerable to any unauthorized act, and if he/she trusts the operational competency of the government in terms of the government employees receiving and completing the online requests within the appropriate time frame.
- A citizen would perceive the system to be useful if he/she believes that using the system would fulfill his/her needs in terms of executing the task he wants to achieve, and would benefit him in terms of increasing efficiency where he/she saves time and effort compared to the face-to-face channel.

C. The citizens' adoption-related attributes, including use and intention to use an EGS.

D. The obtained values or benefits from using an EGS, both psychological and tangible ones. For instance, evaluating the psychological and tangible benefits that citizens could ultimately obtain from utilizing an "effective, good-quality" EGS.

These four main sets of factors are shown diagrammatically in Figure 1-4. As presented in the figure, factors A, B, and D altogether influence the individual's decision to use the system while D also impacts B in an adaptive manner.



**Figure 1-4: The determinants of EGS utilization and obtained benefits**

#### ***1.4 Aim & Objectives***

Yoon *et al.* (1995) suggest that the best measure for evaluating a system's success is dependent on the study's objectives. Based on the previously mentioned research purpose and the discussion, the aim of this study is to develop a suitable and valid model that can be used, along with its measurement instrument, to assess an EGS' success in terms of the fulfillment of:

- The system-oriented goal; i.e., assessing the extent of the EGS' effectiveness and quality.
- The citizen-oriented goal; i.e., assessing the obtained benefits for citizens who use it, including both tangible and psychological benefits.

The model would also address the citizen intention to use and use of an EGS as well as the psychological attributes that influence their adoption of the system as presented in Figure 1-4.

The proposed model should help in measuring and understanding the following:

- A. the effectiveness and quality of EGS itself, as perceived by the citizens who use it;
- B. how the different attributes (constructs) of the model interact with each other, particularly how they influence citizens' use of and intention to use an EGS; and,
- C. the obtained benefits of satisfaction and increased efficiency through savings in time, effort and cost, as a result of EGS use.

In order to accomplish the research purpose, the validity of the proposed model within the e-government domain must be ensured. A measurement instrument is required to allow the model to be applied. Therefore, the objectives of this study are to:

1. Develop a conceptual citizen-centric model of EGS assessment, incorporating the following constructs, to show how the quality of the EGS used influences the benefits obtained by citizen-users:
  - i. the system attributes,
  - ii. the factors that influence citizens' use, and
  - iii. the citizens' psychological and tangible benefits.
2. Develop a measurement instrument that can be used to collect the data and to validate the proposed conceptual citizen-centric model of EGS assessment.
3. Quantitatively validate the proposed conceptual citizen-centric model of EGS assessment.

This study will be organized into three stages: conceptual, exploratory and confirmatory. The *conceptual* stage involved conducting a comprehensive investigation and analysis of the existing relevant literature. The *exploratory* stage involved conducting a pilot study on the survey instrument and empirically testing the model. The *confirmatory* stage retested the survey instrument using data organized by respondent sub-groups based on agency use, and analyzed existing discrepancies based on the type of agency.

## ***1.5 Justification***

### **1.5.1 E-government versus E-commerce**

There is an underlying question as to whether it is fundamentally correct to view citizens' relationship with the government as being intrinsically similar to that of the relationship between consumers and commercial suppliers of goods and services (Hazlett and Hill 2003).

Morison and Newman (2001) state that

*"...there seems to have been very little discussion about how the whole project of connecting citizens with Government might, and should, differ from linking citizens with commercial opportunities." (cited in Hazlett and Hill 2003, 448)*



Indeed, an EGS shares several characteristics with an e-commerce system in terms of utilizing a Web-based Information System (WIS) to interact with the public. Also, the factors that impact users' intentions to use an organization's website are somewhat similar in both domains. In fact, common measures related to WIS quality, which were originally developed for the e-commerce context, were later employed as measures in the e-government context (Barnes and Vidgen 2003). However, an EGS is different in nature from an e-commerce system. The former is provided by a public (not-for-profit) organization while the latter is provided by a private and a commercial one. This difference determines the core goal for which each organization implements a WIS (Wang *et al.* 2005).

In fact, in the e-commerce context, the primary goal for the private organizations that use a WIS is to maximize their profits. Therefore, such organizations are interested in providing good services and products so that they have a competitive advantage and subsequently attract more customers. Hence, maintaining customer satisfaction is crucial for their survival and success. Otherwise, customers would turn to other competitors and choose those who provide better services and products (Wang *et al.* 2005). Thus, customer satisfaction seems to be a sufficient and important indicator that could be considered as a proxy for measuring a commercial organization's WIS success (DeLone and McLean 2004; Wang *et al.* 2005).

In the e-government context, on the other hand, the 'citizen-oriented' nature of governments' goals for introducing EGS are different from e-commerce goals, which are largely concerned with providing better services to citizens, mostly through saving citizen-users' time and effort. Also, government organizations deliver uniquely specialized and (free, on a cost-recovery basis, or through taxes) services to the public, who form a larger and more heterogeneous population (i.e. different characteristics like literacy, gender, income) of potential users than those of e-commerce (Wang *et al.* 2005; Conklin 2007). Thus, in this context, the idea of competition is not applicable. Though there might be some competition between other government agencies in terms of quality of the e-services they provide, this is intended to distinguish between the concept of competitive advantage existing in the e-commerce context from which the evaluation models have been adopted versus the e-government context. This makes us stop and think – are the commonly used success measure, such as System Use or User Satisfaction,

appropriate here as in the case of e-commerce, especially given that citizens may feel obliged to use an EGS when there is no alternative service provider?

Many researchers base their studies on the notion that a system's success is in the hands of its users ([Hazlett and Hill 2003](#)). This group of researchers, which will be discussed in Chapter 2, uses the concepts of System Use, and Intention to Use/Continue Use a system as dependent variables reflecting system success. In other words, using or having the intention to use a system is an indication that a system is successful. This implies that a system will only be successful if users are accepting to use it, appropriately utilize it, and sufficiently rely on it. This conceptualization is particularly appropriate for system internal-users (i.e. workplace users). Without employees accepting to efficiently utilize a system, the system's implementation will be worthless and unsuccessful. However, in the online system, it is not the success of an online system, per se, that is dependent on customer adoption. It is, in fact, the organization's overall success that is dependent on the customers' use of the system. Indeed, a commercial organization whose business is entirely online will not be able to survive unless a sufficient number of customers use its online system.

From that perspective, it is fundamentally incorrect to assume that citizens' adoption of an EGS is a suitable measure of the degree to which a government (as an organization) is successful. Neither is the success of an EGS dependent on citizens' use. It is actually the other way around. It is true that by citizens' not using an EGS the implementation of that system might not pay-off ([Wang et al. 2005](#)) and the invested resources would be lost. However, citizens' adoption or non-adoption of the EGS does not cause the government failure as in commercial organizations. This is simply because governments are not reliant on making profits from citizens' payments through the EGS.

Since a good quality, effective EGS helps users to achieve their required task easily and efficiently, it is supposed to induce citizens' adoption, citizens' use of an EGS could be partially regarded as a reflection of:

1. the perceived quality of the output service and performance offered to citizens; and,
2. the outcome of their obtained psychological and tangible benefits.

Therefore, we believe that there is a logical distinction between evaluation of a WIS in an e-commerce context and an e-government context.

### 1.5.2 The Existing Research Gap

By reviewing the external-user literature, in particular the studies that focused on system assessment and success, it appears that:

There is a lack of studies that measure the three aspects which were previously presented in Section (1.3). As shown earlier, each of these aspects incorporates two or more attributes. DeLone and McLean's (2003) IS success model introduced most of the attributes; namely, the three system attributes of IQ, STQ, & SQ, User Satisfaction (reflecting the psychological benefit), and net benefit (reflecting the tangible benefits only). There were a few attempts by researchers to validate this IS success model in the e-commerce and e-government literature (e.g., DeLone and McLean 2004; Teo *et al.* 2008; Wang and Liao 2008). However, it is important to note that their models were basically focused on assessing the system's attributes without considering other variables that are necessary in the external WIS user context (e.g. trust in the system).

The models that have been used in the external-user context, such as e-commerce and e-government, were adapted from the IS or marketing literature. Likewise, the models that were used to assess the overall EGS quality or overall service quality of an EGS were borrowed from the IS or e-commerce research (Torres *et al.* 2005; Wang *et al.* 2005). However, the models proposed in the IS literature were originally developed to suit the organizational internal-user context (i.e., workplace). Although the marketing literature introduced models for evaluating the success of the overall services provided to external customers, the discussions were mainly about the private-organization (commercial) context, which differs from the public e-services (Torres *et al.* 2005; Wang *et al.* 2005).

Some researchers have suggested that marketing models that are used to assess the total service quality of a WIS for commercial organizations can be applied in the e-government context to assess their website quality (Steyaert 2004). However, studies that were situated in the e-government domain seem to be rare and incomprehensive. For example, they either focus on certain attributes (some of which we propose to be important) while ignoring other important ones that determine User Satisfaction or net benefit (e.g., Prybutok *et al.* 2008; Wangpipatwong *et al.* 2008), or appear to be unreliable due to some methodological issues. For instance, some lacked appropriate methodological instruments that are reliable and comprehensive enough to reflect the

nature of the latent variable (e.g., [Kumar et al. 2007](#)); others had inconsistent clustering of variables (e.g., [Sung et al. 2009](#)).

There are a small number of citizen-centric studies in the e-government literature that used models to assess whether an EGS facilitated better services to citizens. These studies varied in terms of the dependent variable used as a success indicator that evaluates an EGS' success. For example, there are models that have investigated e-government success from the citizens' perspective in terms of measuring User Satisfaction (e.g., [Chae-Eon et al. 2009](#); [Mohamed et al. 2009](#); [Verdegem and Verleye 2009](#)), and technology acceptance and Intention to Use/Continue Use the EGS (e.g., [Carter and Belanger 2005](#); [Hung et al. 2009](#); [Jaeger and Matteson 2009](#); [Lean et al. 2009](#); [Wangpipatwong et al. 2009](#); [Ozkan and Kanat 2011](#)), but not the Tangible Benefits per se. Although the studies presented in the e-government literature clearly acknowledge that a core goal for governments in delivering EGSs is the provision of more convenience and increased efficiency to citizens by saving them time, effort and cost, those Tangible Benefits were not sufficiently and explicitly explored as an attribute in its own right in the proposed models as an indication of an EGS success, or as a determinant of User satisfaction.

Generally, the limitation in understanding the broadness of IT utilization, such as that of an EGS, and its impact in the current time, hinders the prediction of the future ([Misuraca 2009](#)). So, in the e-government context, the lack of a clear evaluation of individuals' adoption of an EGS and its benefits, including quantification of the Tangible Benefits that are subsequently realized, will consequently limit the knowledge of its impact and the actual benefits ([Misuraca 2009](#)).

To our best knowledge and to date, it appears that there is lack of studies that propose and quantitatively validate models that explicitly use of both attributes (psychological and tangible benefits) simultaneously as success measures, reflecting the citizens' overall obtained benefits from using an EGS. Table 1 shows a summary of the constructs investigated in the citizen-centric studies in e-government literature. In this table we name the constructs that we propose to be incorporated in the assessment model, and classify the studies in terms of constructs explored.

Table 1: Investigated attributes in the citizen-centric studies in the literature		
Suggested attributes	Attributes used	Studies in which they were used
A- System attribute B- Individual attributes (Trust & PU) C- Behavioral intention D- Use behavior E- Satisfaction F- Tangible Benefits	A & C	(Wangpipatwong <i>et al.</i> 2009)
	A & E	(Mohamed <i>et al.</i> 2009)
	A & C & E	(Sung <i>et al.</i> 2009)
	A & B & C	(Tan <i>et al.</i> 2008; Alsaghier <i>et al.</i> 2009)
	A & B & C & D	(Hamner and Qazi 2009)
	A & C & D & E	(Verdegem and Verleye 2009)
	A & B & C & E	(Teo <i>et al.</i> 2008)
	B & C	(Carter and Belanger 2004; Fu <i>et al.</i> 2006; Hung <i>et al.</i> 2006; Horst <i>et al.</i> 2007; Bélanger and Carter 2008; Wangpipatwong <i>et al.</i> 2008; Lean <i>et al.</i> 2009)
	B & C & D	(AlAwadhi and Morris 2008; van Dijk <i>et al.</i> 2008; Hamner and Al-Qahtani 2009; Mahadeo 2009)
	A & D & F	(Wangpipatwong <i>et al.</i> 2005)
	A & D & E & F	(Wang and Liao 2008)
	A & B & D & E	(Kumar <i>et al.</i> 2007; Bwalya 2009)
	A & E & F	(Prybutok <i>et al.</i> 2008)
	B & E & F	(Chae-Eon <i>et al.</i> 2009)
	A & total quality	(Barnes and Vidgen 2003; Gil-Garcia 2006)
	A & F	(Kolsaker and Lee-Kelley 2008)

As presented in Table 1, it appears that there is a lack of studies in the e-government domain that provide a citizen-centric model that incorporates and validates all the suggested attributes. There is no sufficient assessment tool that governments can use to assess whether an EGS offers ‘good quality’ service and system performance such that it increases citizens’ efficiency when performing their tasks.

In the context of this study, an ‘assessment tool’ refers to:

*An approach or method used to collect information to understand a certain topic based on some concepts built in a model with a particular way of interrelation. That is, the application of the model and the measurement criteria of the instrument which is based on that model serve as an assessment tool. So, it is not exclusive to the process in which the data of each attribute is collected, but also the application of the model which shows the way those attributes are interrelated is important to fully statistically analyze, assess and understand a particular phenomenon.*

In the few studies that did incorporate the concept of Tangible Benefits, the available studies either:

- focused on a perspective different to the one in this research, for example, identifying benchmarks and specific criteria that should exist to obtain a successful e-government initiative from the citizens' perspective (Park 2008) but not evaluating that success; or,
- had methodological issues that made them open to criticism, for example:
  - lack of depth in the evaluation criteria (e.g., Wang and Liao 2008; Alshawhi and Alalwany 2009)
  - redundancies due to similar concepts in multiple variables (e.g., Wang and Liao 2008; Alshawhi and Alalwany 2009)
  - lack of clarity of the proposed evaluation criteria in the EGS success assessment model (e.g., Wang *et al.* 2005),
  - missing variables (i.e., service quality) which are considered to be important aspects in WIS context (e.g., Wang *et al.* 2005; Park 2008; Alshawhi and Alalwany 2009).

## ***1.6 Contribution & Significance***

Upon addressing the questions “what does this research add to the literature, what makes it worthwhile, or who cares about it” (Whetten 1989; Straub 2009b; Straub 2009a), we argue that this study fills an important gap that exists in the e-government literature, with the findings useful for both researchers and EGS assessors.

This study presents a detailed theoretical discussion to synthesize the literature and provide a macro-level view. It provides a comprehensive explanation of the e-government success literature in terms of what citizens obtain when using an EGS, especially when these outcomes reflect the degree to which citizens have achieved their goal from using the system. It also helps in understanding the concept of success and its relationships with the other determining factors in an online ‘voluntary individual use’ environment in general and in the e-government context in particular. In addition, this study develops a comprehensive model that was influenced by the DeLone and McLean (2003) IS success model with the addition of the Perceived Usefulness attribute from the

Technology Acceptance Model (TAM) and the incorporation of trust (as additional determining factors) while emphasizing the incorporation of the Tangible Benefits as a dependent variable which was lacking in the e-government literature. Although these constructs and similar models have been tested in the other contexts (mostly in e-commerce), there is a need to develop and test a model that can be used in the e-government context.

As explained earlier, we propose that the theory behind measuring the success of a particular online system is different in the e-commerce context compared to the e-government. The Tangible Benefits construct in this study is regarded as being the most influential concept that promotes EGS adoption and leads to Satisfaction. Most importantly, it is the most essential measure to directly evaluate citizens' benefits obtained from using an EGS. For that reason, we accentuate the significance of assessing the citizens' perspective of their obtained Tangible Benefits from using an EGS as opposed to focusing on the User Satisfaction or System Use as measures, as in other e-government studies adopting from the e-commerce context. Therefore, the most prominent contribution of this research is the operationalization of the success measure used in the e-government context and the addition of the Tangible Benefits attribute, which needs to be used in conjunction with the psychological attribute of User Satisfaction.

Moreover, the methodology was given careful attention to reduce any potential flaws or bias to the collected data while the validation process was carried out rigorously to confirm the results and reach a better understanding of the relationships among the various constructs.

The proposed model, together with its measurement instrument, will act as an assessment tool to identify whether a government fulfilled its goals in providing a 'good quality', effective EGS. The model, once statistically evaluated with collected data, will be useful for identifying the significant attributes that should be investigated and used to assess an EGS success from the citizens' perspective and estimate the level of importance of each of the constructs used for evaluation. The model will also help in evaluating the importance of each attribute from the perspective of citizens as users, to understand how

each attribute can influence them in terms of their adoption of an EGS and their obtained benefits. Evaluating the importance of each attribute also aids in understanding the areas of weaknesses or advantages and focusing on them for improvement, development or maintenance.

## ***1.7 Conclusion***

A comprehensive review of the published research concerned with evaluating EGSs from the citizens' perspective shows that, despite the arguments that EGSs save citizens' time and effort, there is lack of research that explicitly incorporates and studies the benefits obtained by citizens'; particularly, there is little research on the tangible benefits for citizens – (see Sections (1.2) and (2.2.5) for further details). Most of the proposed models are adapted from the e-commerce context, in which the operationalization of the success measure is based using User Satisfaction (US), Use, or even Intention to Use a WIS. Our research argues that, in the e-government context, these measures are not sufficient for determining an EGS success. Instead, our research argues that it is more appropriate for the success measure to be operationalized based on the obtained Tangible Benefits, in association with other commonly used success measures.

It is important to assess the citizens' perspective of their obtained Tangible Benefits from using an EGS, as an indicator of EGS success. By doing so, this research contributes to the body of research by filling this gap. This is achieved with the introduction and validation of a conceptual model that explicitly evaluates the obtained Tangible Benefits from the citizens' perspective, in conjunction with the commonly used success measures (i.e., Use and User Satisfaction), in the context of e-government. This model will, consequently, provide a more holistic view of the success level. The model, along with its measurement criteria, can be used as an approach to assess EGS success from the citizens' perspective, in terms of their perception of its quality and the benefits the citizens subsequently obtain from its use.

This chapter has introduced the notion of e-government and explained the aim of this study: to develop and validate a model that can be used to assess an EGS from the citizens' perspective and their psychological and tangible obtained benefits. A justification for the research was presented based on a brief synthesis of the literature,



which identified the existing gap. Thereafter, the research aims and objectives were listed, and the significance of this research was highlighted. The next chapter presents and discusses the literature that underpins this study; from this, the proposed model is developed. Chapter 3 presents the research approach and methodology. Chapter 4 presents the results and related discussion. Finally, the conclusion and limitations of the study are presented in Chapter 5.

## **2 LITERATURE REVIEW**

### **2.1 Introduction**

The previous chapter presented the focus of this study and noted that this research only deals with the effectiveness and quality of e-government systems (EGS) from the citizens' perspective. The research question was introduced and accordingly the research aim was presented, followed by a clarification of the gap in the literature. Based on the existing gap, the following research objectives were stated:

- 1- Develop a conceptual citizen-centric model of EGS assessment, incorporating the following constructs, to show how the quality of the EGS used influences the benefits obtained by citizen-users:
  - 1- the system attributes,
  - 2- the factors that influence citizens' use, and
  - 3- the citizens' psychological and tangible benefits
- 2- Develop a measurement instrument that can be used to collect the data and to validate the proposed conceptual citizen-centric model of EGS assessment.
- 3- Quantitatively validate the proposed conceptual citizen-centric model of EGS assessment.

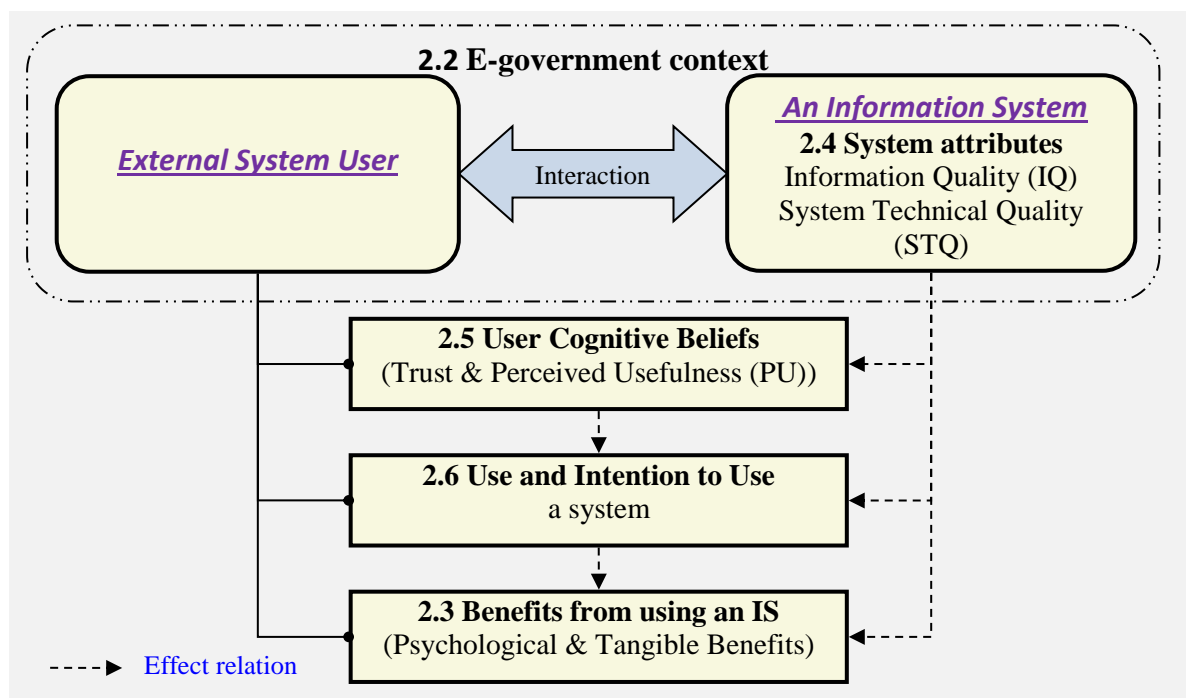
To fulfill the first objective, some factors need to be considered, including:

- The context for which this model is constructed, i.e., the e-government domain.
- The goals or anticipated benefits for introducing an EGS as a service channel to interact with the external-users, i.e., citizens.
- The possible antecedents that may determine the attainment of the anticipated benefits.
- The system attributes that influence users' perceptions of the overall system effectiveness and quality.
- The attributes that influence users' use or intention to use an online system.

Accordingly, multiple areas of the literature need to be reviewed including Information Systems (IS), Marketing and e-Commerce, Psychology, and Management and Business Administration, in order to identify and define the different attributes to be included in the proposed model. This chapter will present and discuss the literature that is deemed to

be important to develop the conceptual model. However, given the complexity of this study where there are several inter-related areas are being discussed in the literature review and where the model is later developed, this tends to make this chapter lengthy in nature. To reduce any possible confusion, this chapter can be considered as two main streams. The first focuses mainly on the literature review and the necessary background of the e-government related topics, and evaluation which is presented in Section (2.2). The second part focuses on the relevant literature on the model attributes from which the hypotheses are extracted and the proposed conceptual model is developed, and is covered in Section (2.3) to (2.6). These four sections include a presentation of the common antecedents and/or dependent variables in the relevant models and the definitions associated with the relevant attributes as constructs. While the literature review is analyzed, the hypotheses are presented following each related topic.

Figure 2-1 shows the conceptual framework for this chapter including the main concepts and their interrelations.



**Figure 2-1: Chapter 2 Conceptual Framework**

Section (2.2) discusses E-government (EG) and E-government Systems (EGS). It presents the e-government background, its definitions, the available e-government

citizen-centric literature, and a critical analysis of current evaluation approaches and their shortcomings.

Section (2.3) presents the notion of users' obtained benefits, psychological (User Satisfaction (US)) and tangible. This includes the relevant literature and theories of US, approaches for measuring US and its relation with IS success evaluation approaches, and the perspectives of US in the external-users context.

Section (2.4) discusses the most commonly used system attributes in the literature, namely, Information Quality (IQ), System Technical Quality (STQ), and Service Quality (SQ). Also, this section explains the concept of overall system performance quality and effectiveness as perceived by users (Perceived overall System Performance Quality-POSQ) and how they are affected by these system attributes.

Section (2.5) discusses the individual attributes of cognitive beliefs, namely, Trust (T) and Perceived Usefulness (PU), while Section (2.6) discusses external-users' behavior and behavioral intention to use a system.

Finally, Section (2.7) presents the final taxonomy of conceptual model based on the literature.

## ***2.2 E-Government (EG) and E-Government Systems (EGS)***

### **2.2.1 Definition and Background of EG and EGS**

ICT utilization in government work is not a recent phenomenon and governments have been using technology, such as computers, networks, e-mails and file transfer, for the past few decades (Yildiz 2007). This digital dependency<sup>5</sup> has gradually increased over time to the extent that governments have become highly dependent on technology in nearly all their work and interactions with their different stakeholders.

With the spread of the Internet as a means of communication, online users have increasingly been demanding more customized, rapid, and "at home services" (Torres *et*

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<sup>5</sup> Refers to the level to which governments use and depend on technology

*al.* 2005; Wang and Liao 2008; Pina *et al.* 2010). Thus, governments needed to consider the demand for providing faster, better, and cheaper services run through the Internet (Gupta and Jana 2003; Pina *et al.* 2010; Cordella and Bonina 2012). Utilizing an advanced form of ICT to achieve the different business processes and serving the different stakeholders, particularly the public (i.e., citizens, residents, and businesses), is generally referred to as electronic government or e-government (Hernon *et al.* 2002; Jaeger 2003). So, in response to this demand and to keep up with the global advancement of technology, and because of the significant potential benefits, governments worldwide increasingly undertook e-government initiatives (Azab *et al.* 2009).

They started to introduce online, web-based services (e-services) to support their activities, to improve their interaction with the public, and to enhance their responsiveness, efficiency, and transparency (Carter and Belanger 2005; Conklin 2007; Kumar *et al.* 2007; Wangpipatwong *et al.* 2008). With the introduction of e-government services, citizens, as users of public services were anticipating similar levels of high-quality responsiveness and services from their governments as those they receive from the private sector (Hazlett and Hill 2003; Torres *et al.* 2005; Pina *et al.* 2010). They also expect integration across government agencies (Hazlett and Hill 2003).

In this study, the concept of an EGS is mostly concerned with the government's use of IS artifacts (websites, networks, databases) to interact with the different stakeholders, as well as the human participants (employees) who are responsible for completing any required business processes, maintaining the system, and keeping it updated.

The term e-government has been defined in many different ways (Jaeger 2003; Yildiz 2007; Verdegem and Verleye 2009) and has had various synonyms used in academic papers and in informal common language. The term was generally used to refer to a technology-based service channel (Jaeger 2003), while the technical aspect of it involves databases, discussion support, multimedia, tracking and tracing, personal identification technologies, automated machines for personal inquiry and payment, and networking (e.g., the Internet, mobile networks) (Jaeger 2003; Yildiz 2007).

On the other hand, when e-government is discussed from the external-users' perspective, it is usually considered to be a service delivery channel based on ICT, most often the Web. The concept of e-government was sometimes referred to as a 'public online service channel', a 'web-based service channel', or a 'public e-service channel'.

Formal definitions of e-government may differ from one country to another, may be influenced by particular government objectives or priorities (Verdegem and Verleye 2009), or may depend on the various contexts in which e-government was discussed. However, a generic definition for e-government could be 'an Internetworked government that relies on adopting ICT to reach several objectives and benefits from different perspectives'. For example, a government sets certain objectives based on what it anticipates from implementing an EGS and endeavors to achieve these objectives.

Different researchers also have different perspectives on e-government, leading them to define e-government according to the scope of their research (Jaeger 2003). The different definitions of e-government may also be influenced by the "regulatory environment, the dominance of a group of actors in a given situation, and the different priorities in government strategies" (Yildiz 2007, p.654). For example, some authors discuss e-government in terms of being an e-service delivery channel, a system, or an ICT enabled government, while others discuss it in relation to e-governance<sup>i</sup>, e-democracy, etc. Helbig *et. al.* (2009) suggest that there are several synonyms<sup>6</sup> for e-government such as e-democracy, digital government, and e-governance. The diversity of e-government concepts around the world makes it difficult to uniquely define e-government.

Table 2 provides some examples of e-government definitions, showing how different researchers define e-government from different perspectives and processes.

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<sup>6</sup> For the sake of consistency, the expression of e-government system (EGS) will be used throughout this study, regardless of what the terms or synonyms were used by other authors.

Table 2: E-government definitions	
Author/s	The notion of e-government reflects
Tapscott (1996) <sup>7</sup>	An inter-networked government.
Sprecher (2000)	Any way in which technology is used to help simplify and automate transactions between governments and citizens, businesses, or other governments.
Wimmer and Traunmuller (2000) <sup>8</sup>	A guiding vision towards modern administration and democracy which is concerned with the transformation that government and public administration have to undergo in the next decades.
Aichholzer and Schmutzer (2000) <sup>9</sup>	The changes of governance in a two-fold manner: (1) Transformation of the business of governance, i.e. improving service quality delivery, reducing costs and renewing administrative processes. (2) Transformation of governance itself, i.e., re-examining the functioning of democratic practices.
Whitson and Davis (2001)	Implementing cost-effective models for citizens, industry, federal employees, and other stakeholders to conduct business transactions online. The concept integrates strategy, process, organization, and technology.
Kaylor <i>et al.</i> (2001)	The ability for citizens to communicate and/or interact with the city via the Internet in any more sophisticated way than a simple email letter to the generic city (or Webmaster) or e-mail address provided at the site.
Layne & Lee (2001)	Government's use of technology, particularly web-based Internet applications to enhance the access to and delivery of government information and services to citizens, business partners, employees, other agencies and government entities. It has the potential to help build better relationships between the government and the public by making interaction with citizens smoother, easier, and more efficient. Government agencies report using "electronic commerce" to improve core business operations and to deliver information and services faster, cheaper and to wider groups of customers.
Ho (2002)	The use of ICT, in particular the Internet, to encourage transformation from the traditional bureaucratic paradigm, which emphasizes standardization, departmentalization, and operational cost-efficiency, to the e-government paradigm, which emphasizes coordinated network building, external collaboration, and customer services.
United Nations & American Society of Public Administration (2002) <sup>10</sup>	Use the Internet and the World Wide Web for delivering government information and services to citizens.
Moon (2004)	The use of the Internet and other information technologies. This includes making information available to the public on websites, improving communication between government agencies, and allowing people and businesses to conduct government business on-line, such as filing taxes, requesting a form, making a transaction, or receiving a service.

<sup>7</sup> Cited in (Sharifi and Zarei 2004)

<sup>8</sup> Cited in (Devadoss *et al.* 2002)

<sup>9</sup> Cited in (Devadoss *et al.* 2002) & (Kim *et al.* 2007)

<sup>10</sup> Cited in (Torres *et al.* 2005) and (Yildiz 2007)

(Continued)

Table 2: E-government definitions	
Author/s	The notion of e-government reflects
Akman et al. (2005)	The use of technology, particularly the Internet, to deliver services to citizens, businesses and other entities
Evans, and Yen (2005)	The communication between the government and its citizens via computers and a Web-enabled presence.
Lau <i>et al.</i> (2008)	The process of connecting citizens digitally to their government in order that they might access information and services offered by government agencies. Nations have traditionally relied on telephone networks to fulfill similar telecommunication functions
Wang and Liao (2008)	The use of ICT, particularly Web-based Internet applications, to enhance the access to and delivery of government information and service to citizens, business partners, employees, and other agencies and entities.
Luk (2009)	The use of information and communication technology (ICT), in particular, the Internet and web-based technologies, by the government to deliver information and services; it is considered to be critical to the governments' progress.
United Nations E-Government Survey (2010)	Motley and eclectic variety of front-office and back-office operations that happen to be carried out by government and that has in places become properly systemic.

A general view on what e-government refers to includes being an Internetnetworked government that utilizes ICT to conduct its work, store digitized information, provide an easy way to find and retrieve information, interact with various stakeholders and provide diverse types of services that meet their needs, particularly the public.

Generally, in the early stages of e-government development, the definition of e-government mostly focused on its technical aspects in terms of utilizing ICT as means of interaction, such as networks, databases, and the Internet. However, more recent definitions focused on the strategic value of adopting EGS (e.g., increased efficiency and effectiveness). Hence, the concepts and definitions of e-government mostly fall into two groups (Torres *et al.* 2005):

- 1- E-government is focused on using the Internet (online service delivery channel) and other Internet-based activity.
- 2- E-government is focused on the ability to transform public administration (to be more effective and efficient) through the use of ICT

Despite the fact that the term e-government means electronic government, which covers any type of ICT such as WIS, mobile networks, etc., it is commonly applied to Internet or



Web-based interaction only. Until recently, the vast majority of studies emphasized the online service channel (i.e., the Internet) rather than including other types of ICT, such as mobile networks, which could also facilitate services providing. The reason why earlier studies focused on the use of the Internet might have been due to the broad range of advantages, e-services, and the amount of information provided via the Web. For example, through the Internet, it was possible to inquire about a wide range of personal information and status, view information related to policies, regulations, and legislation, download forms, conduct various transactional and payment services, lodge a request for a service. These advantages, altogether, produce a wider range of services and benefits to all stakeholders as compared to the services initially provided via, for instance, mobile GSM networks.

It is noteworthy though, that unlike GSM networks which offered limited and simple services to citizens through the “SMS” service, recent, more advanced mobile phones, which are referred to as smart phones, provide another access channel to government services through mobile Internet which has similar characteristics to the Internet websites accessed via computers. Hence, researchers, such as (Vance *et al.* 2008; Chung and Kwon 2009; Venkatesh *et al.* 2012), started studying the phenomenon of using mobile Internet and related it to other IS related concepts such as user technology acceptance, satisfaction, and trust. Recently, more focus is being put on studying and assessing e-government which is accessed through the new versions of smart phones, in the context of m-government which is an extension of e-government (Misuraca 2009; Hung *et al.* 2013). For the purpose of this study, this new access channel could be considered to be part of e-government.

In addition to the previously mentioned ICT-based means of interaction between the government and its citizens, “distributed service centers” (DSC) could also be considered as an interaction channel that relies on ICT. The term DSC refers to the government service centers where government employees provide specific services using internetworked databases to serve citizens in distributed, multipurpose, and nearby service centers. Although a DSC is not an IT artifact that users can actually exploit to interact with the government, it still reflects a positive aspect of the government deploying ICT to provide better services and benefits to citizens. These DSCs are

connected in a unified network and share a single database that stores citizens' personal information. Having digitized and centralized all information in a shared database makes information retrieval easier and much more efficient. Consequently, citizens can go to any nearby service center instead of going to the government agency in a specific location, which may be far away. Moreover, these DSCs may also have a positive impact on minimizing the workload and long queues that result from visitors in one location. This is also very important when citizens attempt to inquire offline (e.g., by telephone, helpdesk) (Verdegem and Verleye 2009).

DSCs are particularly important for those people who are unable to access or use ICT for any reason. This phenomenon is referred to as the digital divide<sup>11</sup>. The existence of a digital divide hinders the use of EGS and is a challenge that a government needs to deal with (Akman *et al.* 2005; Reddick 2005; Pieterse *et al.* 2007; Bertot and Jaeger 2008; van Dijk *et al.* 2008; Al Naji and Hamdan 2009; Verdegem and Verleye 2009). Accordingly, governments need to consider an alternative way to facilitate another interaction channel to engage with the groups of people who lack access or competency to utilize the digital means of interaction with the government (Gupta and Jana 2003; Verdegem and Verleye 2009).

Although the e-government online service channel cannot completely replace the offline (traditional) channel, it still offers some advantages that cannot be replicated or are not available in the traditional channel, such as 24/7 access, independent search capacity, and task or semi-task completion (Torres *et al.* 2005). The services provided via this online channel (e-services) could include renewal of a license or an ID; tracking the progress of an inquiry or a passport renewal; payment of fees, infringements, or taxes. The introduction of an online channel, which provides a range of services 24/7 which support or which may even be an alternative to the traditional channel in some cases, is considered a major improvement in a government performance and effectiveness (Torres *et al.* 2005). Due to the nature and characteristics of an online channel, an EGS would theoretically provide advantages that cannot possibly be obtained through an offline channel (Torres *et al.* 2005).

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<sup>11</sup> The digital divide will be further explained in Section (2.2.2.2)

Because adopting e-government initiatives has broad and significant social, economical, and political implications, and because governments aim to realize certain benefits, researchers, academics, and government professionals are increasingly investigating this phenomenon<sup>12</sup>. In fact, many researchers from disciplines such as political science, management and administrative sciences, economics, IS, marketing, computer science, etc. are exploring the different attributes, significance, and implication of EGS implementation (Gil-Garcia and Martinez-Moyano 2007; Heeks and Bailur 2007; Groznik *et al.* 2008).

A number of researchers have categorized e-government based on the stakeholders involved. Common categories include: government to government (G2G) which refers to the interaction between governments and other governments or between government agencies; government to citizens (G2C) which refers to the services provided from government to citizens; and government to business (G2B) which refers to the services provided from government to business entities in the private sector (Jaeger 2003; Akman *et al.* 2005; Torres *et al.* 2005; Evans and Yen 2006; Wang and Liao 2008; Al Nagi and Hamdan 2009; Luk 2009). In addition, some scholars also included government to employees (G2E) which refers to the services provided from government to employees while employing an EGS to facilitate interaction and information retrieval and exchange (Al Nagi and Hamdan 2009; Luk 2009).

The e-government literature has become a broad domain in its own right, covering a diverse and increasing range of topics including:

- Investigating the required resources and strategic planning so that the prospective e-government initiative can succeed;
- Studying the political implications, such as government transparency;
- Studying the economic benefits;
- Understanding the aspects related to strategic management;
- Studying the re-engineering of business processes;

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<sup>12</sup> The “phenomenon” refers to the adoption of e-government initiatives through the high dependency on the digitized information, interrelated networks and ICT to interact with stakeholders and perform all work and processes.

- Exploring the system requirements in order to provide good quality service and performance;
- Discussing the integration of government agencies and information sharing;
- Understanding the social factors (e.g., employees' resistance vs. acceptance, employees training).

Moreover, many researchers seek to understand what governments should or can do to maximize the benefits which may result from implementing an EGS, as well as understanding the factors that determine a user's behavioral intention to use an EGS. Some researchers have focused on understanding the determinants of users' adoption of EGS, studying the factors that encourage system adoption or enhance users' performance (i.e., for employees and government agencies), see for example, (Koh *et al.* 2008; Hamner and Qazi 2009; Hung *et al.* 2009; Jaeger and Matteson 2009). The majority of research has focused on the factors determining the use behavior of an EGS, particularly for citizens, see for example, (Hazlett and Hill 2003; Carter and Belanger 2005; Fu *et al.* 2006; Hung *et al.* 2006; Horst *et al.* 2007; Kumar *et al.* 2007; AlAwadhi and Morris 2008; Cenfetelli *et al.* 2008; Tan *et al.* 2008; van Dijk *et al.* 2008; Wangpipatwong *et al.* 2008; Hamner and Qazi 2009; Hung *et al.* 2009; Lean *et al.* 2009; Mahadeo 2009; Sung *et al.* 2009). Over time, an increasing number of topics are being introduced into the e-government literature.

Table 3 presents examples of common topics found in the e-government literature along with examples of references.

Table 3: Examples of different topics & studies presented in e-government literature	
Topic	studies
1 Assessing e-government readiness.	(UN 2005; Picci 2006; Zaied A N H 2007; Koh <i>et al.</i> 2008; Azab <i>et al.</i> 2009; Yuan <i>et al.</i> 2012)
2 E-government evaluation:	
<ul style="list-style-type: none"> <li>* Internally <ul style="list-style-type: none"> <li>- Economic impact/cost-benefit (Gupta and Jana 2003; Steyaert 2004; Picci 2006)</li> <li>- Intangible benefits (Gupta and Jana 2003; Prybutok <i>et al.</i> 2008)</li> <li>- General evaluation issues (Irani <i>et al.</i> 2006; Jones <i>et al.</i> 2007; Alshawi and Alalwany 2009; Luarn and Huang 2009)</li> </ul> </li> <li>* Externally (from citizens' perspective) (Ancarani 2005; Wang <i>et al.</i> 2005; Wang and Liao 2008)</li> <li>* In a specific context (e.g., accessibility) (Abanumy <i>et al.</i> 2005; Kuzma 2010)</li> </ul>	
3 Exploring factors impacting on the success of:	
<ul style="list-style-type: none"> <li>* E-government projects in general (Gil-García and Pardo 2005; Luk 2009)</li> <li>* E-government websites (Gil-Garcia 2006; Kumar <i>et al.</i> 2007; Teo <i>et al.</i> 2008; Wang and Liao 2008)</li> </ul>	
4 Measuring User Satisfaction with e-government, from the perspective of:	
<ul style="list-style-type: none"> <li>* External-users (Kumar <i>et al.</i> 2007; Teo <i>et al.</i> 2008; Wang and Liao 2008; Chae-Eon <i>et al.</i> 2009; Verdegem and Verleye 2009; Xiaohong <i>et al.</i> 2009)</li> <li>* Internal-users (Mohamed <i>et al.</i> 2009)</li> </ul>	
5 Investigating e-government use and acceptance:	
<ul style="list-style-type: none"> <li>* Internally (employees/public servants/ bureaucrats) (Koh <i>et al.</i> 2008; Hung <i>et al.</i> 2009; Jaeger and Matteson 2009)</li> <li>* Externally (public sector), where the determinants of use are: <ul style="list-style-type: none"> <li>- Individual/demographic attributes (AlAwadhi and Morris 2008; Wangpipatwong <i>et al.</i> 2008)</li> <li>- System attributes (Teo <i>et al.</i> 2008; Wangpipatwong <i>et al.</i> 2009)</li> <li>- Both attributes (Hong <i>et al.</i> 2001; van Dijk <i>et al.</i> 2008; Hamner and Al-Qahtani 2009; Luarn and Huang 2009)</li> </ul> </li> </ul>	
6 Challenges/Barriers to e-government implementation or adoption:	
<ul style="list-style-type: none"> <li>* In general (Ho 2002; Jaeger 2003; Jaeger and Thompson 2004)</li> <li>* In a specific context (e.g., delivering high quality services and inducing citizens/bureaucrats use of EGS) (Roberts 2002; Hazlett and Hill 2003; Bertot and Jaeger 2006; Conklin 2007; Schwester 2009)</li> </ul>	

(Continued)

Table 3: Examples of different topics & studies presented in e-government literature	
Topic	studies
7 Discussing the digital divide in the e-government context.	(Belanger and Carter 2006)
8 Discussing trust and government/e-government perceived trustworthiness:	
* Security and privacy issues	(Teo <i>et al.</i> 2008; Beldad <i>et al.</i> 2009; Zhao and Zhao)
* Operational competency	(Teo <i>et al.</i> 2008)
9 Discussing e-government implementation including stages, development, and evolution.	(Layne and Lee 2001; Sharifi and Zarei 2004; Alessandro 2005; Torres <i>et al.</i> 2005; Jaeger and Matteson 2009; Press 2009)
10 Reengineering/modeling business process in the e-government context	(Ho 2002; Janice and Greg 2003; Groznik <i>et al.</i> 2008; Chourabi <i>et al.</i> 2009)
11 Social values from using e-government	(Grimsley and Meehan 2008)
12 Exploring the government's internal attributes related to e-government	(Eschenfelder 2004)
13 Political attributes of EGS, such as e-voting, e-democracy <sup>13</sup> :	(Shackleton <i>et al.</i> 2004; Backhouse 2007; Helbig <i>et al.</i> 2009; Zissis <i>et al.</i> 2009)
14 Discussing transparency as a consequence of e-government adoption and its impact on citizens-government relationship	
* Political focus	(Cho and Choi 2004; Relly and Sabharwal 2009; Bertot <i>et al.</i> 2010; Pina <i>et al.</i> 2010)
* Focus on trust	(Welch and Hinnant 2002; Nicolaou and McKnight 2006; Grimmelikhuijsen 2009)

## 2.2.2 EGS Benefits

According to Hazlett and Hill (2003), modernizing the government, in general, revolves around three main goals which are seen as long-term program improvements but do provide immediate reforms and benefits. The goals are:

- 1- Ensuring that policy making is more aligned and strategic,
- 2- Making sure that public service users, not providers, are the focus, by matching services more closely to peoples' lives, and
- 3- Delivering public services that are high-quality and efficient.

Only the second and third of these goals are relevant to the current research.

<sup>13</sup> E-democracy is defined as the electronic representation of the democratic processes, and is divided into three sub-process which are: 1- information acquisition, 2- formation of an opinion (i.e., e-participation), and 3- making decisions (through e-voting process) (Zissis *et al.* 2009).

With the continuing advancement of ICT, adopting EGSs was the only way to achieve such goals ([Hazlett and Hill 2003](#); [Cordella and Bonina 2012](#)). Therefore, EGSs were increasingly implemented worldwide due to their significant potential benefits from both an internal organization perspective (i.e., government employees, government agencies, and the government as a whole), and an external perspective (i.e., the public) ([Wangpipatwong et al. 2005](#)). Governments adopting EGS consider these potential benefits as objectives they are endeavoring to achieve.

Based on the potential benefits, which will be elaborated on in the next two sections, the core objectives for implementing an EGS correspond to what could be described as:

- 1- An internal perspective, which is focused on enhancing the government's efficiency and effectiveness by having less paperwork, fewer errors and delays in completing online job requests, see for example, ([Akman et al. 2005](#); [Cordella and Bonina 2012](#)); and less the government's costs ([Wangpipatwong et al. 2005](#); [Cordella and Bonina 2012](#)).
- 2- An external perspective, which is focused on providing citizens and other stakeholders with an online means of communication to conduct their required tasks and find the information they need in order to save them time and effort, see for example, ([Akman et al. 2005](#)).

Generally, the “benefits from e-government initiatives are described as both modifications to current organizational structures and processes, as well as specific organizational outcomes such as improved service quality or increased policy effectiveness” ([Gil-Garcia 2006, p.2](#)). However, in order to be able to obtain the potential benefits, EGS must be successfully implemented and then used correctly and repeatedly by the different stakeholders, such as citizens, residents, businesses in the private sector, and government employees.

Sections (2.2.2.1) and (2.2.2.2) will discuss in more detail the benefits associated with the internal and external perspectives, respectively.

### ***2.2.2.1 EGS Benefits: Internal (Government-Oriented) Perspective***

As mentioned earlier, an EGS is based on interconnected databases, where all information is securely saved and shared among relevant government agencies. From the internal governmental perspective, the adoption of EGSs is regarded to be very beneficial in many ways. Generally, governments implement EGS to increase their overall efficiency and effectiveness and to improve data performance (Moon and Welch 2004; Abanumy *et al.* 2005; Akman *et al.* 2005; Ancarani 2005; Wang *et al.* 2005; Kumar *et al.* 2007; Yildiz 2007; Groznik *et al.* 2008; Luk 2009). The improved efficiency of performance, particularly where government-citizen interaction is concerned, can be sensed or experienced by the public.

Efficiency reflects an inner view of the organization's output, by doing the right thing in the right way (Alter 2002), i.e., considering the amount and quality of input resources versus the quality and amount of output. For example, improving quality of the tasks performed while minimizing the resources used, such as employees, time, paperwork, will indicate an improvement in the government's efficiency. On the other hand, effectiveness is perceived as an external view of having done the right thing, regardless of how it was accomplished (Alter 2002). Thus, citizens, as external viewers of the services, would "perceive" an EGS as effective when their needed tasks are completed, efficiently.

The improvement of efficiency, effectiveness, and performance occurs with attainment of several benefits. For example, the adoption of EGS expected to reduce government costs through less paperwork and administrative costs which in turn lead to more cost-effective services delivery (Sprecher 2000; Jaeger 2003; Akman *et al.* 2005; Ancarani 2005; Wang *et al.* 2005; Wangpipatwong *et al.* 2005; Gil-Garcia 2006; Kumar *et al.* 2007; Groznik *et al.* 2008; Wangpipatwong *et al.* 2008; Al Nagi and Hamdan 2009; Jaeger and Matteson 2009; Luk 2009).

It is also expected that the enhanced effectiveness of managerial decision making at various levels of management, due to the existence of EGS, would aid in the administration reform (Sharifi and Zarei 2004; Gil-Garcia 2006; Yildiz 2007).



In addition, the adoption of EGSs will subsequently transform government structures and improve the quality of government services provided by government agencies. That is because the availability of EGS that is based on massive interconnected databases facilitates interoperability and information sharing caused by the integration of government agencies (Sharifi and Zarei 2004; Akman *et al.* 2005; Torres *et al.* 2005; Gil-Garcia 2006; Al Nagi and Hamdan 2009). This will consequently lead to reduced redundancy (Jaeger 2003).

Moreover, EGS adoption aid in enhancing the working environment for government employees through being able to quickly and easily store, retrieve, modify, and track information with less error rates, reflecting an increased employee efficiency (Gupta and Jana 2003; Jaeger 2003; Akman *et al.* 2005; Wang *et al.* 2005; Groznik *et al.* 2008). EGSs, also, aid in improving governments activities, processes, and outputs while reducing input resources, such as effort, costs, manpower, etc. (Gupta and Jana 2003; Jaeger 2003; Abanumy *et al.* 2005; Gil-Garcia 2006; Groznik *et al.* 2008; Al Nagi and Hamdan 2009; Jaeger and Matteson 2009; Luk 2009; Karunasena and Deng 2012). Furthermore, as citizen-users and other stakeholders participate in transferring information and checking the accuracy of their stored information, the information in the databases will also be accurately preserved. This might also lead to fewer errors, less task repetition and paperwork; hence, reducing the number of government employees needed.

Additionally, citizens' adoption of EGSs will help reduce the pressure on the traditional face-to-face channel. This is especially true if the EGS was perceived by citizens to be of good-quality and they are encouraged to use it. This would, hypothetically, reduce the number of customers visiting government agencies and would consequently support the front-line service channel by changing the nature of that face-to-face interaction. As a result, "employees"<sup>14</sup> involvement in services will shift from routine, low-value tasks to high-value, and personal oriented consultancy on important issues, problems, or desires"

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<sup>14</sup> A government employee or a public employee in the face-to-face channel is also referred as "street-level bureaucrats" defined by Lipsky (1969). Street-level bureaucrats can be defined as those individuals who, in their face-to-face encounters with citizens, "represent" the government to the people. They are those public service employees whose work is characterized by interacting constantly with citizens in the regular course of their job. Although they work within a bureaucratic structure, their independence on the job is fairly extensive. Though independence in making decisions is limited and controlled, the independence in job performance is not as limited or controlled. Thus, their attitude and general approach toward their clients may affect the clients significantly. In other words, the potential impact on citizens with whom they deal is fairly extensive (Lipsky 1969).

(Voss 2000). Consequently, citizens' adoption of an EGS would potentially contribute to providing better and more personalized services to the visiting citizens (Voss 2000; Reddick 2005; Wang *et al.* 2005). This would also contribute to the reduction of government's costs through the reduction of the administrative and managerial costs (Wang *et al.* 2005; Wangpipatwong *et al.* 2005; Wangpipatwong *et al.* 2008). In essence, citizens' adoption of an EGS is a prerequisite to any benefit to them as users, to the government itself, as well as to the citizen visitors of the traditional face-to-face channel.

#### ***2.2.2.2 EGS Benefits: External (Citizen-Oriented) Perspective***

According to Torres *et al.* (2005), improving the quality of the relationship between a government and its citizens requires considering various issues, such as:

- Considering policies that take into account citizens' relationships with the government.
- Enhancing the citizens' quality of life.
- Delivering high quality e-services through the e-government channel.
- Providing transparency and accessibility to citizens.
- Improving administration and making it more efficient through adopting modern administration styles and simplifying the administrative procedures such that it is result- and citizen-oriented.

Reddick (2005) states that governments are focusing their attention more on system development and maintenance, optimizing information processes, and creating links between systems in various government agencies. He also suggests that, in some cases, the interaction between government employees and citizens no longer takes place in face-to-face communication (e.g., meeting rooms, or from behind windows), but through digital means (e.g., cameras, modems, and websites).

Gupta and Jana (2003) claim that IT investments are more targeted to achieve better customer services rather than to cut costs. The availability of better services through a WIS to those who can and are willing to access and use it will encourage those potential users to utilize the online system. Providing citizens with the ability to complete a required task online and to find sufficient information would benefit them through help saving them time, effort and costs (i.e., increased efficiency) which will make them

perceive the government services provided through an EGS to be useful and good. This attainment of these tangible benefits will, consequently, increase their level of satisfaction. In fact, given the nature of services provided by government agencies, the benefits that citizens anticipate, by adopting an EGS, are mostly related to the attainment of those tangible benefits which are reflected as the system outcomes, as explained in Figure 1-3.

The system outcomes, e.g., represented in the citizen-users increased efficiency, are dependent on the overall system quality, effectiveness, or performance which also reflects the overall service quality provided through an EGS. This means that, better EGS quality, effectiveness, and performance would subsequently lead to increased citizen efficiency while conducting a certain task when using an EGS (Gupta and Jana 2003; Wang and Liao 2008). Thus, the Overall Service Quality provided (OSQ) through an EGS can be briefly and generally explained as the extent to which an EGS facilitates the efficient delivery of effective public e-services to assist citizens to accomplish their governmental transactions (Gupta and Jana 2003; Tan *et al.* 2008; Wang and Liao 2008).

As previously mentioned, the potential benefits that governments aim to provide to citizens are mostly related to, providing better services to the citizens while meeting their diverse needs, in particular through an EGS. This can be achieved by providing the following benefits:

- 1- Providing a channel in which it is easy to access relevant, accurate, recent, and comprehensive information (Gupta and Jana 2003; Jaeger 2003; Akman *et al.* 2005; Wang *et al.* 2005; Kumar *et al.* 2007; Al Nagi and Hamdan 2009).
- 2- Increasing flexibility by making the government agency's website available and accessible to perform a task or acquire information 24hours/7days (Sprecher 2000; Torres *et al.* 2005; Conklin 2007; Kumar *et al.* 2007; Wangpipatwong *et al.* 2008; Al Nagi and Hamdan 2009; Luk 2009; Wong *et al.* 2011).
- 3- Providing a single entry point (i.e., e-government portal) that facilitates easy access to different government agencies and various e-services (Torres *et al.* 2005; Luk 2009; Verdegem and Verleye 2009; Karunasena and Deng 2012).
- 4- Increasing external-users' efficiency in a cost-effective manner, where they save time, effort and cost, and increase their independencies through a good quality EGS

(Sprecher 2000; Akman *et al.* 2005; Torres *et al.* 2005; Kumar *et al.* 2007; Groznik *et al.* 2008; Al Nagi and Hamdan 2009; Jaeger and Matteson 2009; Verdegem and Verleye 2009; Wong *et al.* 2011; Karunasena and Deng 2012).

- 5- Increasing citizens' convenience and/or satisfaction (Gupta and Jana 2003; Wang *et al.* 2005; Wangpipatwong *et al.* 2005; Grimsley and Meehan 2008; Luk 2009).
- 6- Making it easier for disadvantaged people to utilize the online service channel in order to interact with the government and/or get their task done (Jaeger 2003; Abanumy *et al.* 2005).
- 7- Increasing transparency to citizens, and thus accountability (Sprecher 2000; Jaeger 2003; Al Nagi and Hamdan 2009).
- 8- Reducing the administrative burden, such as cost and boring routine processes (Verdegem and Verleye 2009; Wong *et al.* 2011).
- 9- Enhancing how governments and citizens communicate and interact (Jaeger 2003; Gil-Garcia 2006).
- 10- Reducing the distance between the government and the public through effective interaction; such as posting suggestions, complaints, political participation, etc. which assists in increasing democracy and improving decision making (Jaeger 2003; Reddick 2005; Torres *et al.* 2005; Gil-Garcia 2006; Wangpipatwong *et al.* 2008; Al Nagi and Hamdan 2009; Luk 2009; Verdegem and Verleye 2009). This is sometimes referred to as social inclusion or e-inclusion (Grimsley and Meehan 2008). However, the focus of the current study is not considering the political aspect of the gained value.

Given the various number of potential benefits, it is considered that the services provided to the public through an EGS to be a very powerful tool (Torres *et al.* 2005; Wangpipatwong *et al.* 2008; Wangpipatwong *et al.* 2009; Pina *et al.* 2010).

### **2.2.3 Importance of the “Back-End” Function to the EGS Success**

Like any IS, an EGS is composed of a number of elements including IT infrastructure, information, people, and processes (Alter 2002; Hazlett and Hill 2003). Naturally, all system elements are very important for a successful implementation and ongoing use of an EGS. The quality and availability of resources and the ability of obtaining, managing, and effectively using information technology (IT) are all vital factors when implanting an

EGS (Kim and Bretschneider 2004; Azab *et al.* 2009). A successful EGS implementation requires careful strategic planning and coordination of goals, policies, processes, and technologies (Koh *et al.* 2008). This, for example, includes planning for adequate employees training, considering the policies and government goal when restricting the process, deploying high quality infrastructure and resources, etc. Thus, lack of effective planning could cause inconsistencies, redundancies, waste of resources, and, ultimately, cause further dissatisfaction among the public sector, in particular citizens (Sharifi and Zarei 2004).

Effective coordination can only happen through a well-designed collaboration and integration of functions, a developed plan to reengineer the processes, and a change of the administrative system. Also, integrating information among government agencies is an important issue that hugely impacts the success of an EGS (Azab *et al.* 2009). Lack of full integration across all uses and applications will hinder realizing the full capacity of technology (Kim and Bretschneider 2004). Having good leadership will aid in setting a well designed plan for the above mentioned requirements and assist in accelerating the implementation process, while also ensuring good quality standards.

Although, elements such as leadership, management, and administration greatly influence the success of systems implementation and continuance, they are not within the scope of our study; so, they will not be elaborated on. The scope of this study is mostly concerned with the elements that constitute an IS or an EGS and reflect its effectiveness and output quality including those elements at the back-end.

The back-end generally means “behind the scene” business operations with which the customer rarely comes in contact (e.g., back-end offices or departments provide the services that make up a business function, such as accounting, administration, communications, data processing, document handling); or technical infrastructure (e.g., networks, databases, computers, servers, mainframes, etc.). In the context of this study, ‘back-end’ refers to the system elements that are invisible to customer or external-user of a particular system; yet have a powerful influence on the quality of an EGS and how it functions. Such elements involve the government employees training and involvement, the restructured business processes, and the IT infrastructure and integration. In the next

few paragraphs we explain briefly how these unseen elements or factors interrelate and impact how an EGS function and become successful from users' perception.

**Government employees** – There is no doubt that the human part of an EGS requires adequate training and preparation because it has a great influence on the success or failure of an EGS (Alter 2002; Kim and Bretschneider 2004; Grimsley and Meehan 2008; Al Nagi and Hamdan 2009; Azab *et al.* 2009; Luk 2009). Government employees, whom are part of system components, need to be given a great attention in terms of preparation so that they are able to sufficiently use an EGS. EGS implementation usually involves changes of processes and the way work is executed. This change will likely lead to resistance from government employees to adequately utilize that EGS in their respective service area (Jones *et al.* 2006). They are considered a vital component of an EGS as they provide services to the public and complete the business process both offline and online. Hence, they need to be well trained so that they can, and are willing, to proficiently use the system and provide adequate input and services to the public (Azab *et al.* 2009).

**Business process** – Indeed, the transformation from the traditional way of executing the business processes and serving the public to being mostly dependent on IT requires a thorough redesigning the business processes. Hammer suggest that the power of modern IT underlies the need for a reinvention of the internal process (Hammer 1990). It is important to re-engineer or restructure the business processes (BP) to ensure an effective implementation of an e-government initiative, and achieve dramatic improvements in a government performance, particularly through an EGS (Hammer 1990; Gupta and Jana 2003; Groznik *et al.* 2008; Azab *et al.* 2009). For instance, in the first stage of implementation, which only reflects the presence of a website with some information posted for the public, there was not much needed in restructuring the internal BP. However, when a larger number and more complex two-way interaction services such as transactions, are required; reengineering the BP is inevitable and is a prerequisite to reach more advanced interactions, processes, and services (Groznik *et al.* 2008).

The BP redesign concerns those processes that are executed in both ways, electronically and manually. Electronic BPs are determined and setup within the IT infrastructure (i.e., website design) when developing a system. Manual BPs are determined and executed by

government employees complementing the electronic processes. Both manual and electronic BPs significantly determine the function and output quality of an EGS, where the former is evaluated as part of a system's service quality and the latter as part of a system's technical quality. In other words, the redesigned BPs would affect the quality and effectiveness of an EGS through the website and the employees as system participants. The redesign of these BP, especially the electronically executed ones, requires a complete transformation of administrative operations and internal BP; an integration of the databases, and an alteration of the legislations, regulations, classifications, and standards (Grozniak *et al.* 2008). (e.g., For example, when a user does an online payment, the payment needs to be acknowledged, recorded, transferred to the appropriate location in the database, and matched with the rest of the individual's information so that all his records get updated. It also needs to be administrated.)

***IT infrastructure and integration*** – Like e-business, the concept of e-government is based on deploying IS and integrating it along with its processes to create a whole value chain (Grozniak *et al.* 2008). In the e-government domain, this innovation is considered to cause effective coordination between government agencies. Nonetheless, this effective coordination can only occur through a well-designed collaboration and integration of functions, a well-developed planning to reengineer the processes, and a change of the administrative system. The reconstruction of these integrations, largely depend on the IT infrastructure configuration. Also, integrating information among government agencies is an important issue that hugely impacts the success of an EGS (Azab *et al.* 2009). Lack of full integration across all uses and applications (e.g., inefficient databases and web-portals like Internet and intranet) will hinder realizing the full capacity of technology (Kim and Bretschneider 2004).

In conclusion, citizens' positive experiences of an EGS do not only rely on the availability and quality of information and e-services provided, but also on the quality of the other elements in the system (e.g., government employees and technology) which leads to EGS success (Luk 2009). A good system outcome for citizens can only result from effectiveness, good-quality system output. Therefore, evaluating an EGS based on citizens' perceptions of the overall output and outcome qualities would, presumably, provide an indication for the backend quality. This also means that the outcome from



using an EGS (i.e., obtained benefits) could indicate whether a government was able to fulfill its citizen-oriented goal of satisfying its citizens, and providing better service to them through increasing their efficiency and fulfilling their requirements and needs. The only shortcoming of this kind of assessment is the limitation in accurately pinpointing the exact characteristics or quality of each system element and the level to which it contributes to the total value when measuring what citizens obtain from using this particular system.

#### **2.2.4 Challenges to EGS Implementation and Citizens' Adoption**

Many e-government projects take high priority on their governments' agenda, and have been allocated huge resources (Alshaw and Alalwany 2009; Verdegem and Verleye 2009). However, as mentioned earlier, the concept of citizens' adoption is an important prerequisite for the benefit realization (Youngohc and Guimaraes 1995). In this study, we argue that the factors related to an EGS output quality and effectiveness play an important role in determining citizens' actual adoption, in addition to their need to execute certain tasks. The quality of an EGS is very much dependent on what happens during its implementation stages (Jaeger 2003; Verdegem and Verleye 2009).

The term 'implementation' in the IS field usually refers to the phase that initially takes place to install a system before customers or employees can formally utilize it (e.g., building IT infrastructure, redesigning of process, training employees, availability of a website and information, etc.) (Alter 1999). However, in the EGS context, the term 'implementation' is used differently. It is used to reflect the stages that take place until it is fully matured, which also continues even after being available for the public (Layne and Lee 2001). An EGS can be available to public for use with simple basic feature and it continues to grow with more various and complex features with time over a number of stages. These stages are referred to in the e-government context as the "implementation" or "maturity" stages<sup>ii</sup>. The progress of these stages also involves a number of challenges. Therefore, it is worthwhile understanding those challenges of EGS implementation which impact the quality of an EGS and citizens' adoption later on. The most prominent of these challenges that have been suggested in the literature include:



- 1- Ensuring high-level security measures to protect individuals' privacy and confidential information (Moon and Welch 2004; Conklin 2007). Individuals' concerns with the security and privacy issues impact their perceived trustworthiness of an EGS; especially when a government reaches stage 2<sup>ii</sup> of the implementation in which citizens want to conduct an online transaction. This challenge also influences one's intention to utilize an EGS (Pieterse *et al.* 2007).
- 2- Deploying high-quality technological infrastructure which reflects vital aspect of a successful EGS (Pieterse *et al.* 2007).
- 3- Understanding and fulfilling all citizens' needs and expectations (Hazlett and Hill 2003; Torres *et al.* 2005; Bertot and Jaeger 2008; Verdegem and Verleye 2009) including providing information and services to citizens that are easy to find (Wang *et al.* 2005).
- 4- Delivering an efficient, responsive, accountable, and transparent relationship between a government and its citizens (Torres *et al.* 2005).
- 5- Getting e-government stakeholders (e.g., legislators, bureaucrats, public) to change their attitudes and to believe that an EGS is useful and efficient in meeting their needs, and consequently to utilize it (Moon and Welch 2004; Akman *et al.* 2005; Conklin 2007; Pieterse *et al.* 2007).
- 6- Re-engineering internal business processes appropriately in order to be able to comply with the objectives of implementing an EGS and delivering good quality service to various stakeholders. (Gupta and Jana 2003; Conklin 2007; Pieterse *et al.* 2007; Groznik *et al.* 2008; Azab *et al.* 2009).
- 7- Handling government employees' resistance issues that arise from their concerns of being replaced by an EGS. Employees' resistance is reflected by their unwillingness to learn about an EGS and use it, which in turn, leads to lack of sufficient ability to use an EGS. (Alter 2002). Their resistance could also be reflected by their reluctance to use the EGS which will, in turn, impact the system quality and ultimately, citizens' perception of the EGS (Sefyryn and Mörtberg 2009 ).
- 8- Integrating and standardizing process and procedures between government agencies requires well-planned cooperation, particularly when the EGS is accessed through a

single portal (Prasad and Ieee 2003; Pieterse *et al.* 2007). Inconsistent and poorly managed EGS will drive citizens away from using it.

In addition to the citizens' perception of the quality of EGS, which presumably impact their adoption of the system, there are other factors that hinder citizens' adoption of EGS. Such factors or reasons could be due to the relevant recency of this innovation, the digital divide, or even individuals' natural tendency towards sticking to their old habits.

Due to the broad diversity of citizens in terms of their demographic and other characteristics, some groups of people within the community are unable to benefit from using an EGS. Different researchers investigated socio-economic and demographic characteristics and their impact on EGS Use, (see for example, Mossenburg *et al.* 2003; Akman *et al.* 2005; Belanger and Carter 2006). It was found that differences in age, gender, level of education, income, computer literacy, geographic location, different socioeconomic levels, and ethnic/cultural background may hinder user adoption of an EGS, especially in developing countries (UN 2005; UN 2010). Hence, government agencies need to take steps to provide "good-services" to these disadvantaged groups of people (Helbig *et al.* 2009). The distinction between those who have access to ICT and those who don't is referred to as the digital divide (Laudon and Laudon 2005; Belanger and Carter 2006).

The digital divide also includes aspects related to information and/or technical literacy and the ability to access and use ICT (Mossenburg *et al.* 2003; Belanger and Carter 2006). There are groups of citizens who might be technically literate<sup>15</sup> but are unable to access ICT, due to their income, gender, or ethnicity<sup>16</sup>. An empirical study conducted by Belanger and Carter (2006) showed that higher frequencies of using the Internet and

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<sup>15</sup> The technical literacy refers to the technical competency and the skills required to use the hardware such as a computer and its peripherals, while the information competency refers to the capability of utilizing information to effectively getting a job done, such as uploading the correct information, selecting and putting it in the right order, or even finding suitable and relevant information (Mossenburg *et al.* 2003; Belanger and Carter 2006).

<sup>16</sup> Despite the increase digital dependency (high usage of technology) worldwide in this era, it was found that there is still a noticeable gap in the ICT adoption level among the different socioeconomic groups (Akman *et al.* 2005). Similarly, people from different racial or cultural backgrounds, such as Hispanics, White, African, Asian Americans, etc., have different tendencies towards adopting ICT including EGS (Hoffman *et al.* 2000). Individuals' behaviour (including the behaviour of adopting WIS) is influenced by two interrelated factors which are their beliefs and living (life) style. Their living style is also influenced by their socioeconomic characteristics, such as education and income.

higher frequencies of searching for information on the Internet all have a significant impact on EGS use. Their study also suggested that income, education, age and gender significantly impact ICT use including EGS. On the other hand, their study revealed that ethnicity, years of computer use experience, and experience with online purchases have no significant impact on the use of an EGS.

Moreover, van Dijk *et al.* (2008) argue that citizens are more inclined to stick to their habit of using a non-electronic channel. That is because people tend to maintain a certain habit and avoid any change unless the change is needed and is found to be beneficial, or a better option than what they already have (Hazlett and Hill 2003; van Dijk *et al.* 2008; Wangpipatwong *et al.* 2008). van Dijk *et al.* (2008) also argue that citizens may continue using the traditional channel due to lack of digital preference, access, or experience, or due to the convenience of being familiar with performing a task in a particular manner (e.g., going in person instead of learning how to use the IT innovation). According to the United Nation 2012 report, citizens still show a low level of up take to e-government services.

### **2.2.5 IS and EGS Evaluation and Success**

Given that section is relatively longer than the others in this thesis and contains several sub-sections, we start of by presenting an outline of the sub-sections. Section (2.2.5.1) presents the concepts related to evaluation in both the IS and EGS domains. Section (2.2.5.2) discusses the importance of EGS evaluation in followed by Section (2.2.5.3) which presents the EGS evaluation approaches that were discussed in the literature. Section (2.2.5.4) provides a discussion on the possible challenges for evaluating EGS. Section (2.2.5.5) briefly discusses the success measures used in IS are briefly followed by Section (2.2.5.6) which focuses specifically the most common success measures used from the external-user perspective. Section (2.2.5.7) specifically focuses on the shortcomings of the existing citizen-centric evaluation studies. Finally, Section (2.2.5.8) presents the recommended attributes that should be incorporated to evaluate citizens' obtained benefits from using EGS.

### ***2.2.5.1 General Concepts of Evaluation***

Since the emergence IS in the early seventies, researchers have been interested in exploring its implications and identifying the variables that determine its success (Bailey and Pearson 1983)<sup>17</sup>. The concept of “IS success” can refer to the accomplishment or realization of some anticipated values. The anticipated values that an implemented IS may provide could be relevant, for example, to increasing performance efficiency of employees in an organization, reducing an organization’s costs or increasing profitability, maintaining a good-quality system, recruiting a wider range of customers, providing better services or products, increasing customers’ satisfaction, etc. The IS studies included attempts to identify different evaluation approaches and understand the values of an IS on the different perspectives. For example, there is a user perspective such as the internal-users, customers of e-commerce, other business companies using e-commerce, e-government citizen-users, private organizations using e-government, and other government agencies using EGS. There is also the organization’s perspective such as the quality of decision making or cost/benefit assessment – (the organizational perspective is not discussed as it is beyond the scope of this study).

The IS values are reflected by the non-financial benefits (positive consequences) on the organization working condition, and these consequences will ultimately impact the financial performance (profitability) too (Renkema and Berghout 1997). The term ‘impact’ addresses the positive as well as the negative consequences, whereas ‘benefits’ or ‘net benefits’ usually reflects positive consequences when they are more than the negative ones (Renkema and Berghout 1997; DeLone and McLean 2004). In general, the success of an IS is reflected by the attainment of values associated with the fulfillment of the defined and preset strategic goals, objectives and sub-objectives for acquiring and deploying the IS (Alter 2002). Therefore, there were several studies focusing on the evaluation of an IS success to understand the extent to which the anticipated values have been achieved.

Generally, IS evaluation refers to post-implementation assessment, which relies on utilizing quantitative and/or qualitative instruments to identify the value of an IS reflected generally by the realized benefits (Alshawi and Alalwany 2009). In a general sense, evaluation is not limited only to effects of interventions and activities at the outcome

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<sup>17</sup> The authors presented a number of these studies listing the overall proposed variables.

level but also considers the outputs, implementation processes, content and organization (Vedung 2010). That is, the assessment is not exclusive to the post-implementation stage. Ideally, to increase the likelihood of having a proper implementation and continuance later on, IS officials and managers need to evaluate an IS before, during, and post-implementation. Doing so will reduce the chances of prospective complications, losses, or failure while implementing a system (Alter 2002; Yen *et al.* 2008). Therefore, it is important to take into account the implementation phase and recognize the goals, objectives, and challenges of implementing a particular IS while employing the appropriate techniques to assess the value of an IS (Renkema and Berghout 1997). In the public-sector environment, evaluation is can be narrowly defined as “careful retrospective assessment of public-sector intervention, their organization, content, implementation and outputs or outcomes, which is intended to play a role in future practical situations” (Vedung 2010, p. 264). Given that the focus of this research is specifically on the citizens’ perspective, it is unnecessary to do any evaluation other than the post-implementation evaluation, when the EGS is ready to be used by the public.

In e-the e-government context, Vedung (2010) suggests that the evaluation is generally concerned with systematic assessment and reporting of the consequences of current implementation or recently completed public activities; in addition to ensuring that the rules of conduct are being followed by the agencies for “future-oriented planning of pending operations”.

For an organization to accurately evaluate an IS success to ensure its effectiveness after it has been available for use, all elements must be carefully assessed in sufficient depth, each in its own right (Alter 1999; Azab *et al.* 2009). It is important to keep those elements fairly balanced and not to focus on one over the other (Alter 1999). This is an important issue when developing, correcting, or improving the quality of a certain element in a system (Alter 2002). For example, evaluating each element using explicit, factual (hard) matrix to measure the available information quality, technical quality, restructured business processes, employees interacting with the system and external-users, etc. The evaluation of the effectiveness of a system should also consider the external-user perspective (Alter 2002) through using soft “perceptual” measures related to the users’ perceptions of the quality, benefits they receive, and their satisfaction. This is particularly

true if the services provided to customers or system users are outside the organizations and use an IS because they enjoy online trading or would want to save time and effort. This study is concerned with this kind of evaluation. Similarly, if the area of investigation is concerned with interaction of an organization internal-user (employees) with the system, then the organization would seek its employees' perceptions and assessing their feedback.

The evaluation from different perspectives or on different levels would assist an organization to assess whether its objectives for each of these system elements have been accomplished. The fulfillment of each 'element-related objective(s)' is considered as a success factor; and to reach full and overall success, it is important to ensure the fulfillment of all success factors for each element (Alter 2002). This is vital to identify the exact aspects of success on a particular level in terms of the achieved objectives and to understand the interrelations among the different system elements and the existing advantages and/or downsides (Alter 2002). Otherwise, some aspects may be overlooked, leading to a gap in acknowledging all affecting and affected parameters and result in superficial conclusions.

Conversely, relying on a single element evaluation would not provide an overall view of the actual extent of the system success, for example, in terms of its output quality, effectiveness, or performance (Alter 2002). Therefore, after all elements have been evaluated, the assessment results of each assessed objective should be collectively aggregated in order to be able to view the overall benefits and identify how far the implemented system (e.g., EGS) has paid off and was effective.

Given that the evaluation process is performed from different perspectives, each evaluated perspective requires choosing an appropriate approach and employing a suitable assessment tools. Researchers tend to build on previous studies, especially empirical ones, or borrow their assessment tools or instruments and use the same terms. However, the item measures (i.e., questions) of the variables, in many cases, differ from that of the original study. This fact raises some credibility issues when authors regard their variables or instruments to resemble or be the same as the original borrowed ones used and validated by the previous researchers. A government, for example, cannot be

assured that it has achieved the anticipated benefits of implementing an EGS unless a sufficient and realistic assessment tool is used to evaluate the EGS (Wang *et al.* 2005).

For that reason, one must cautiously interpret and analyze the ‘borrowing’ studies and the reliability and validity of the assessment tool or instrument. Identifying a suitable assessment tool that can adequately serve its purpose and provide the required information is essential. This requires ensuring that the chosen assessment tool is appropriate to the e-government context before borrowing other proposed one, especially from other contexts, such as e-commerce. Governments cannot assume that by following the steps of e-business, they will obtain the same benefits because there are fundamental differences between the private and public sector.

Considering that IS evaluation involves several stakeholder groups and each group has its own values and objectives, claims, issues, and concerns (Vedung 2010). It is essential to clearly identify first the context or groups of stakeholders with which the evaluation needs to be carried out (Axelsson *et al.* 2013) and the aspect of evaluation (e.g., satisfaction, system efficiency, profits, employee performance, etc.), to accurately identify the attributes relevant in this evaluation (Alshawhi and Alalwany 2009). That is, placing adequate attention on identifying the appropriate evaluation criteria of the net benefit which differs from one stakeholder perspective to another (e.g., employees vs. citizens) (DeLone and McLean 2003; Wang and Liao 2008). Stakeholders, external or internal of any government agency, have legitimate interests and these interests can be identified and analyzed using appropriate tools (Flak and Rose 2005).

The importance of the considering stakeholders in the implementation and evaluation processes was emphasized by several researchers (e.g., Freeman 2002; Shankar *et al.* 2002; Flak and Rose 2005; Hansen 2010; Axelsson *et al.* 2013) and stakeholder theory (ST) was introduced. ST has also previously been studied in the e-government and public sector context (e.g., Flak and Rose 2005; Hui and Hayllar 2010; Kamal *et al.* 2011; Axelsson *et al.* 2013). ST in general suggests that organizations should recognize their stakeholders and that each group of these stakeholders has its own intrinsic values and, thus, should attempt to address these needs and maximize their values. This would consequently lead to increasing the organizational profitability and sustainability in the long run (Flak and Rose 2005). Though the concept of maximizing profitability is not a



priority in the public sector, maximizing values definitely is, which makes ST aligned with the purpose of public sector organizations from that perspective. Government agencies have an ethical obligation to care for stakeholders' interests, yet they can only do that to certain and varying degrees ([Flak and Rose 2005](#)). Hanson (2010) conducted a study on the theory-based stakeholder evaluation and suggested that the findings of such an evaluation would provide information on which aspects are strongly supported by stakeholder views, which links are weakly supported and do not matter, and what are the shortcomings.

In the evaluation process, Guba and Lincoln (1989) suggest that the consideration of stakeholders is not exclusive to identifying them and finding out what their claims, concerns and issues are. Rather, each group should confront and considers the inputs from other groups without necessarily accepting the other groups' opinions and judgments of others. It is however important to deal with points of difference or conflict to reach a better understanding of the differences and how to deal them. This can occur by either adequately accommodating the differences or developing meaningful arguments for why the others' propositions should not be entertained ([Guba and Lincoln 1989, p.56-57](#)).

However, in some cases of evaluations it may be "impossible, extremely difficult or for some reason not desirable to reduce complex intervention perceptions into one overarching intervention theory"([Hansen 2010, p.296](#)). That is because, naturally, in an implementation, there are several groups of actors involved and each has many different expectations which needs to be accommodated ([Hansen 2010](#)).

While evaluating a particular IS, Alshawhi and Alalwany (2009) suggest that it is important to consider certain factors that are usually "closely interrelated and are determined in practice by the demands of the situation" (p.194). The elements are:

1. The subject: What is being evaluated?
2. The stakeholders: Who are the key players?
3. The criteria being investigated: What are the key issues which should be considered for the evaluation?
4. The process: How do we get accurate results?
5. The method: What are the methodologies and tools used?



Vedung (2010) argues that there were four waves of evaluative activities were used since 1960, mostly from Swedish perspective and, to a much lesser extent from a North Atlantic view point. The evaluation waves as described by Vedung (2010) were:

- 1- The *scientific wave*: this involves academics testing, through two-group experimentation to achieve subjective goals. Public decision-makers were then supposed to adapt the most effective approaches.
- 2- The *dialogue-oriented wave*: in the early 1970s the conviction of the scientific evaluation has faded and the dialogue-oriented approach started to be applied. “the stakeholder idea was incorporated into the evaluation discourse and practice at about this time.
- 3- The *neo-liberal wave*: from around 1980 pushed for market orientation and the evaluation was mostly based on accountability, value for money and customer satisfaction concepts.
- 4- *Evidence-based wave*: the revival for scientific experimentation relying on the slogan ‘What matters is what works’.

As a governance strategy, evaluation can be conducted in several ways, yet mostly manifests itself as goal-achievement evaluation, stakeholder evaluation, client-oriented evaluation, professional evaluation, self-assessment, randomized experimentation and quality assurance (Vedung 2010).

#### ***2.2.5.2 The Importance of EGS Assessment***

Given that our study is concerned with EGS assessment, this sub-section explains in detail the reasons why evaluating an EGS from the external EGS citizen-users’ perspective is crucial and is considered to be important and useful.

##### ***1- Governments invest significant resources to adopt EGSs to achieve several goals***

Governments invest significant resources in implementing EGS, hoping to accomplish certain goals (Alshawhi and Alalwany 2009; Cordella and Bonina 2012). Though an EGS has a huge potential to contribute to government modernization, some of the benefits promised by EGS can only be realized if its content is citizen-centric and it is designed specifically for the Internet (Torres *et al.* 2005). However, there is a little evidence that the effort in providing an EGS has paid off and met the governments’ goals (Wang *et al.*

2005), including those citizen-related ones. Accordingly, it is important that a government evaluates its EGS effectiveness from citizens' perspective and the benefits they obtain in order to assess whether its citizens-related goal(s) has been attained and to what extent. In addition to an integrative framework, there is a lack of studies on the development of EGSs that are inked with IT governance/frameworks in the overall e-government services sectors.

***2-It is assumed that citizen obtain the highest share of benefits from adopting an EGS***

Although adopting an EGS would benefit both the governments and the public, some researchers believe that citizens obtain the highest value from implementing an EGS (Jaeger 2003; Akman *et al.* 2005; Wang and Liao 2008), especially those who actually use the system.

Accordingly, government institutions and researchers started highlighting the importance of conducting citizen-centric studies, and attempted to evaluate EGS effectiveness, performance, and quality, to identify the best practices for EGS assessment (Torres *et al.* 2005) focusing on citizens' satisfaction, perceptions, and use behavior and behavioral intentions (van Dijk *et al.* 2008; Verdegem and Verleye 2009), see for example, (AlAwadhi and Morris 2008; Tan *et al.* 2008; Sung *et al.* 2009; Verdegem and Verleye 2009).

However, the review of the literature shows that:

- i. There is a lack of an integrative framework that identifies the appropriate nature of relationships among key drivers of adoption (Kumar *et al.* 2007).
- ii. There is little known about the factors that determine citizens' adoption of EGS in the developing countries, in particular, the Arab world (AlAwadhi and Morris 2008).
- iii. There are limited studies on the development of EGS and the use of its services, particularly in developing countries; and whether e-government services can actually improve service quality is still unknown (Luk 2009).

Also, since an EGS is directed to citizens and it facilitates conducting different activities for them, evaluating the citizens' perspective is vital when measuring performance

(Gupta and Jana 2003). Citizens' efficiency of the conducted activities can be used as a measure to reflect the success in achieving the objective of providing better services. Citizens' efficiency while using an EGS can also reflect, to a certain extent, the effectiveness and quality of the EGS itself (Wang *et al.* 2005). This kind of assessment also indirectly infers that the system's output quality is a result of a certain input quality (as explained in Chapter 1, Figure 1-3).

### ***3-Assist in pinpointing and rectifying any shortcoming and maintain ongoing success***

Some authors, (e.g., Torres *et al.* 2005; Kumar *et al.* 2007; Alshawi and Alalwany 2009), suggest that it is also important for a government to evaluate its EGS quality and its level of advancement as compared to EGSs in other countries. That could help the government understand what its system might be lacking and get some insight about the areas of improvement in its EGS in order to provide better services to its citizen-users. Therefore, it is important to develop a tool to be used for that purpose. Vedung (2010) emphasizes that good intentions, increased funding and promising ideas are not enough as the real results are what really count. So 'public policy' must be result oriented.

As mentioned in the previous section, it is important that these evaluations are conducted periodically to assess the system's effectiveness and citizens' expectations and perceptions of the service quality provided through an EGS. Such evaluations will aid in taking the necessary actions to rectify any shortcomings to ensure the ongoing success of an EGS (Gupta and Jana 2003; Wang and Liao 2008; Azab *et al.* 2009). For organizations, careful examination and assessment of the results of any conducted evaluation (assuming it is valid and appropriate) to what was done and how they were done would lead to better future orientation (Vedung 2010).

### ***4-Assess whether the government aim of introducing EGS to provide better services to citizens was fulfilled***

Given that one main objective for implementing an EGS is to improve the "supply-side" service quality provided to the citizens, it is important that an EGS is designed in a way that considers how the "demand-side" (i.e., citizens) would perceive it and react to it (Ancarani 2005; Bertot and Jaeger 2008; Groznik *et al.* 2008; Luk 2009; Verdegem and

Verleye 2009). Nevertheless, rather than focusing on understanding the users' needs, the development and design of EGS seems to have depended largely on the supply-side factors; e.g., the technical capabilities (Bertot and Jaeger 2008; van Dijk *et al.* 2008; Verdegem and Verleye 2009), the business process (BP) model restructuring and optimization (Chourabi *et al.* 2009; Aydinli *et al.* 2009 ), or employees performance (Luarn and Huang 2009). This would, consequently, lead to a narrow conceptualization of services (Torres *et al.* 2005) and causes some other disadvantages (Bertot and Jaeger 2008; van Dijk *et al.* 2008; Verdegem and Verleye 2009). For example, developing an EGS with high technical characteristics could make its functionality seems complex to ordinary citizen-users. This could undermine the benefits that citizens obtain from using an EGS. For this reason, many studies existing in the e-government literature have explored the supply-side perspective rather than considering the demand-side perspective (Reddick 2005; Torres *et al.* 2005; Bertot and Jaeger 2008; van Dijk *et al.* 2008; Verdegem and Verleye 2009).

The change in time, technology, and advancement in e-commerce environment, all impact individuals' expectations of the service they want to receive, which subsequently impact their perceptions of the quality of an EGS. Understanding how citizens perceive and evaluate an EGS quality should aid in better developing the system and providing the anticipated services (Papadomichelaki and Mentzas 2012). Thus, it is important that government understands and assesses the demand side, which reflects citizens' perceptions, needs, expectations, and the factors that significantly influence their perceptions and adoptions (Bertot and Jaeger 2008; van Dijk *et al.* 2008). Consequently, the citizen-users could perceive the EGS to be of good, effective, and useful such that they will ultimately benefit from it.

***5- Citizens' behavior and behavioral intention to use an EGS are useful indicators of citizens perception of the system's related attributes***

Citizens who are already using an EGS could increase or reduce their usage, and the initial users can continue or discontinue using the system mostly influenced by the quality and value they receive (van Dijk *et al.* 2008; Wangpipatwong *et al.* 2008). Thus, assessing citizens' perception of an EGS and the overall service quality of the EGS they

used will help in understanding the factors that affect their intention to continue using an EGS (Reddick 2005; van Dijk *et al.* 2008; Wangpipatwong *et al.* 2008).

Wangpipatwong *et al.* (2008) claim that citizens' intention to continue to use an EGS is very much correlated with their capacity of handling any obstacles they may encounter while using the system; i.e., their level of computer self-efficacy. Thus, together with the computer self-efficacy variable, Wangpipatwong *et al.* endeavor to empirically validate the Technology Acceptance Model (TAM) proposed by Davis (1989), within the e-government domain. Their findings revealed that Perceived Usefulness was the strongest predictor of citizens' continuance intention of using an EGS.

***6-Assess the extent of citizens use of an EGS because the benefits can only be obtained after using the system***

Only after adopting an EGS, will citizens' experience any potential psychological and tangible benefits, which will presumably be positive if the system is of high-quality (Wang *et al.* 2005). Hence, a government needs to consider the factors that encourage citizens to use their EGS. Citizens will be willing to use an EGS if they actually believe that the system and services provided are of good-quality, effective, and useful and better than the traditional offline, face-to-face channel. It is assumed that citizens' adoption of an EGS occurs on two steps:

- i. the existence of a motivator that drives citizens to use the system which influences the "intention to use" the system, and then,
- ii. the realization of benefits which occur after actually using the system.

Therefore, more emphasis should be placed to evaluate the impact of the public services and governments strategies on citizens, and consider the emerging needs and expectations of the e-services in the future (Verdegem and Verleye 2009).

***7-Citizens' satisfaction with an EGS could contribute to reducing governments' costs***

Moving citizens to use an EGS instead of an traditional offline, face-to-face channel will not only help them increase their efficiency but also contribute to the reduction of government's costs (Wang *et al.* 2005). So, the lack of an effective and good EGS quality will most likely drive citizens away from using this interaction channel. As a result, not

only citizens will not obtain any values, but the government itself will not attain its anticipated benefits; and thus, the e-government project will not pay-off (Wang *et al.* 2005).

***8-Lack of adequate studies that are dedicated to assess and understand citizens' perception of an EGS***

It appears the assessment of EGS performance and successful from the external perspective in terms of the received public values is not only it is appropriate but also essential (Verdegem and Verleye 2009). The evaluation of citizen-users' perception of the EGS quality, effectiveness, and benefits is essential as an indication of EGS success is vital because:

- 1- governments invest significant resources in implementing EGS to achieve certain goals,
- 2- citizens' perception can aid in understanding the system's advantages and weaknesses to rectify and ensure its ongoing success, and
- 3- citizens' adoption of an EGS is important because it will contribute to success and attainment of other objectives or goals. For example, citizens' adoption of an EGS will contribute to:
  - a- providing them with benefits;
  - b- reducing the governments' cost;
  - c- supporting the government's face-to-face channel; which aid in
  - d- providing more customized services to citizens' non-user who use the offline channel.

Due to the heterogeneous types of citizens, each group of users has its own characteristics, preferences, and needs. This diversity leads to the existence of various criteria that citizens look at when assessing an EGS (Verdegem and Verleye 2009). Therefore, to ensure the effectiveness of an EGS and re-enforce citizens adoption (Wangpipatwong *et al.* 2008), a government need to assess citizens' perceptions and acceptance to use an EGS and analyze it periodically as a dynamic process (van Dijk *et al.* 2008; Azab *et al.* 2009). By doing so, a government will be able to:

- 1- track citizens needs and preferences;
- 2- understand how they value the EGS;

- 3- know what factors determine and encourage citizens' adoption (Fu *et al.* 2006; Bertot and Jaeger 2008; Groznik *et al.* 2008; Park 2008; Azab *et al.* 2009);
- 4- understand the impact of using EGS on citizens (as customers) (Grimsley and Meehan 2008; Verdegem and Verleye 2009). This is important to maintain a high-quality EGS performance and re-enforce citizens' use behavior (Wangpipatwong *et al.* 2008).

Despite researchers repeated call to assess EGS success in terms of its performance quality or effectiveness from the citizens' perspective, it seems that little effort was put to evaluate EGS; particularly, in linking between online system characteristic and its effect on the provided services' effectiveness and the citizens' efficiency (Wang *et al.* 2005). Accordingly, we can conclude that there is a need for an accurate citizen-centric framework or model to evaluate an EGS effectiveness and quality, which includes assessing those system components, to ensure an appropriate implementation and an effective and successful EGS (Bertot and Jaeger 2008; Wang and Liao 2008; Azab *et al.* 2009).

### **2.2.5.3 EGS Evaluation Approaches**

By implementing an EGS, a government hopes to enhance its efficiency and effectiveness and hence, its performance. The importance of achieving this goal has led to an increasing number of studies conducted to find ways to evaluate the efficiency and effectiveness and measure the performance (Verdegem and Verleye 2009). However, EGS is a complex concept, and its measurement or evaluation is, therefore, multi-attribute in nature (Wang and Liao 2008). That's why governments still have some concerns with regards to identifying objective measures to sufficiently assess the quality of an EGS (Kaylor *et al.* 2001; Gupta and Jana 2003). This sub-section discusses the various aspects related to e-government evaluation, and the approaches presented in the literature.

Based on the anticipated benefits from adopting EGS, presented earlier in Section (2.2.2), researchers, academics, and government organizations can use various tools and approaches to assess the fulfillment of each objective, in its own right, by measuring whether the anticipated benefits has been realized.

The concept of any preset objective is considered the unit of evaluation. For example, if satisfying citizens is an objective, then the measurement should be user satisfaction. If profit or cost reduction is the objective, then, the accountancy or financial assessment tools, such as cost benefit analysis can be used. If the objective is focused on encouraging individuals to use a system, then assessing the accomplishment of this objective can be done by measuring users' acceptance and use of the system. Similarly, if the anticipated objective is related to the users' increased efficiency, then, the appropriate measurements would be related to assessing the input resources versus the outputs (e.g., time, effort, and cost saving while achieving the required task). Examples of evaluation perspectives that can be conducted qualitatively and/or quantitatively could be related to the assessment of (Gupta and Jana 2003):

- 1- the internal government issues such as employees use, efficiency, and performance; or managers decision making and strategic benefits;
- 2- the external-users' perceptive such as evaluating the citizen-users satisfaction, task efficiency, or system acceptance;
- 3- the financial performance such as the cost /benefit from the accounting standpoint; and
- 4- the system functionality such as evaluating its characteristics or counting transactions conducted.

In accordance to the need of developing an adequate success measurement framework, an increasing number of studies have attempted to identify objective measures to assess the quality of an EGS (Torres *et al.* 2005). While it is essential to employ the appropriate techniques to assess the contribution of an IS to the organization realized benefits, it is also important to take into consideration the implementation phase, as well as, to recognize the challenges and organization objectives and goals of implementing a particular IS (Wang *et al.* 2005).

Jones *et al.* (2006), together with other researchers, suggest that a number of human and organizational criteria that support the e-government evaluation process, need to be identified, which could be later used as assessment tools for decision makers.



Some researchers, argue that it is essential to take into account factors such as strategic planning, business process restructuring issues, leadership and management, policies and regulations, government employees training and acceptance of the system (e.g., Teo *et al.* 2008; Wang and Liao 2008).

There have been some attempts by researchers, in the e-government literature, proposing models and frameworks to evaluate EGS success or readiness as a whole. However, these studies differed in their approach and the proposed success factors (e.g., Gil-García and Pardo 2005; Gil-Garcia 2006; Koh *et al.* 2008; Azab *et al.* 2009; Sharifi and Manian 2010). Torres *et al.* (2005) claim that most studies have basically focused on one of two aspects; breadth (number) of services provided online, and the depth (stage) of the services offered online. Some researchers have introduced or differentiated among the alternative evaluation approaches in IS; and the different types of measures that can be applied to evaluate the performance of a particular e-government initiative. For example, there are hard measures, which include evaluation of the economic performance (cost benefit analysis) and benchmarks; and there are soft measures, which include the scoring method, e-government stages, and sociological angles. These measures are explained in the following points:

1- The economic performance: which is based on cost benefit analysis, is concerned with analyzing for how much of the implementation is IS able to increase the net benefit (profit), and measuring other aspects, such as net present value (NPV), average rate of return (ARR), payback period (PP) (Gupta and Jana 2003), cost reduction, and return on investment (ROI) (Grimsley and Meehan 2008).

2- Benchmarks: using certain criteria as basic standards and assigning specific scores for each measure. The evaluation is based on assessing each criteria, giving it the appropriate score, and finally, summing all the scores. The benchmark technique is regarded also as a good tool to determine the minimal satisfaction score that should be achieved before actually offering the new services to the public (Verdegem and Verleye 2009).

3- The scoring method: is based on identifying the organizational key objectives and assigning weights to each of them, including both tangible and intangible benefits; and then, calculating the weighted average of all attributes. The highest score, thus, infers that this service provider is the best among its equivalents (Gupta and Jana 2003).

4- The stages of the e-government implementation: reflect the extent to which the government is able to conquer the challenges in each maturity stage and achieve certain accomplishments (Gupta and Jana 2003).

5- The sociological perspective (sometimes referred to as socio-technical perspective (Grimsley and Meehan 2008)): involves the human aspect and the improvement of the work context for the user whilst addressing corporate goals (Grimsley and Meehan 2008). It is also concerned with employees' resistance vs. acceptance to the technology, which can be handled by the human resources (HR) department. This issue could be resolved or minimized through engaging the employees and consulting them with regards to the shortcomings of the current performance, providing sufficient training to them, and informing them about the advantages of the new technology and how it can provide a better working environment and how it can help the public, particularly citizens, who obtain the widest range of benefits (Jaeger 2003; Akman *et al.* 2005; Wang and Liao 2008).

6- The social values: which reflect the public gain, is also related to individual perceptions of the EGS outcomes and its impact on them when they utilize it (Gupta and Jana 2003). The external perspective of evaluation is also important to measure performance based on citizens' perception of the total service quality (performance) they receive from using an EGS (Bertot and Jaeger 2008; Azab *et al.* 2009). Usually the measurements used are user (citizen) satisfaction, behavior, and behavioral intention to use this innovation, see for example, (Verdegem and Verleye 2009). Generally, citizen-users' perceptions of an EGS are based on their judgment of the following criteria:

- i. A variety of e-services that they can complete entirely online (such as paying an infringement or tax, downloading forms, etc.).
- ii. A variety of e-services that can be partially completed online (e.g., requesting a license or passport renewal or lodging an application) which are completed by government employees; and then receiving the final outcome of the processed task within a reasonable time frame and without errors.
- iii. Sufficient, accurate, recent, and relevant information that citizens might need.
- iv. A website with good technical quality; for example being designed so that it loads quickly, is easy to use, consistent, easy to navigate, etc. It should also be reliable in terms of being constantly available and does not crash.

- v. A well designed and organized system where the information transferred by citizens should be appropriately allocated and saved in the databases for future retrieval.
- vi. A clear acknowledgment statement of the enforced privacy and security standards for handling personal information.

7- Measuring an EGS performance using the indicators used in marketing. Steyaer (2004) introduced five marketing indicators to measure the performance of an EGS. The indicators are consumer awareness, popularity, contact efficiency, conversion, and retention. In that study, awareness deals with the number of visitors to a site; that is, the total number of Internet visitors relative to total agency visitors or consumers. Popularity refers to the rank of the site; that is, the agency's rank relative to the rank of other federal and state agencies in terms of monthly visitors. Contact efficiency refers to the site usability and content such as convenience, security, and privacy with on-line data, publications, e-mail, licenses, etc. Conversion refers to the scores based on customer satisfaction with federal services, state electronic transactions, and visitor time. Finally, retention is measured with customer loyalty based on repeat transactions and repeat visits.

8- The static metric: which is another perspective for assessing EGS performance and is based on using metrics designed for the web content analysis ([Gil-Garcia and Martinez-Moyano 2007](#)). Governments need to ensure that their EGS websites are optimally designed and have the best characteristics, which can suit the heterogeneous needs of users. This assumption implies that borrowing website evaluation criteria, as success measures, from other contexts such as e-commerce, may not be applicable and appropriate for the e-government context ([Wang et al. 2005](#)).

Several researchers have suggested measures for evaluating website designs including proposing criteria for assessing how sufficient the available information, help features, and navigation systems are ([Kaylor et al. 2001](#)). In addition, public websites should have attributes related to effective interactivity and transparency. However, this kind of content analysis as a way to evaluate the performance does not adequately capture the nature of actions and interactions ([Gil-Garcia and Martinez-Moyano 2007](#)).

Also, of the prominent criteria that may concern citizens with regards to EGS characteristics are issues including the level of trust in the security and privacy to protect individuals' confidential personal and financial information from being hacked (Wang and Strong 1996; Abanumy *et al.* 2005; Torres *et al.* 2005).

Another criterion that citizens may consider to be one important manifestation of an EGS success (as an online service channel) is its continuous availability to all stakeholders including disadvantaged people (Abanumy *et al.* 2005). Several articles and reports, (e.g., Abanumy *et al.* 2005; Jaeger and Matteson 2009; Kuzma 2010), discussed the notion of accessibility but different researchers used the term to reflect different concepts. The term accessibility was discussed to reflect, for example, the possibility of availability of the website to everyone 24/7 (Agarwal and Prasad 1999; Jaeger and Thompson 2004; Abanumy *et al.* 2005; Azab *et al.* 2009) and sometimes it was used to refer to the ability and easiness in accessing/retrieving information them in timely fashion (Balasubramanian *et al.* 2003; Alshawi and Alalwany 2009). It was discussed in terms of facilitating features in the e-government website for citizens with impairment, (e.g., visual impairment); and was considered as an assessment measure for the benchmark of e-government websites quality, and the availability of tools that enable disadvantaged individuals to enjoy the web in a manner that is equal to others (Jaeger 2003; Jaeger and Thompson 2004; Jaeger and Matteson 2009).

Luk (2009) summarized the components of the total service quality of an EGS to include the following:

- 1- Timeliness (responsiveness): the time that customers have to wait for a service to be delivered.
- 2- Amount or volume of services: is the frequency of the services delivered
- 3- Accessibility and convenience of service: whether the service exists for everyone including the geographically dispersed people.
- 4- Availability: whether there is downtime.
- 5- Accuracy: whether citizens received accurate information about obtaining the services;
- 6- safety: related to the security and privacy terms or standards.

- 7- Appropriateness and suitability: whether the services meet citizens' needs, such that, they have a variety of options that they can conduct to address their requirements.
- 8- Simplicity: whether the service is easy to use.
- 9- Employees politeness.

A recent study conducted by Cordella and Bonina (2012) on the 'public value' perspective for ICT enabled public sector reforms. The authors comprehensively reviewed the literature and proposed that there is a need to find and use new indicators in assessing EGS success when it comes to evaluating it from citizens' perspective and their obtained values or benefits. Although the concept of 'public values' as they referred to it was presented and discussed in the literature, a more suitable and reflective indicators need to be used for EGS success evaluation (Cordella and Bonina 2012). They argue that the public value is looked at in terms of what it is related to and how it is measured is not seen to be most appropriate and reflective. The authors argue that creation of benefits in the form of 'public value' involve a multi-attribute problem on balancing these challenging values. According to their literature review regarding outcome of or obtained public values, they suggested that there are studies that looked at the public values from three perspectives, the efficiency which is related to the organization value, effectiveness which is related to citizens' value, and democracy which is related to the political value. Other studies proposed that EGS can provide direct benefit to citizens and add to the government values. They suggested that the indicators presented in these studies reflect the direct and indirect impact of ICT adoption in the public sector (i.e., the EGS) through the administrative and economical performances which include the social and political impact (Cordella and Bonina 2012).

Accordingly, they suggested that it is important to change the way EGSs are evaluated when they are being assessed from the citizens' perspective, and probably use a more comprehensive tool which includes indicators that could also reflect social and political attributes.

Gupta and Jana (2003) introduced a framework to evaluate an e-government performance by measuring the tangible and intangible benefits. Their model was more dedicated to considering a general and an overall performance of an e-government initiative, which

they referred to as “return on e-government”. Gupta and Jana suggested two determining ways in measuring the performance of an e-government initiative: *a-* the evaluation according to the integration and collaboration between governments, within the government, and across sectors; and *b-* the degree of skillfulness of the leadership that would empower knowledgeable workers. They have summarized the performance and success evaluation hierarchy to be as follows:

Level 1- ROI,

Level 2- Total costs and revenues,

Level 3- Improvement in quality of planning and control,

Level 4- Quality of decisions,

Level 5- Value of information, and

Level 6- System characteristics.

Torres et al. (2005) conducted a study exploring the quality and citizens’ use of public e-services (of EGS) in Europe for each implementation stage in which an EGS goes through. This study was committed to identify for each implementation / maturity stage: which services were offered online by government agencies in the countries studied; how the e-government website allowed interaction with citizens; and what are the breadth and depth of the e-services provided for citizens that simplify the relationship with the public administration. Their findings enabled them to conclude that the e-government seems to be following a predictable development pattern which starts off with limited interaction to complete two-way interaction. The two-way interaction resembles satisfactory completion of financial transactions online with reasonable security and protection of privacy.

Gil-Garcia (2006) focused on understanding how factors affect government use of IT, and how IT affects the way government works. The author investigated the contextual factors and their inter-relation with the government success, i.e. understanding the dynamic relationship between IT and the social structures in the government settings. The factors that were explored in the model were:

1- demographic factors,

2- voting preference,

3- overall size of the economy,

- 4- web management practice,
- 5- institutional arrangement,
- 6- general organizational factors, and
- 7- website functionality.

The author found out that some of the organizational factors play different roles in different contexts, their relevance is affected by state-specific environmental conditions, and the reasons for why they are important differ from one setting to another.

Azab *et al.* (2009) introduced an e-government evaluation model. Their model, mostly, focused on the importance of assessing the e-government success from the employees' perspective. The model was validated based on quantitative and qualitative analysis which was gathered through the use of unstructured and semi structured interviews. The authors acknowledged the limitations, and that their model required more validation to ensure its viability. However, having mainly focused in employees' perspective, the model cannot be reliably used in citizen-centric assessment.

#### ***2.2.5.4 The Complexity and Challenges in Evaluating EGS***

Evaluating e-government projects is not only important but is also very complex (Alshawhi and Alalwany 2009); probably even more than evaluating other traditional IS initiatives. Alshawhi and Alalwany (2009) infer the evaluation complexity to the multiple perspectives to be investigated, the difficulties of quantifying the benefits, and to the social and technical context of use. In addition, the assessment of the total service quality, from customers/users perception, of an online vendor in the e-commerce context, is much simpler than for that of an EGS. The purpose for which individuals use an e-commerce website is different from that for which they use an e-government service website and the former has more predicted steps than the latter (Wang *et al.* 2005).

In the e-government context, the case is more complex and unpredictable. That is because there are various government organizations providing different type of service; and addressing various stakeholders, particularly, citizens. There are also varying users characteristics with different needs from a particular government agency (Wang *et al.* 2005). For example, the process that a citizen user go through to conduct a certain action

is dependent on whether that action is related to finding information, downloading forms, performing transactional actions (online payment), requesting services, lodging an application, checking personal status, or following-up a requested task. Because of the various reasons and tasks for which citizen use an EGS, it is difficult to anticipate the processes that a user would go through and to measure the qualities of all system attributes all at once and from one service or one experience (Wang *et al.* 2005).

Generally, any e-government user can provide feedback on the technical quality, in terms of his/her experience of the loading time, navigation, ease of use, etc. Nevertheless, it is more difficult to assess the other two attributes (i.e., information quality, and e-service quality) when the assessment involve evaluating the service quality of government employees, unless the user providing the feedback has a previous experience with services or tasks completed by the government employees.

For these reasons, it is difficult to assess the overall service from citizens' perspective (Wang *et al.* 2005). This is especially true if the users have not experienced or used all types of services. Wang *et al.* (2005) state that, "it is difficult to identify all the possible factors influencing performance in one model" (p.5). Thus, it is important be cautious in choosing the sample and the assessment attributes (i.e., e-services), particularly if the evaluation is concerned with the assessing the perception of the EGS overall quality and effectiveness or performance.

The complexity of e-government evaluation result from the fact that there are multiple aspects that needs to be considered which affect several stakeholders and the social and technical context of use (Alshawi and Alalwany 2009). The stakeholders, for example, include citizens, business entities, employees, government officials, and other government agencies; and each group has its own values and objectives (Akman *et al.* 2005). For that reason, an e-government evaluation encompasses several aspects of assessment and could be carried out from different perspectives, for example:

- Assessing system output and website(s) characteristics, e-services, or even drill down to investigate a single e-service perspective, e.g., e-tax payment, on-line status check facility, etc.;



- Assessing the impact of implementing an EGS on transparency and e-consultation/democracy (political consequences);
- Assessing the managerial aspect, in terms of the quality of government officials' decision making, or, the accuracy and availability of information that is used in management and development;
- Assessing the impact on government agencies with regard to the quality of shared information, or how sharing information with other agencies would positively impact their performance quality
- Assessing the impact on employees' satisfaction or efficiency (performance quality);
- Assessing the impact on the public.

However, even when considering the 'public' perspective when evaluating the impact of an EGS, it is important to distinguish who is addressed in the area of study in order to deploy the appropriate assessment tool. That is because the 'public' does not only refer to individuals like citizens and residents but also to business entities.

Citizens for example, are mostly interested in their tangible obtained benefits like efficiency or performance in conducting a particular task while using an EGS (e.g., time, money, and effort saving). In addition, citizens are also concerned with other 'psychological' attributes that are related to their trust in the operational competency and security of the used EGS; which in turn affect their perception of the system and consequently their satisfaction and use intentions. The business entities, on the other hand, may be more concerned with cost saving, or tenders opportunities and the impact on business profitability. Thus, it is difficult to assess the impact of an EGS on the public by using one comprehensive assessment tool that can take into account all the factors that correspond to the both citizens and business organizations. Hence, the chosen assessment tool must be suitable and exclusive to the perspective for which it is being used.

While studying any of the previously listed perspectives, it is also essential to consider other factors that might influence the findings of those assessments, such as the phase of the implementation, whether it is a developed or a developing country, the social and cultural characteristics, etc. Unlike an e-commerce system or website, an EGS consists of

several implementation stages which can differ dramatically in terms of the contents and types of information of services. Therefore, it is important to consider realistic assessment measures for each implementation stage, as each phase differs in nature from the other and becomes more complex and encompasses more attributes and services as it develops (Ancarani 2005). It is noteworthy to mention that developing countries have the chance to learn from the e-government implementation failure and success in developed countries, and may, even, be able to perform the requirements of all the stages almost simultaneously (Yildiz 2007).

The complexity that characterizes the e-government domain requires special attention when considering conducting any evaluation. Each perspective should be separately evaluated using several criteria. For example, internal vs. external organizational perspective, employees vs. citizens' satisfaction and/or increased performance efficiency, consequences of tangible outputs such as the online system performance vs. intangible consequences such as political democracy. Consequently, the assessment requires deploying an evaluation tools that is valid, reliable, and suitable to the corresponding variables and objectives to be measured. Thereafter, the assessment of all evaluated perspectives could be, accumulatively, considered so that the overall success of an e-government is understood and visualized.

#### ***2.2.5.5 Success Measures Used in IS***

Scholars have attempted to assess the level of IS success using different criteria to investigate the improvement of efficiency and effectiveness (Iivari and Ervasti 1994). Generally, IS effectiveness and efficiency are used jointly to indicate the positive results by deploying an IS in an organization. From that point of view, IS effectiveness is defined as “the contribution of an IS to organizational effectiveness” (Iivari and Ervasti 1994). Similarly, IS success can be interpreted as “the impact of implementing IS on the effectiveness of the adopting organization” (Iivari and Ervasti 1994, p.206).

Researchers in the IS domain have proposed various approaches to measure IS success; some used quantitative methods to measure the Tangible Benefits (e.g., Iivari and Ervasti 1994), and some used qualitative analysis to measure variables that are related to the Intangible Benefits or indirect costs (e.g., Doherty and McAulay 2002). Such measures include User Satisfaction (Ives *et al.* 1983; Galletta 1989; DeLone and McLean 1992),

level of System Use (Swanson 1974; Ein-Dor and Segev 1978; Davis *et al.* 1989; Turel *et al.* 2010), Perceived Usefulness or benefit (Davis 1989), Improved Performance (Lucas 1975), Quality of Decisions (Sharda *et al.* 1988), Financial Performance and Profitability (Sharda *et al.* 1988; Santhanam and Hartono 2003).

Although some variables, such as the quality of decision making or return on investment (cost/benefit) analysis, seem appropriate to assess IS success, they were deemed not to be feasible due to the difficulty of accurately measuring its success (Lucas Jr 1978; Ives *et al.* 1983). For example, using financial performance or profitability to assess IS value or success was found to be:

- 1- influenced by non-controllable variables which lead to difficulty in reaching a conclusion (Gallagher 1974); and
- 2- mutually dependent and interrelated with other variables that were used as success measurement criteria (e.g., user satisfaction, use, quality of decision making and performance) (Ein-Dor and Segev 1978).

In addition, some qualitative variables (e.g., decisions), or intangible variables (such as indirect costs and benefit) that were used to assess IS value or success were unable to be accurately measured or difficult to keep track of and record (Gallagher 1974). The Intangible Benefits could also include, user satisfaction, improved decision quality, work quality (employees' efficiency), and input effort vs. output quality. Also, one should keep in mind that qualitative measures are subject to the individual differences and interpretations, which could vary from one person to another (Gupta and Jana 2003).

Furthermore, measures such as the decision quality and financial performance are not applicable for individual level studies or external-user context, such as ours (Moore and Benbasat 1991). That's because the perspectives and attributes that are involved with the individual-user level context are different from those at the organizational level and thus the success measurement criteria used must be different and suitable for each perspective and context.

Although researchers have attempted to study IS value and success using qualitative approaches, quantitative approaches (Alshawhi and Alalwany 2009), or a combination of both approaches (Muylle *et al.* 2004), the evaluation of IS success has remained a

difficult task (Negash *et al.* 2003) and the objective measures were difficult to identify (Etezadi-Amoli and Farhoomand 1996).

#### ***2.2.5.6 Success Measures Used in the External-User Perspective***

As discussed in Section (2.2.5.3), some researchers attempted to propose models or frameworks to evaluate an e-government success or readiness. These studies varied in the evaluation approach and success measures they used. In those studies that discussed EGS success from the citizens' perspective, the concepts that were mostly focused on were assessing EGS performance and quality in terms of its efficiency and effectiveness, and discussing citizens' acceptance and adoption of an EGS, examples include (Teo *et al.* 2008; Wang and Liao 2008; Chee-Wee and Benbasat 2009; Wangpipatwong *et al.* 2009; Zhou *et al.* 2009b; Yuan *et al.* 2012; Aladwani 2013; Detlor *et al.* 2013; Papadomichelaki *et al.* 2013). Moreover, most of the studies that focused on assessing EGS performance and quality in terms of its efficiency and effectiveness from the citizens' perspective, focused predominantly on investigating the system output quality (i.e., WIS characteristics and/or service quality) but without or with minimal consideration of other relevant and important attributes and what values or benefits the citizens obtained (e.g., Wangpipatwong *et al.* 2009; Elling *et al.* 2012; Karunasena and Deng 2012; Papadomichelaki and Mentzas 2012), also see Table 1. The focus on the concept of citizens' acceptance and utilization of an EGS was due to the necessity of this step towards the realization of potential tangible benefits (time, effort, and cost savings) and intangible or psychological benefits (convenience and satisfaction).

According to Zmud (1979), System Use, User Satisfaction, and User Performance (or efficiency) are important variables that can be used to evaluate IS success and can support decision making in management information system. In fact, system acceptance measures, i.e., User Satisfaction (US) and System Use, are the most common variables researchers use to assess system success.

There is ample evidence in the literature that there is a relation between a system's attributes (e.g., system quality, technical quality etc.), and individual users' attributes (e.g., users' perceptions, users' satisfaction, use and intention to use a system); see for example, (Parasuraman *et al.* 2005; Kumar *et al.* 2007; Cenfetelli *et al.* 2008; Tan *et al.*

2008; Wang and Liao 2008; Verdegem and Verleye 2009; Wangpipatwong *et al.* 2009). However, some researchers have focused on the system attributes (e.g., Koh *et al.* 2008; Prybutok *et al.* 2008; Chee-Wee and Benbasat 2009; Sung *et al.* 2009; Verdegem and Verleye 2009), while another group focused on the individual users' attributes (e.g., Horst *et al.* 2007; Wangpipatwong *et al.* 2008; Hamner and Al-Qahtani 2009; Hung *et al.* 2009; Lean *et al.* 2009).

The former group focuses on the system itself and its characteristics, and attempts to understand these factors, which are considered to be success measures. Their proposition is based on the assumption that a “successful”, good-quality system will influence users' perceptions positively, which will subsequently encourage their adoption of the system. Thus, citizens' adoption of an IS or an EGS is itself regarded as a success indicator (Wang *et al.* 2005; Teo *et al.* 2008; Bwalya 2009).

On the other hand, the latter group focuses on individuals' perceptions and characteristics as the factors that determine the users' use intentions and behavior. The second group of researchers assumes that users' adoption of a system or their intention to continue using a system is an indirect indication of an EGS quality and effectiveness or performance; and that the continuous use of the system will eventually lead to the attainment of some sort of benefits, for both, the users as well as the government (Wang *et al.* 2005).

In fact there are some researchers who claim that the success of an EGS is dependent on citizens' willingness to utilize this service channel (reflected by System Use which were used as success measures) (e.g., Carter and Belanger 2004; Fu *et al.* 2006; AlAwadhi and Morris 2008; Park 2008; Wangpipatwong *et al.* 2008; Lin *et al.* 2011; Ozkan and Kanat 2011). These studies consider citizens' use of an EGS to be an important factor that ‘leads’ or contributes to the success of an EGS.

Though many studies focused on a single measure as proxy to success, e.g., System Use, User Satisfaction, and Intentions to Use; the limitations associated with understanding the level of success when relying on one measure entail combining subsets of those measures together. These attributes, System Use, User Satisfaction, and Intention to Use, appear to be highly interrelated. The next three sub-sections discuss the concept of success

associated with these three commonly used success measures in the IS field, the theory behind considering them as success measures and their limitations.

#### **2.2.5.6.1 The concept of System Use and IS success**

Some researchers argue that the actual behavior of ‘System Use’, as a dependent variable, is sufficient to indicate IS success. System Use, is defined as the degree to which an IS is being used in terms of frequency and level of dependence. Research that has focused on System Use linked users’ attitudes and beliefs with their behavior of using an IS (e.g., [Davis 1989](#); [Davis et al. 1989](#)). Schewe (1976) believed that “attitudes are feelings of favorableness or un-favorableness toward the object” while one’s attitude “should result in behavior with respect to the object consistent with the individual's attitudes” (p.578), though it is not necessarily always true. In his empirical study, Schewe (1976) concluded that “attitudes” do not have a significant relationship with behavior of System Use.

Other scholars also argued that System Use or ‘Use’, as sometimes referred to for brevity, is actually not sufficient by itself to indicate IS success, and they question its validity ([Ginzberg 1978](#); [Lucas Jr 1978](#); [Davis et al. 1989](#); [Wixom and Todd 2005](#)). That is because of the existence of expected or unexpected barriers (e.g., external factors) which may dominate one’s behavior and override the influence of attitude ([Schewe 1976](#)).

In addition, a user’s behavior of using or not using a system is not necessarily related to his/her feelings of liking or being satisfied with a system or not. The behavior of using a system could be influenced by other factors. For example, using a system in an organizational environment is likely to be mandatory ([Conklin 2007](#)). Hence, using the system is imperative as a job requirement, otherwise, the employees will risk having penalties or losing his/her job. Similarly, a user might need to use a system simply because there is no other option to get the required task done. Consequently, Use in such cases is not an accurate measurement of the success of an implemented IS ([Lucas Jr 1978](#)), especially if the notion of success reflects or relates to the quality of the system.

Generally, it is deemed more appropriate that Use be used as a surrogate to measure a system’s success in certain conditions, such as in voluntary situations ([Lucas Jr 1978](#); [Ives et al. 1983](#)). This is because in voluntary situations, such as in the WIS context, if users do not believe that a system is reliable and the information is accurate or suitable,

they will be reluctant to use it and will endeavor to find an alternative method to get their work accomplished (Lucas Jr 1978; Ives *et al.* 1983). This assumption is valid specifically when there are alternatives or other options that users could choose from, such as e-commerce organizations.

It might be sensible to expect that the availability of a ‘good-quality’ and effective EGS, which offers various services and information that citizens may need or that saves its users’ time and effort, would encourage the citizen-users’ adoption or use of the system. Hence, Use, in this case, may be considered as a reasonable success measure. However, as discussed in Section (1.5.1), in the e-government context, the case is slightly different than that of the e-commerce context. The studies that evaluate an EGS success from citizens’ perspective exclusively based on the level of their use of the system are flawed or only partially correct. Citizens’ use of an EGS is not solely dependent on the system’s effectiveness, performance, or quality. There are multiple other possible predicted and unpredicted factors that can influence citizens’ use or intention to use an EGS which are non-system related. It is, therefore, incorrect to depend exclusively on the notion of citizens’ adoption or use of a system as an indication of system success or good-quality.

This is true because citizens may need to use an EGS when there are no alternatives to choose from that provide the same required services. For example, if citizens are hindered from physically traveling to an agency to get their work done and thus attempt to use limited-quality EGS, then Use itself does not truly indicate any form of success; and therefore cannot be considered as an accurate measure to an EGS success.

The concept of encouraging citizens’ adoption of an EGS is, nevertheless, still valid and important. Given that governments aim to achieve certain goals and objectives from implementing EGS, those implemented systems must first be used before any benefits are realized by the government or obtained by its citizens. Some researchers, such as Wang *et al.* (2005), believe that moving citizens to use an EGS will not only benefit citizens, but the government itself will also benefit. By adequately using a “good” EGS, citizens will presumably obtain benefits such as increased convenience and efficiency, and will reduce the burden on the government itself (Wang *et al.* 2005). Government agencies will, consequently, be able to provide better personalized services to their ‘face-to-face’

visitors and reduce their costs. Hence, a government would need to be successful in providing a good-quality EGS that citizen-users are encouraged to use. That's because not only citizens' circumstances driving them to seek using an online facility, the quality and effectiveness of the used EGS also play an important role.

In summary, the attainment of the anticipated benefits is dependent on the level of use. That is, the more people utilize the online channel, the more efficiency and less cost they will have (Wang *et al.* 2005). Therefore, deploying Use as a measure in the EGS success assessment process is crucial but not to be used alone as the assessment will be deficient. Use could reflect or explain part of what the situation is, but it certainly needs to be accompanied with other measures to better assess EGS success with respect to citizens' use.

#### **2.2.5.6.2 The Concept of User Satisfaction and IS Success**

Considering that the end products (e.g., goods, services, systems) are directed to customers, it is natural that, organizations regard these customers to be the best and most important assessors of the end products. Thus, an important objective for an organization is to obtain and keep customers, and to do so, it must attract and maintain customers' satisfaction (Alter 2002). Similarly, in any IS context, system-users are conceptualized as customers in which it is important to keep them satisfied in order to encourage them to use the system; and that includes the external-user context like e-commerce and e-government (Oberer 2002; Verdegem and Verleye 2009) or even the organizational internal-user (employees) context (Alter 2002). User Satisfaction (US) reflects the attitude of the users of a system and it measures how the users view the used IS.

US<sup>18</sup> has been studied in different settings and contexts and as being a dependent and an independent variable. Before the 90s, US studies were focused on the organization internal-users (employees). With globalization, increasing during the 90s, and with the spread of Internet use all around the world, private-sector organizations turned to using the Internet to provide e-commerce as a new facility added to traditional face-to-face trading. Hence, studies, especially those in the marketing field, started focusing more on customers' satisfaction as external-users. More recently, when EGSs were launched in

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<sup>18</sup> The concept of User Satisfaction is discussed in more detail in Section (2.3.2)



the early 2000s, greater emphasis was placed on studying citizens' satisfaction and many scholars considered US to be a reasonable success measure.

In the WIS context, such as an e-commerce or an e-government, part of the end product is the 'platform' (Schwester 2009) or 'interface' (Parboteeah *et al.* 2009; Aladwani 2013) (i.e., the website) with which customers or users interact with and facilitates obtaining what they seek (Voss 2000; Wolfinbarger and Gilly 2003). One important characteristic of a WIS, that encourages adoption, is the users' increased convenience and efficiency in saving time and effort. The online 24/7 service makes it easier and more convenient for people to fulfill their requirements. This approach helps organizations, not only attract and reach out for more customers, but also target those with special needs that have difficulties to transport and acquire what they need from services or suppliers.

Customers/users perceive the end product (including the communication channel, i.e., website) with a certain quality level. That quality is very much dependent on the quality, effectiveness, and, performance of the other work system elements, such as technology, employees, information, business processes; and certain criteria must exist in order for an IS to survive (Alter 2002; Azab *et al.* 2009). For example, information transferred to and received by a customer over a WIS needs to be properly integrated, and the whole chain of business processes is completed appropriately (Alter 2002). As mentioned earlier, for any customer using e-commerce, even if completing an online purchasing task was easy, he/she will not be happy if the purchased item did not arrive on time, or the one received was different from the one initially requested (Alter 1999). For that reason, researches emphasized the importance of studying the external-users' (customers') satisfaction as means to measure the IS e-commerce success, as well as studying their requirements and how to fulfill their needs and expectations.

It is assumed that satisfied customers will return and reuse a system. Many researchers argue that US is the most useful surrogate measure of systems success (Guimaraes 1988; Etezadi-Amoli and Farhoomand 1996), and the most useful assessment for systems effectiveness<sup>19</sup>, where effectiveness resemble a significant aspect of success (Hamilton

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<sup>19</sup> "Many empirical studies of IS effectiveness adopt user satisfaction as a primary measure or surrogate of IS success due partially to convenience and ease of measurement" (Petter *et al.* 2008). Though IS effectiveness does not mean IS success where it appears in some studies as a measurement criteria of one of

and Chervany 1981). Iivari and Ervasti (1994), argue that US has a positive relationship with effectiveness, and is an appropriate tool to measure IS effectiveness or success. US was shown in the IS literature to work as a proxy to measure an IS success and effectiveness (Gallagher 1974; Ives *et al.* 1983; DeLone and McLean 1992; Iivari and Ervasti 1994).

Given that a system's effectiveness is reflected by its users' satisfaction (Negash *et al.* 2003), US is considered as a good perceptual measure and an indicator for IS success (Ives *et al.* 1983; Etezadi-Amoli and Farhoomand 1996). So, as a general conceptualization, it could be assumed that a system is "successful" when users consider the system to be of "good-quality" or "effective for them" which makes them satisfied with its outcomes and then accepting to use it.

Assessing users' perception of the used-system effectiveness and output quality is very important for an organization. It helps in understanding the aspects of weaknesses, flaws, and advantages; and accordingly the organization can fix these shortcomings to maintain an effective performance and reaches success from a particular perspective. Thus, maintaining US is regarded as a critical success factor for an organization. This is particularly true from the e-commerce context where the behavior of using a system is voluntary and there is competition among the organization. Without these customers, the organization is not successful and is not able to maintain its position in the market. Consequently, an organization management must develop effective means to assess the US of both internal and external-users in order to evaluate the quality and effectiveness of its IS (Ancarani 2005).

This conceptualization may also be appropriate in the e-government context where one main objective of introducing an EGS is to respond to the external-users (i.e., citizens) call and expectations for providing more efficient and effective services. However, in the e-government context, governments are not dependent on citizens' use of the system to

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the attributes to assess an IS success (e.g., Sedera *et al.* 2004), IS effectiveness has been closely linked with IS success that it was used in some studies to reflect the same notion; meaning an effective system is a successful one (e.g., Hamilton and Chervany 1981; DeLone and McLean 1992; Negash *et al.* 2003). However, this connection is dependent on the success evaluation context. To be more accurate, the success of an IS is dependent on the measurable objectives that were initially set (Powers and Dickson 1973). So if an IS effectiveness was an objective that an organization wanted to accomplish, then having or evaluating the IS as being effective is considered as an IS success.

‘survive’ nor the use of the system is entirely voluntary. A government may be able to fulfill some of its objectives or goals of launching an EGS if citizens accept and use the system and were consequently able to achieve what they seek (e.g., accomplish their task conveniently and save time and effort). Citizen-users could accordingly be satisfied with it and continue using it if the provided system was effective and of good-quality. Consequently, the government will be successful in fulfilling its objectives with respect to providing better services and tangible benefits to its citizen-users when using the EGS facility, reducing the government’s costs, assisting the offline face-to-face channel, and reducing the work load on the government employees.

Due to the importance of assessing an IS success and the role of US in helping in the assessment process, previous models and approaches of measuring IS success and US (presented in detail in Section (2.3.2)) in the inter-organizational context were adopted for the e-commerce context, and later on, in the e-government context. To some extent, the determinants of customer-user satisfaction were very similar to that of internal-users (employees). For example, system quality, information quality, ease of use, service quality. However, there are additional attributes that needed to be taken into account due to the two main differences between the environments of internal-users using enterprise systems and external-users using the e-commerce or EGS. First, as mentioned earlier, System Use inside organizations is mostly mandatory. On the other hand, in the external-users’ context, choosing to use a WIS or a “website”, as means of interaction with the service provider, is mostly voluntary. This makes the context of US and its determinants different from that of the internal-user context. Second, the transferred information with respect to the users (employees) in the internal organizational context is mostly formal and work-related rather than personal or financial information as in the case of the external-user context. This, in turn, led to another criterion that impact user satisfaction to emerge, which is related to privacy and security issues and users’ trust.

Table 4 presents examples of references of research that focused on studying user perceptions and feelings towards a certain system quality and the consequences in a certain context.

Table 4: Examples of US <sup>20</sup> references presented in the literature	
Internal	External
For example, (Amoroso and Cheney 1991), (Baroudi 1985), (Bhattacharjee and Sanford 2006), (Garrity <i>et al.</i> 2005), (Garrity and Sanders 1998), (Goodhue and Thompson 1995), (Kulkarni <i>et al.</i> 2006), (Mahmood and Sniezek 1989), (Mirani and King 1994), (Paul <i>et al.</i> 2004), (Sanders and Courtney 1985), (Sethi and King 1999), (Wixom and Todd 2005), (Wixom and Watson 2001), (Yoon <i>et al.</i> 1995), (Youngohc and Guimaraes 1995)	E-commerce
	E-government
	For example, (AGIMO 2006), (Akman <i>et al.</i> 2005), (Alshawhi and Alalwany 2009), (Bertot and Jaeger 2006), (Carter and Belanger 2004), (Carter and Belanger 2005), (Hung <i>et al.</i> 2009), (Jaeger 2005), (Jaeger and Matteson 2009), (Mohamed <i>et al.</i> 2009), (Wang <i>et al.</i> 2005), (Reddick 2005), (Schedler and Summermatter 2007), (Wangpipatwong <i>et al.</i> 2008), (Verdegem and Verleye 2009)

### 2.2.5.6.3 The Concept of Intention to Use and IS Success

“Intention to Use” is a psychometric attribute that reflects satisfaction and has also been used as an IS success measurement (e.g., Bhattacharjee 2001; Teo *et al.* 2008; Wangpipatwong *et al.* 2008). However, the initial intention to use an IS is not sufficient by itself. Rather, the “intention to continue to use” an IS is a more significant factor (Bhattacharjee 2001), and is a better indicator of IS success. Indeed, many scholars have argued that IS success is reflected by repeated use, which indicates that the users are content with a system’s output and the process of using it, especially in voluntary settings. Likewise, in the context of e-government, the repeated use of an EGS to obtain information or e-service(s) would most probably indicate that the government succeeded

<sup>20</sup> US was studied in the inter-organizational context with respect to employees and executives satisfaction; e.g., Technology Task Fit/Support Satisfaction, Overall System Satisfaction, job Satisfaction, Knowledge Satisfaction, Decision Satisfaction

in implementing an EGS that was sufficiently designed, updated, and maintained; which in turn fulfills the users' requirements (Wangpipatwong *et al.* 2008).

Oliver (1980) hypothesizes that the post-usage attitude, such as the intention to make a purchase, using the system, or continue/discontinue using it, is a function of satisfaction. In other words, a user's future attitude, such as the behavior intention, after using a particular system is determined by the user's satisfaction. For example, when users discontinue using a system, it would imply that they are dissatisfied with it because it was difficult to use and/or did not meet their needs and requirements; this is referred to as "disenchantment discontinuance" (Rogers 1995). Another possible inference for why users discontinued using a system is because they opted for using a better alternative that is more effective or better in performance; and this is referred to as "replacement discontinuance" (Rogers 1995; cited in, Wangpipatwong *et al.* 2008). Customers are generally concerned in the relative advantage of a product or a service when compared to the available alternatives (Hazlett and Hill 2003). Nevertheless, in an e-government context, this assumption is not entirely applicable unless the two options are either using the available EGS or going through the traditional face-to-face channel.

Wangpipatwong *et al.* (2008) state that, although various researchers (e.g., Carter and Belanger 2004) have investigated the initial intention to adopt an EGS, no adequate attention was given to appropriately investigate the intention to continue using a particular system. Governments need to consider citizens' perceptions towards their EGS and investigate the factors that influence citizens' continuance intention (Wangpipatwong *et al.* 2008; Karunasena and Deng 2012).

When assessing the success of a particular EGS from the citizens' perspective, relying solely on their Intention to Use the system as a measure is insufficient. This is particularly true when the assessment is carried out to understand whether the citizen-oriented goal of increasing their efficiency has been accomplished. That is because the intention itself does not mean that the citizen-users have obtained their anticipated benefits. For that reason, it is important to assess explicitly whether citizen-users have obtained the anticipated benefits. The incorporation of Obtained Benefits in the assessment, in addition to the intention to continue using a system, endorses a better assessment of the level of success.

#### **2.2.5.6.4 Selected Examples of Citizen-Centric Studies that Focused on System Use, Intention to Use, and User Satisfaction**

Van Dijk *et al.* (2008) introduced an adoption model that is mostly based on individual characteristics such as individuals' attitude, digital literacy, demographic, expectations, etc. to measure citizens' use and intention to use an EGS. In their study, the results revealed that performance expectancy is very much related to preference and experience. Performance expectancy reflects the expectation of how an EGS will perform, and how would the system be useful if it performed well and, consequently, provided good services that met citizens' needs. Also, the first and the second important mental factors, i.e., performance and effort expectancy, were significantly correlated with one's intention to use an EGS. However, in the causal testing, both of those variables were insignificant. The effort expectancy, is similar to the concept of 'Perceived Ease of Use' introduced in the Technology Acceptance model (TAM) proposed by Davis (1989)<sup>21</sup>, which reflects one's beliefs of how easy it is going to be to use a particular system.

Reddick (2005) proposed one measure of an EGS performance that reflects the extent to which citizens are able to receive what they are seeking which would encourage their adoption of the system. His evaluation approach was focused on understanding citizens' 'e-interaction' with the government (using EGS) while taking into consideration the services provided in each stage of the system's development. The author believes that the degree to which citizens are willing to use and benefit from an EGS is dependent on certain characteristics or factors. These factors are the EGS output quality, citizens' social demographic characteristics, trust of the possible e-democracy (Reddick 2005).

Wangpipatwong *et al.* (2008) conducted a study to investigate the fundamental factors that influence e-government users to continue using an EGS. They have based their study on the concept of TAM, and used Perceived Usefulness (PU) and perceived Ease of Use (PEU), as well as computer self-efficacy introduced by Compeau and Higgins (1995). All three variables served as antecedents to individuals' behavioral intention to continue using an EGS. (Wangpipatwong *et al.* 2008). Wangpipatwong *et al.* (2008) findings revealed that the higher citizen's perception of Usefulness and Ease of Use of an EGS is, the higher their intention to continue using the system will be. The study also revealed that PU was the strongest predictor of citizens' intention to continue using the system.

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<sup>21</sup> TAM will be explained in more detail later in Section (2.3.2.2).

They also concluded that PEU seemed to enhance the sense of Usefulness in citizens, which indirectly increases the intention to continue using an EGS. Consistent with Campeau and Higgins (1995), the authors also found that computer self-efficacy was positively related to users' Intention to Use an EGS, which implied that the higher citizens' self-efficacy is, the higher the "Intention to Continue Use" the system will be. The authors further concluded from their investigation that citizens place more focus on PU and PEU than computer self-efficacy (Wangpipatwong *et al.* 2008).

Wang and Liao (2008) performed a study to measure e-government success from citizens' perspective through validating DeLone and McLean<sup>22</sup> (2003) IS success model. Their empirical findings supported all the hypothesized relationships, except for the link from system quality to use. Although the authors considered the system attributes, individual Use, Satisfaction, and Tangible Benefits; they did not take into account other individual attributes that are important and impact one's intentions of utilizing the EGS which we postulate to be important, like PU and Trust.

While using the technology acceptance model (TAM) proposed by Davis (1989) to base their model, Verdegem and Verleye (2009) investigated user (citizen) satisfaction from the e-government service. They argue that citizens' actual adoption of an EGS is dependent on their awareness of its existence and usefulness in fulfilling one's needs, as this would make them have the intention to use it and then actually attempt to utilize it. Having actually used the EGS, citizens will consequently form a perception of the systems' outputs quality and characteristics, and this will determine their level of satisfaction. The authors assert that their qualitatively and quantitatively validated model assists the e-government suppliers to understand users' perception and acceptance of e-government services (EGS).

Moreover, Sung *et al.* (2009) performed a study to explore the "quality divide" caused by perceived differences between users and administrators in order to understand how a government can successfully implement a citizen-centric EGS. The 'quality divide' refers to the differences of the information and services qualities in an e-government portal (EGP) which are provided independently by each government agency (Sung *et al.* 2009).

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<sup>22</sup> See Section (2.3.2.2) for more details

The authors based their proposed model on Parasuraman *et al.* (1988) conceptual model of service quality. The concept on which their model is developed is based on identifying the “major service quality variables” of the [system]<sup>23</sup> to serve and an indication of the impact of this service quality on users’ satisfaction and intention to continue using the EGS. One of the constructs that account for the total service quality and influence Users’ Satisfaction and Use Intentions was “responsiveness”. The “responsiveness” in their study referred to the responsiveness of the public servants to citizens’ online inquiries, and the speed of the information retrieval and navigation in a particular EGP, etc. (Sung *et al.* 2009). Obviously, the first example is related to employees’ responsiveness and service quality. However, the second and third examples seem to be more associated with either individual’s efficacy and experience in using the system, or, with the system technical quality (characteristics).

The results of the empirical validation show that, the “web design and appeal” was a very significant antecedent to citizens’ Satisfaction. “Reliability”, on the other hand, which is related to the system’s operational competency and security, was found to be insignificant (Sung *et al.* 2009). It seems that the relevant importance, which was indicated by the empirical results for those two variables, does not reflect the nature of the e-government domain.

In their conclusion, they assert that citizens’ intention to reuse an EGS, which is determined by the total service quality of the EGS and users’ satisfaction, is considered as an indication of system success. The authors also suggested that the desired outcomes can only be attained if a significant number of citizens somewhat rely on EGS.

#### ***2.2.5.7 Shortcomings of ‘Similar’ Existing Citizen-Centric Studies***

This section addresses the shortcomings of the studies that have previously been conducted to evaluate the success of EGS from the citizens’ perspective. The first part of this section identifies the shortcomings of the e-government citizens-centric evaluation studies in general. The latter part presents in details and critically analyzes the e-government citizen-centric evaluation studies that use the same parameters in which we

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<sup>23</sup> The square brackets indicate the author(s) used this term or expression in their study.



propose to be important for an e-government citizen-centric success evaluation model. The purpose of this discussion is to avoid these shortcomings in our study.

Most studies that evaluated EGS success from the citizen-centric perspective were based mostly on either investigating citizens'

- 1- behavior or behavioral intention to use an EGS, which would subsequently lead to the attainment of the potential Tangible Benefits and cause the reduction of governmental costs; (e.g., Carter and Belanger 2005; Hung *et al.* 2009; Jaeger and Matteson 2009; Lean *et al.* 2009; Wangpipatwong *et al.* 2009) , or,
- 2- psychological benefit (i.e., Satisfaction) with the EGS outputs as an indication for success; (e.g., Kumar *et al.* 2007; Cenfetelli *et al.* 2008; Teo *et al.* 2008; Bwalya 2009; Mohamed *et al.* 2009; Sung *et al.* 2009; Verdegem and Verleye 2009).

In addition, evaluation models, in general, that have been proposed to assess an EGS quality, performance, or success from citizen perspective were mainly adopted from the e-commerce context. Most of these models lacked the suitable alteration to fit the public service sector, and that poses a credibility question (Wang *et al.* 2005; Azab *et al.* 2009). Moreover, many researchers suggested that e-government evaluation has not been given sufficient attention and was overlooked (Jones *et al.* 2006). However, as presented throughout this study, there have been an increasing number of studies on EGS evaluation since the publication of the Jones *et al.* study.

As mentioned previously, the notion of received benefits from using an EGS, also sometimes referred to as 'Public values', are the values (or benefits) that citizens would obtain by using an EGS, and it is an important concept when evaluating an EGS and its success (Karunasena and Deng 2012). It appears that there is a lack of studies proposing valid and reliable models that 'actually' measure the consequences of using an EGS. Very few researchers have attempted to measure these benefits in the e-government context while incorporating both the psychological as well as the tangible benefits, (i.e., Wang and Liao 2008; Chae-Eon *et al.* 2009). These studies regarded all the citizens' obtained benefits to be an indication of EGS success. Wang *et al.* (2005) claim that some models concentrate on government efforts in delivering web-based services; yet, only

taking into account individuals attitudes and behavior of utilizing the system. For that reason, some researchers, such as Wang *et al.* (2005), have attempted to fill that gap in their own studies.

Wang *et al.* (2005) proposed an evaluation approach for an e-government online channel. In summary, they suggested that the performance of an EGS, in facilitating the interaction between the public and the government agencies, determines the realization of the potential benefits. That is, by having word of mouth recommendation or having experienced a good EGS performance, citizens will consequently use this service channel, which will ultimately save them cost of travelling and effort. Utilizing an EGS as a service channel is a prerequisite for realizing the benefits (Wang *et al.* 2005; Kumar *et al.* 2007; Wangpipatwong *et al.* 2008).

Wang *et al.* (2005) evaluation model was proposed to help inform a government agency whether its EGS was of high-quality, and to identify the organizational factors that account for the success or failure of the EGS. In other words, the authors attempted to form a citizen-centric model that evaluates an EGS output and the level of improvement in its performance (outcome/consequences). They suggest that the improvement in citizens' efficiency or task performance, while deploying the EGS, implies that the government performance has also improved because of the availability of a "good-quality" EGS that facilitate delivering the services to the citizens.

Their proposed model was 
$$P = f(C, T, S, C \times T, C \times S, T \times S, C \times T \times S)$$

Table 5 shows a summary for each parameter, used in Wang *et al.* model, what each referred to, and what the possible attributes are. The notion "f( )" stands for "a function of".

<b>Table 5: Wang <i>et al.</i> (2005) definitions of the parameters of their e-government evaluation model</b>	
<b>Parameters</b>	<b>Attributes</b>
<b>P</b> is a measure of the users' performance of Web-based information seeking	The users' performance outcome includes two sub-attributes, the process and the substance. The process attribute focuses on how the task is conducted and the substance attribute looks at the actual results/consequences. For example, the process outcome could include the time spent to complete an information task, actions taken and nodes visited during the information seeking session. The substance outcomes could include the quality of the information found, appropriateness of information found, and satisfaction with the outcome.
<b>C</b> refers to citizen's characteristics	Could include gender, age, previous experience in using the World Wide Web, domain expertise, cognitive styles, problem-solving styles, etc.
<b>T</b> refers to the characteristics of information task	For information tasks, the factors that may influence the user's information seeking performance could include, uncertainty/predictability, the appropriateness of being completed by using Web technology, how clearly the information task is defined, and how urgent it is.
<b>S</b> Refers to the characteristics of government Website	The perceptual stimuli loaded on Web pages are corresponding with cognitive load for Web visitors, which may lead to variations in information seeking performance from person to person the structural attributes of a Web page design could make certain information seeking tasks become easy or difficult; and the reliability that a Website has may make the information seeking experience frustrating or the opposite.

The authors argue that the variation of the services provided online from one government agency to another, in addition to the variation in the population they serve, make identifying all the possible factors influencing the citizens' performance and including them in one model a difficult task, and the generalizability would be invalid. Accordingly, the authors formed a generic model, yet it cannot be directly used to assess a specific web-based e-government service.

Though the idea of their model seems to be comprehensive and worthy, the model had some shortcomings. The model lacks clarity of the components that should be taken into account. The authors base their model on possible attributes. Given that the proposed model is supposed to be generic, these attributes are not identified and defined clearly which form some vagueness. Accordingly, the chances of selecting the appropriate

components to measure each attribute to investigate citizens' performance is subjective to the evaluator, which can vary from one to another. In addition, because the chosen attributes for the generic model can differ in each time it is conducted, the validity and reliability of the model cannot be ensured. Moreover, although the notion of service quality has been demonstrated in the literature to have it impacts on the tangible benefit which customers gain (increased efficiency), it was not taken into account as a component of the system and a determinant of the individual task performance.

Another study proposed by Park (2008), focused on identifying the factors that influence a particular EGS based on citizens judgment of the obtained benefits (obtained values as referred to in Park's study). His research question was based on what citizens value most in e-government services. The notion of e-government in the author's study was based on West (2004) definition of e-government as being "the delivery of government information and services online through the Internet or other digital means" (Park 2008, p.1); and this is a wider notion than the one we focus on in this study which is limited to the services introduced via the Internet channel. The author used a structured online survey to assess citizens perspectives of what the important aspects were to obtain the means objectives and subsequently fundamental objectives. These attributes were designed to serve as benchmarks for a prospective e-government initiative to be successful (Park 2008).

Similar to Wang *et al.*, the author also believes that in order to have a successful e-government initiative, it is important to understand and influence citizens' adoption of EGS, because this success is dependent on citizens' willingness to use the EGS. Citizens are likely to use the e-government service channel if they receive more value than the through traditional channel.

He developed two instruments to measure perceived e-government value. They were means objectives and fundamental objectives<sup>24</sup>. The development of these instruments is based on the work of Keeney (1999) and Torkzadeh and Dhillon (2002), which was based on assessing the value and success factors in the e-commerce environment. The basic

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<sup>24</sup> The means and fundamental objectives have a similar notion to what we refer to in our study as "intermediate-objectives" or a success factor and the government's core (strategic) goal, respectively – (see Section (1.2)).

idea behind the means objective and fundamental objective is that the means objectives must come first in order for citizens to utilize the e-government initiative and obtain the fundamental objectives. This simply means, obtaining the ‘objective of providing’ a good-quality output, will subsequently impact the attainment of the final objective (i.e., good consequences or outcomes)<sup>25</sup>. We agree with the author in that there are necessary variables that influence the overall quality of an EGS. The level of this quality will be a significant determinant of citizens’ adoption of the system; which will ultimately provide them with the fundamental or strategic objective.

By reviewing the authors’ instrument (i.e., survey questions) we found that the means objectives have four main parameters. The first is concerned with the public’s trust in the privacy and security issues of how their information is protected and handled. The second is related to what the public anticipate with regards to information accessibility and quality. The third parameter is about the anticipated access benefits, including facilitating the e-government services through different means of ICT channels of interaction (e.g., digital devices) as well as taking into consideration the disadvantaged and digital-divided group of people to benefit from the e-government services. The fourth and last parameter, Service Quality, it is mainly related to the trust in the systems’ “operational competency” (Park 2008).

Moreover, the measures used in the citizen-centric “fundamental objectives”, which are the final consequences of implementing and using an EGS, reflect two main parts. The first part, which encompasses most measurements, concerns the citizens’ direct and instant gained benefits. This includes the Usefulness of the system’s information and services which cater in saving citizens’ time, effort, and cost. The second part of the measurement is concerned with general criteria of benefits that the society as a whole gains through the “environmental impact” which results from having citizens use ICT instead of traveling in person to the government agency. Such benefits, for example, are minimizing pollution, traffic, and accidents.

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<sup>25</sup> This concept has been introduced and discussed earlier in the introduction section.

Park (2008) study shares common grounds with our proposition of the importance of a good-quality EGS which would presumably lead to the attainment of the final benefits, there are still some differences between Park's study and ours; for example:

- 1- In Park's study, it is assumed that an EGS would be successful from a citizens' perspective if the means objectives and the fundamental objectives have been accomplished. It proposes attributes to be important from citizens' perspective in order to regard an EGS to be successful. In other words, it focuses on identifying the factors that influence citizen's judgment of the potential values from implementing an EGS. However, in our study, we focus on what have been already realized from using an EGS as an indication of EGS success.
- 2- In Park's study, the concept of obtained benefits are seen to be long term or attained over a period of time and could impact the whole society, where as in our study the concept of benefits concern those that are realized instantly by citizen-users after using an EGS (the psychological and citizens efficiency-related benefits).
- 3- Park's study differs in that it does not provide a utilization frame-work in which a given quality system's output leads to a certain level of positive consequences.

Additionally, a study conducted by Wangpipatwong *et al.* (2009) focused on exploring the quality of system attributes on citizens' intention to continue using an EGS. While referring to the e-government literature, Wangpipatwong *et al.* (2009) used the System Technical Quality, Information Quality, and Service Quality corresponding to the website quality. Their findings showed that the higher the qualities of these attributes are, the higher citizens' intentions to use an EGS will be. Their research findings also revealed that the System Technical Quality is the most significant determinants of users' intention to adopt an EGS while the Service Quality and Information Quality came second and last, respectively (Wangpipatwong *et al.* 2009).

However, it is worth noting that the approach in which the authors used to develop their model and assess the success of an EGS appeared to have some shortcomings. Though Wangpipatwong *et al.* (2009) depended on concepts for constructs from previous studies, the application and operationalization of the nominated constructs and their measurement items seemed to be inconsistent and overlapping due to the variations in the conventional

conceptualizations used in the IS literature. The authors used the concept of system quality (based on the IS literature) while borrowing the concept of service quality from the marketing literature. For instance, 'system quality' imply the system 'technical' quality, as commonly acknowledged in the IS literature, while the authors defined it as reflecting the concept of a system as a whole, which encompasses all system components. Their construct of system quality also included the 'Usefulness' as a component borrowed from Davis *et al.* (1989) technology acceptance model (TAM), yet did not reflect the same exact concept introduced in TAM.

Similarly, the service quality in that study was not confined to the aspect of staff-service quality and support per se, as used in the IS literature, and in particular, D&M model from which the construct was borrowed. The Wangpipatwong *et al.* (2009) used the item components proposed by Parasurman *et al.* (1988) from the marketing literature reflecting the overall service quality which impact the customers perception, including the website interface. Also, the "appearance of personnel", is totally irrelevant, especially in the e-government context. This irregularity has resulted in overlapping of the measurement items in their proposed model; posing some credibility issues.

Alshawhi and Alalwany (2009) claim that there is no evaluation study proposed in the literature that sufficiently evaluate the e-government development and management. Thus, they proposed some evaluation criteria for developing an EGS evaluation framework and empirically validated the evaluation instrument. The proposed evaluation criteria were the following:

- 1- Efficiency with the service: reflected by the time spent to complete a task and the satisfaction with the outcome.
- 2- Money saving: measured based on how much money citizens save by using the e-government online system.
- 3- Time saving: is measured on how much citizens save time by using the EGS.
- 4- Personalized information and service: which were measured by the degree to which the system can enable citizens to personalize information and services according to their needs.
- 5- Efficient user interface: reflect system interface design and characteristics as part of the system technical quality, and it was assessed by the available options of

user interface, including graphics interface, multi-screen interface, and attentive user interfaces.

- 6- Disability access: assessed based on whether the system offers some form of disability access and foreign language translation features.
- 7- Openness: reflects information quality as commonly acknowledged in the literature and it was measured by value of information in terms of amount, quality, and transparency that government organization provides to citizens.
- 8- Trust in the Internet: measured by the degree in which citizens are confident in the Internet.
- 9- Trust in government: was assessed by the level of security in handling citizens' information and privacy.
- 10- Perceived ease of use: is related to the complexity level and user friendliness of the website as part of the system technical quality, and was assessed by the level of complexity in using the e-government online service.
- 11- Perceived Usefulness: measured by the comprehensiveness and features of the EGS.

The authors claim that this instrument is considered to be an effective, adaptable, and a reflective EGS assessment tool from citizens' perspective. They argue that such instrument will be of great value for two reasons: useful for governments to enhance their understanding of the factors influencing citizens' utilization of e-government; and useful for governments to use it to provide feedback for planning future e-government initiatives.

Although the proposed notions of the evaluation criteria seemed to be comprehensive, their assessment criteria had some shortcomings. First, it lacked the aspect of service quality provided by the public servants at the backend (as a component of EGS). It also lacked details in exploring the technical aspect of the website, such as the loading time, navigation and consistency. In addition, according to the authors, Perceived Usefulness, as an assessment criterion, was measured by the comprehensiveness and the features of EGS, which does not accurately reflect the common notion of Perceived Usefulness used in the literature and introduced by Davis (1989) in TAM. Hence, rather than measuring what is actually there, it would have been more appropriate if this construct was



measured through users' perceptions and believes about the usefulness in terms of being a better option than the traditional face-to-face channel; or, in terms of facilitating the accomplishment of the required task in an easier and more efficient manner. In general, their instrument and questions used to measure these evaluation criteria were very brief and sometimes redundant. It required more investigation of the EGS attributes, and needs further validation.

#### ***2.2.5.8 Recommended Attributes for the Evaluation***

As mentioned earlier, there are several perspectives and various stakeholders that use an EGS. Hence, it is imperative to identify the population and the perspective of investigation, and accordingly, use the suitable measurement criteria (i.e., survey questions) and instruments, which reflect the requirements of that particular group of users. For instance, to measure the obtained benefits, "one has to adopt some stakeholder's point of view about what is valuable and what is not" (Seddon 1997, p.246). The external stakeholders (e.g., citizens) are dependent on the system and the e-services provided through it, while the internal stakeholders (e.g., government employees) are important to maintain the system and to get it working properly (Axelsson *et al.* 2013). Therefore, to be more accurate when evaluating an EGS from the citizens' perspectives, the investigation should be carried out taking into consideration whether their needs and requirements have been met (Alshawhi and Alalwany 2009).

##### **2.2.5.8.1 Attributes We Propose to be Important for this Study**

In this study, we focus on the values that citizens receive as an indication of the success of an EGS. The notion of success used in this study reflects the ability of providing citizens with a good-quality EGS that would encourage them to use it and ultimately increase their efficiency in terms of increasing convenience and saving time and effort. Based on this definition of success, certain attributes need to be incorporated in our proposed "Citizens-Centric E-government Evaluation Model" (CEM). These attributes are presented below.

To assess the overall EGS quality, performance and effectiveness from citizens' point of view, all system attributes (namely, Information Quality, System Technical Quality, and

Service Quality), which are reflected as perceptual measures, need to be explicitly evaluated. Each of these attributes will be discussed, in its own right, in Sections (2.4.1), (2.4.2), and (2.4.3). As mentioned earlier in Section (2.2.5.6), it has been widely presented in the literature that a system quality and effectiveness impacts user's behavior and behavioral intention to use a system, especially in voluntary or semi-voluntary settings. The actual use of a system is a prerequisite to benefiting from it. Therefore, the use and intention to use attributes are considered in CEM.

Users' perception of the EGS output quality they receive is not the only determinant of their use behavior and behavioral intentions to use the system. There are other factors that impact one's use and intention to use an EGS. These variables are also related to the individuals' trust in the system; such as, trust in the information they receive through EGS, the security of the system when they use online payments, the privacy of citizens' personal and confidential information in terms of how it is being accessed and by whom, as well as the trust in the operational competency in accomplishing the appropriate task within the assigned time frame. Lack of this trust may hinder citizens from using the system. Thus, we postulate that the trust attribute be incorporated in the CEM.

Furthermore, individuals' characteristics and circumstances significantly influence individuals' cognitive beliefs about the Usefulness of the system. That is, individuals' intention and/or actual adoption of the system is significantly influenced by their beliefs and expectation that the system is a beneficial tool to perform their tasks and is expected to help them save time, effort, costs, and dependence on others. Therefore, the Perceived Usefulness attribute is considered in the CEM as part of the individual's attribute.

Having been influenced by one's need or perception to use an EGS system, with a given quality, it is expected that citizen-users will be able to realize some values or benefits. These values include increasing one's efficiency represented by saving time, effort, and costs, which will also provide psychological benefits represented by satisfaction. These two attributes of benefits, the tangible and psychological, are important in reflecting the level of success of an EGS in providing 'instant' benefits to the citizen-users; and therefore, they have been included in the CEM.

As mentioned earlier in Section (2.2.5.6), it is insufficient to use either User Satisfaction or System Use, by itself, as an indication for obtaining a better service from using an EGS rather than the traditional channel, in terms of convenience and increased efficiency, is insufficient. Therefore, we will include both these attributes while assuming that:

- 1- citizens' increased efficiency in terms of increasing independency and saving time and effort, is greatly influenced by the quality of the EGS; and
- 2- citizens' satisfaction with their experience from using the EGS, is also influenced by their perceptions of the EGS quality and their increased efficiency.

In summary, four aspects are being included in our proposed model (CEM), each of which includes two or more attributes as explained below (and discussed in detail in the following sections):

- 1- The EGS's attributes that reflects the EGS output quality and effectiveness.  
This includes:
  - Information Quality (IQ)
  - System Technical Quality (STQ)
  - Service Quality
- 2- the citizen-users psychological attributes variables, which includes
  - Perceived Usefulness (PU)
  - Trust (T)
- 3- the citizens' adoption related attributes which leads to the attainment of the benefits; and that includes
  - Intention to Use (IU)
  - System Use (Use)
- 4- The obtained benefits (which are the system outcomes of using an EGS) reflected by
  - Tangible Benefits (TB)
  - Psychological Benefit – User Satisfaction (US)

#### **2.2.5.8.2 Aspects Relevant to E-Government Evaluation but has been Discarded from the CEM**

As mentioned in Section (2.2.5.3), transparency and e-democracy are sometimes regarded as important aspects of e-government evaluation and part of the potential benefits of an EGS. However, they are not considered in our model because they do not fit within the scope of our study for the following reasons:

- 1- The scope of our study focuses on the benefits such as citizen-users' satisfaction and most importantly their increased efficiency. Although transparency and e-democracy impact the citizens' level of satisfaction, they are not related to their tangible benefits or increased efficiency (i.e., time, effort, and cost saving) per se.
- 2- The model of this study investigates whether the government was able to deliver better service through an EGS in terms of increasing citizens efficiency in fulfilling their required task and satisfying them. In other words, evaluating both psychological and tangible obtained benefits, as immediate consequences, that are instantly or simultaneously realized when performing specific ordinary tasks using an EGS, e.g., ID renewals; fines payments, e-tax, downloading and uploading forms,. On the other hand, e-democracy or transparency are realized over a long period of time through various stages of e-participation, and they impact the whole population rather than an individual user.
- 3- These attributes require special investigation in their own right due to the complex nature and magnitude of these attributes, especially that these attributes are more socially and politically related benefits.
- 4- Transparency results from the existence of other attributes and is not an actual e-service.

In addition, the “accessibility” attribute, which is related to the functionality provided through an EGS to people with disabilities, is not considered in this study. Although, several studies (e.g., [Abanumy et al. 2005](#); [Park 2008](#); [Jaeger and Matteson 2009](#); [Kuzma 2010](#)) have discussed or referred to accessibility for people with disabilities as being an important criterion for an EGS success, we believe that this aspect is not particularly

significant. A user who has any sort of impairment and would need an accessibility tools, such as using voice activated tools like speech-to-text and/or text-to-speech tools, magnifier, narrator (Jaeger and Matteson 2009); would have already had these tools available in his/or own PC in order to be able to use the computer or website before getting to the e-government website in the first place. We believe that this particular attribute of “accessibility” is not valid enough to impact citizens’ obtained psychological and tangible benefits, and thus, it is not directly related to our study. However, the “accessibility” attribute, which sometimes refers to the functionality of the system in terms of citizens’ ability to open and use the e-government website, is considered in this study as being part of the system technical characteristics.

Moreover, “computer self-efficacy<sup>26</sup>”, which was suggested in several studies to ultimately have an impact on individuals performance, intention, and behavioral intention to use an IS (e.g., Bandura 1977; Compeau and Higgins 1995; Hong *et al.* 2001; Hung *et al.* 2006; Pavlou and Fygenson 2006; Wangpipatwong *et al.* 2008; Hung *et al.* 2009; Luarn and Huang 2009) is not considered in our study. Though we agree that this attribute would have an influence on one’s final obtained psychological and tangible benefits, it is not incorporated in our proposed model because of the reasons discussed below.

For the purpose of this study and the development of the research model, our primary interest is related to:

**1-** Assessing the citizen-users’ perception of the overall EGS output quality, effectiveness or performance which would impact citizens’ obtained benefits.

Since we focus on measuring what citizens were able to obtain from the used EGS, it is more appropriate to use a sample of EGS users rather than a sample that represents the whole community. That is, we mainly need to target the population of those people who actually chose or attempted to use an EGS as an alternative over the traditional offline, face-to-face interaction channel. This group of people are assumed to have basic knowledge of computer use (IT literate) and are familiar with using the Internet and its’ facilities (which is becoming more of a common skill especially with the advancement of

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<sup>26</sup> Self-efficacy” and its relation with the individual’s cognitive beliefs and planned behaviour theory is explained in more details in Section (2.3.2.2)

technology in all aspects of current life style). Therefore, we do not believe that including a computer self-efficacy variable in our model is a reflective variable that fit the scope of our investigation and may, hence, produce a bias result, an unrepresentative conclusion, or may be of no relative value.

**2-** Measuring the positive impact and accumulated benefits for those citizens who use an EGS, such as satisfaction and time saving, through the repeated intention to reuse the government website.

We believe that citizens' use of an EGS is a prerequisite to obtain the final benefits which we aim to measure, and that there are some influencing factors that affect individuals' "use". This study is concerned with benefits obtained from what is provided to citizens through an EGS rather than to focus on "use" determinants per se. Hence, we need to consider the "use" determining factors that are directly related to individuals' beliefs about an EGS quality or effectiveness in terms of their perception of what is provided through the system. This include citizen-users' perception of the existing system characteristics and qualities (i.e., system related factors) and their cognitive belief about the EGS (i.e., individual related factors). In other words, only the cognitive beliefs variables that are directly interrelated or influenced by an EGS are considered but not those that that are determined by the individuals themselves in terms of their characteristics, such as their beliefs about their computer self-efficacy.

## ***2.3 The Obtained Values (Benefits) from Using an EGS***

### **2.3.1 The Notion of Obtained Benefits**

There is no doubt that individual's behavior and intention to conduct a particular action are determined by his/her expectation of the attainment of certain values. Generally, people use an IT innovation either because they have no other option, or because it resembles a better option than what they already have; otherwise, they would not be inclined or motivated to change their habit ([van Dijk et al. 2008](#)). In the case of using a WIS, individuals are motivated to use it mostly because they expect some kind of positive consequences or benefits. This notion is particularly true in the external-user context, where the adoption of WIS is voluntary.

As mentioned earlier, individuals who use an EGS assume that by adopting an EGS, they will be able to obtain more values or benefits over the traditional face-to-face channel. They would generally expect to obtain increased convenience by avoiding physical transfer, queues, routine, bureaucracy, and administrative burdens, while reducing costs and possibly the need to depend on others.

Typically, choosing a product/service over another is dependent on what value it offers in terms of the costs and benefits. Similarly, in the WIS context, such as e-commerce, the values that businesses offer to its users reflect the same concept of cost/benefit relation (Rayport and Sviokla 1994; Keeney 1999). That is because the outcome of a particular action is not necessarily wholly positive without any negative consequences (DeLone and McLean 2004). In fact, using a WIS to accomplish a certain goal is not cost free, though this cost is mostly intangible and indirect. For instance, the process of executing certain task such as finding specific information, or perform a transaction, can be indirectly costly if the process was tedious, time and effort consuming. This can occur if the used website is inconsistent, has a poorly designed layout, or had slow servers and loading time. In addition, further potential costs could be incurred when a person jeopardizes his confidential (personal and financial) information, through online transactions, to be accessed, stolen, or manipulated by an unauthorized party. In essence, even though using an online channel is most probably less costly than physical transfer, yet, the notion of 'cost-benefit' still applies in the WIS context.

Therefore, when assessing the final obtained benefits for a particular task such as attempting to purchase online, the evaluation must be extended to encompass the relevant attributes that influence the end results (Keeney 1999; Torkzadeh and Dhillon 2002), such as the effort and time consumed earn about using a website, navigate. "The net value of the benefits and costs of both the product and the processes of finding, ordering, and receiving it", in the 'e-commerce' context, were referred to as the value proposition (Keeney 1999; cited in, Torkzadeh and Dhillon 2002, p.187). This notion also applies to the e-government context as it shares the same nature with e-commerce in terms of deploying WIS to provide services to various stakeholders, particularly individuals.

In general, these benefits could be classified into two main attributes, psychological benefits and tangible benefits (i.e., User Satisfaction (US) and increased individual's performance efficiency, respectively). Some researches emphasized the importance of including the performance variable as a success measure in addition to the satisfaction (e.g., Etezadi-Amoli and Farhoomand 1996).

The notion of Tangible Benefits in obtaining an efficient performance by utilizing an IS, was presented as global construct in Etezadi-Amoli and Farhoomand (1996) research. In their study, the performance construct reflected four measures; namely, improving output quality, saving time, completing a task in an easier manner (i.e., saving effort), and fulfilling citizens' needs and requirements. It reflects the positive impact and actual citizens' gains from using an EGS. Such information related to citizens' obtained benefits can be easily accessed and measured quantitatively.

As discussed in Section (2.2.3), assessing citizens' perception of the "consequences"<sup>27</sup> and the obtained benefits as a final outcome, indirectly indicates the backend quality with regards to the EGS implementation, such as the quality of employees who work on the EGS.

For some researchers, by referring to the obtained benefits or "Net Benefits", especially when focusing on individuals' benefits rather organizations, they indirectly mean the Tangible Benefits reflecting time, effort, costs, etc., that affect individuals' performance on using a particular IS. This is evident in the studies that distinguish the "Net benefit" construct, which is measured by tangible attributes, from US, which is measured by perceptual or psychological attributes, as being two separate constructs in their own right (e.g., DeLone and McLean 2003; Petter *et al.* 2008; Wang and Liao 2008). For example, in DeLone and McLean (2003) updated IS success model, although they have grouped all the "impact" measures into a single impact or net benefit category, they have distinguished US from the 'net benefit' construct. However, other researchers have looked at the obtained 'net' benefits with a more comprehensive view incorporating all consequences of using a system, especially the positive ones, which included both psychological and tangible benefits.

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<sup>27</sup> Seddon (1997) refers "consequences" to the outcome or impact of using a particular system.



Seddon (1997), for instance, explained the “Net Benefits” to be idealized “as a comprehensive measure of the sum of all past and expected future benefits, less all past and expected future costs, attributed to the use of information technology application” (p.246). Although we agree with Seddon’s notion of net benefit in terms of the relationship between costs and benefits; we believe that “net benefit” should only resemble the actual gain versus the actual loss, i.e., excluding the expected or future benefits. We accentuate the distinction between the expected and actual attainment of benefits (values). This distinction is similar to the conceptual difference between the notions of Perceived Usefulness (PU), as defined by Davis and other scholars, and the actual obtained values or benefits, in particular the tangible ones – (see Section (2.5.2)). PU is a perceptual measure that focuses mostly on the beliefs of realizing the expected benefits from using a system, and that notion does not take into account for any expected costs. The ‘Net benefits’, on the other hand, reflects the actual gains which indirectly account for the costs of using a particular system (Seddon 1997).

In addition, Keeney (1999), proposed a comprehensive view of a network that encompasses several attributes that impact the end value (benefit). For example, the aspects that account for the overall net benefits from using an e-commerce (WIS) results from the fact that the customer uses the website without having to personally traveling to the location. He referred to the overall net benefit as a fundamental objective that should be attained by minimizing costs and time, maximizing convenience and user/customer satisfaction, and having reasonable time in receiving the products/services<sup>28</sup>.

The notion that Keeney proposed for ‘net benefit’ incorporated both the tangible and psychological attributes. Keeney (1999) also suggested that the overall values or benefits could be obtained through the following key determinants:

- 1- A secure system that protects personal and credit card information.
- 2- The availability and variety of products and electronic services.
- 3- A secure system that perform accurate transactions.
- 4- Reliable delivery for products/services.
- 5- Accessible information.
- 6- An easy to use system.

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<sup>28</sup> Keeney (1999) also included attainment of enjoyment as well as minimizing environment impact when avoiding personal travel (e.g., minimize traffic and pollution)

Similarly, depending on the concept of D&M IS success model (DeLone and McLean 2003), Prybutok *et al.* (2008) argue that information, technical, and service qualities significantly impact the obtained benefits, which are important to enhance the online government agencies performance to achieve their goal in providing good-quality services to the public. They also argue that leadership and strategic planning impact organizational performance and directly and indirectly impact the realized benefits (Conklin 2007; Prybutok *et al.* 2008). Thus, they have incorporated three attributes to measure the net benefit from an implemented EGS, namely, US and individual and organizational performance efficiency (Prybutok *et al.* 2008). However, given that the scope of our study is focused on assessing the final ‘obtained benefits’ with respect to citizens, we only focus on our point of interest with regards to the consequences to citizens in terms of what they immediately obtain when using an EGS.

Although each reflects a distinct attribute, both the psychological and tangible attributes are considered to be consequences of using a system. So, naturally, the concept of cost/benefit relation, which is embedded in the consequences and reflect the ‘net benefit,’ would still apply even on a psychometric measure, such as satisfaction, especially if we consider that it is an outcome of ‘sum-of-feelings’ towards something. Or, in other words, the User Satisfaction variable is a result of combination of a positive/negative reaction or feeling toward qualities of elements of an IS, where at times or at some aspects it may be positive and at others it may be negative. The process of determining a particular level of satisfaction, indirectly accounts for the negative feelings along with the positive ones.

Similarly, Bailey and Pearson (1983) interpret satisfaction in a given situation as the sum of the individual feelings or attitudes toward a variety of factors affecting that situation. Thus, they defined the end-user computer satisfaction in their model as “the sum of one's positive and negative reactions to a set of factors, where the individual's feeling must be placed somewhere between a "most negative" reaction and a "most positive"” (Bailey and Pearson 1983, p.531).

In addition, Seddon (1997) explained US to be a subjective evaluation of the various consequences, evaluated on a pleasant-unpleasant continuum, and is more likely to be

closest in meaning to the ideal net benefits measure. This confirms that US reflects the intangible (psychological) attribute of the consequences or obtained benefits of using a system (DeLone and McLean 2003).

Different researchers proposed different measures to evaluate an EGS success. Some suggested US and others suggested Tangible Benefits, and some included both, mostly under one construct. According to Wang and Liao (2008), the obtained Tangible Benefits (of increased performance efficiency) was empirically found to be the closer measure that reflects an e-government success rather than other measures, such as US or Use on its own. On the other hand, Doll and Torkzadeh (1991), argued that individuals performance related behavior are application-specific, and generalization is not necessarily applicable unless more behavioral phenomena are also identified and measured; such as predicting system utilization behavior, and user satisfaction attitude (Doll and Torkzadeh 1991).

In our study, we choose to include both aspects as outcomes or consequences from using an EGS. Including both tangible and intangible aspects of benefits will aid in more effectively understanding what benefits citizens obtain from using an EGS. Nonetheless, in this study, we need to distinguish between the psychological and tangible benefits as both reflect different aspects of the obtained ‘net’ benefits<sup>29</sup>, where the psychological aspect reflects US and the tangible ones reflects task-related efficiency.

Since US is a consequence of using a ‘good-quality’ system and is affected by citizen-users’ Tangible Benefits, we will focus primarily on the US literature, which is presented in the next section, especially that a considerable amount of research use US as an indication of IS success.

### **2.3.2 Psychological Benefits: User Satisfaction (US)**

Because of its importance, “Satisfaction” was studied from different perspectives and within different areas of research, such as psychology, marketing, information systems, and business and management; and thus, had various definitions. In the IS literature, a

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<sup>29</sup> Although we conceptualized and justified why citizens’ obtained benefits from using an EGS incorporate the notion of cost-benefit which reflects a final ‘net benefit’, for simplicity, we will discard ‘net’ and simply use the term obtained benefit.

number of studies have investigated “User Satisfaction” from different aspects, as a concept and as a measure, mainly, according to the type of the used information system. For example, satisfaction was studied when using information systems such as management information systems (Maish 1979; Ives and Olson 1984; Conrath and Mignen 1990), decision support systems (Mahmood and Snizek 1989; Massetti 1996), and knowledge systems (Kulkarni *et al.* 2006). Accordingly, these systems would differently affect the types of satisfaction such as job satisfaction, data/ information satisfaction, user satisfaction, and decision satisfaction.

Many studies have investigated measures in its own context which basically referred to the same concept of “IS User Satisfaction” but using different terms (Ives *et al.* 1983). For example, it was sometimes referred to as User Information Satisfaction (UIS)<sup>30</sup> (Baroudi and Orlikowski 1988; Iivari and Ervasti 1994), End-User Computer Satisfaction (Doll and Torkzadeh 1988), and User Evaluation (Goodhue 1995). In other instances, it was indirectly investigated by studying the Perceived Usefulness (Davis 1989), system acceptance (Lee *et al.* 1995), feelings about IS (Maish 1979), MIS appreciation (Swanson 1974). Conrath and Mignen (1990) concluded in their study that “user satisfaction should be directly measured rather than indirectly by means of ‘object’ surrogate, such as System Use for instance” (p.17).

### 2.3.2.1 Defining US

It is obvious that satisfaction is a very complex variable (Bruce 1998), and this is verified by the diversity of approaches that study its attributes and validity in the different disciplines including the IS literature. This is particularly true where satisfaction is characterized as a summary assessment of information seeking by an IS user. Bruce (1998) suggests that it is difficult to accurately define User Satisfaction, and therefore, it is hard to measure. That is because satisfaction with information seeking is “a state of mind which represents the composite of a user’s material and emotional responses to the information seeking context” (Bruce 1998, p.541). The **material satisfaction** is a result

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<sup>30</sup> The expression User Information Satisfaction (UIS) was used in earlier studies (e.g., Ives *et al.* 1980; Baroudi and Orlikowski 1988; Ang and Koh 1997) to refer to the satisfaction of those who use an information system. In more recent studies, the expression was simplified to User Satisfaction (US). Thus, we will be using the latter expression of US throughout the study regardless what the original authors have referred to it.

of factors associated with various features of an IS's performance. The **emotion satisfaction**, on the other hand, is related to the feelings of satisfaction, based on the user's requirements, expectations, goal determination, and task orientation (Bruce 1998). Satisfaction is affected by the inner emotions driven by the intrinsic motivation while the tangible satisfaction is affected by the extrinsic motivation, which results from actually accomplishing a certain goal like saving time or money. The level of satisfaction is sometimes referred to as "overall satisfaction" (Ringle *et al.* 2011). Seddon and Kiew (1994), have regarded US as "the net feeling of pleasure or displeasure that results from aggregating all the benefits that a person hopes to receive from interaction with an IS" (p.95).

User Satisfaction (US) reflects the recipient response to the use of the output of an IS (DeLone and McLean 1992). It is a perceptual measure of the net benefit from the IS use that shows the degree of user satisfaction with the system (Rai *et al.* 2002). Goodhue (1995) defines user 'Evaluations' as the elicited beliefs and attitudes about something. Thus "User Evaluation (UE)" was used within the same context of user satisfaction. The author believes that, in order for UE to be used as an effective measure, specific users evaluation construct must be identified, and defined within a theoretical perspective that can usefully link underlying systems to their relevant impacts Goodhue (1995) also defined it as "the assessment made by a user, along some continuum from positive to negative about certain qualities of information systems".

Ives *et al.* (1983) defined US as "the extent to which users believe the information system available to them and meets their information requirements" (Ives *et al.* 1983, p 875). Doll and Torkzadeh (1988) conceptualized US as "the affective attitude towards a specific computer application by someone who interacts with the application directly". Here there are two types of satisfaction; the primary which focuses the information satisfaction, and the secondary which focuses on the satisfaction with the ease of use (Doll and Torkzadeh 1988).

As seen in the previous definitions, different researchers define US differently; for example, referring to it to reflect a belief, an attitude, a feeling, a perception, or a reaction; but at the end they all revolve around the same idea. In general, IS user

satisfaction could be defined as the level to which an IS user is pleased of the information system output upon using it and while his/her needs are met.

### ***2.3.2.2 Theories and Models for Predicting US and IT Adoption***

As mentioned earlier, due to the various contexts in which US was investigated, researchers have deployed multiple theories and models to predict US. They have attempted to validate those approaches in terms of predicting UIS or US. In the literature US was conceptualized to be very much related to technology acceptance and adoption. The most common theories and models that were used as grounds to predict individuals' attitude, satisfaction, and technology adoption behavior were; Cognitive and Self-Efficacy theory by Bandura (1977), Diffusion of Innovation (DOI) by Rogers (1995), Theory of Reasoned Action (TRA) by Ajzen and Fishbein (1985), Theory of Planned Behavior (TPB) by Ajzen and Madden (1989), Technology Acceptance Model (TAM) by Davis (1989), and DeLone and McLean IS Success Model (1992, 2003). In determining US and/or system utilization behavior, researchers integrated or extended those theories and models to fit the different contexts in which the dependent variables were investigated. The next six sub-sections introduce and briefly explain these theories.

#### **➤ *Cognitive and Self-Efficacy Theories***

##### **Bandura (1977)**

Social Cognitive Theory, presented by Bandura (1977), discusses the perspective of human development, adaptation, and change from three aspects: the individuals point of view; the people who are attempting to retain certain outcomes by influencing others to do the act on their behalf; the group of people who perform particular actions to accomplish specific desired results (Bandura 2002). The social cognitive theory of **self-efficacy** represents the individual's belief in his own capability of conducting a certain behavior (Compeau and Higgins 1995). However, the theory is not only limited to the judgments of one's aptitudes, but also to the shared beliefs, of a group of members, of the perceived collective efficacy in which several steps are to be done to attain collective desired outcomes (Bandura 2002). Bandura (1977) hypothesized that individual's expectations of his/her personal efficacy determine: whether he/she will take action toward performing a certain behavior; the amount of effort that will be applied by the

individual; and the length of time that the individual is able to sustain barriers and aversive events/ situations.

He proposed a model in which the expectations of self-efficacy are determined by four sources of information: performance outcomes, verbal persuasion; sensing others' experiences; and physiological conditions and reactions due to emotional stimulation. Furthermore, stronger effects of the information sources would cause more changes in an individual's perceived self-efficacy. He found that when the person experiences less or no threatening events, emotional arousal will be minimized, which consequently reduces the avoidance or resistance behavior, to change and increases the coping capabilities (Bandura 1977). From an IS point of interest, it is important to diminish the users' resistance to adapting technology or new innovation. Therefore, this argument explains the importance of engaging users and training them during the implementation phase to increase their acceptance to using technology.

Likewise, Campeau and Higgins (1995), empirically, investigated **computer self-efficacy**, which was based on the concept of self-efficacy proposed by Bandura but was referring to the individuals' beliefs about their personal competencies in sufficiently using the computers. They defined it as "a judgment of one's capability to use a computer to perform a certain task" (Campeau and Higgins 1995, 192). It simply means the inner-self-confidence of the individual's capabilities in using technology.

Campeau and Higgins (1995) suggested three different but interrelated attributes of self-efficacy judgment: magnitude, strength, and generalizability.

- **"Magnitude"** refers to the "level of task difficulty one believes is attainable", interpreted to reflect the level of capability expected. This means that, people with high magnitude or self-confidence would consider themselves as capable of handling difficult tasks as opposite to those with low self-efficacy magnitude who assume that they are only capable of executing simple tasks and would, most probably, need assistance.
- **"Strength"** in Campeau and Higgins study reflects the level of confidence about the judgment where individuals with low sense of self-efficacy would not be able to be persistent when facing an obstacle. These individuals will easily get

frustrated because they have lower expectations of their capabilities than those with higher sense of self-efficacy.

- “**Generalizability**” is indicated by the extent to which individuals’ judgments or perceptions of self-efficacy are limited to particular domain activities or situations. These individuals believe that they can conduct some behavior in specific circumstances, while others believe they can carry out any task in any circumstances (Compeau and Higgins 1995).

Campeau and Higgins (1995) have found computer self-efficacy to be dependable on three factors: availability organization IT support to who needs it; observing and learning from others’ use of technology; and encouragement (verbal persuasion) of others such as peers and managers to whom the individual turns to acquire guidance.

Moreover, computer self-efficacy was also found to be a direct antecedent to “use behavior”, and indirect through **personal outcome expectations, performance outcome expectation, anxiety** from using computers, and the positive effect of using computers (Compeau and Higgins 1995). In other words, people with high self-efficacy would have less anxiety and tend to use a computer more frequently, easily, and confidently, and would have a positive effect on them so they like using it more. Computer self-efficacy was also used in some models as antecedent to use, perceived ease of use (Hong *et al.* 2001; Wangpipatwong *et al.* 2008), individual performance (Luarn and Huang 2009), desired participation (behavioral intention) (Hunton and Beeler 1997).

➤ ***Diffusion of Innovation Theory (DOIT)***  
***Rogers (1995)<sup>31</sup>***

The Diffusion of Innovation Theory is a well-known theory used in the IS literature to predict one’s intention to adopt a new innovation (Moore and Benbasat 1991; Bhattacharjee 2001; Carter and Belanger 2005). An **innovation** is an idea, a practice, or an object that is perceived as new by an individual or another unit of adoption (Rogers 1995, p.12). **Diffusion** is a process by which an innovation is communicated through

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<sup>31</sup> Rogers’ book of his theory on Diffusion of Innovation was initially introduced in 1962. However, with the wide-spread of technology use and researchers increasing interest of studying the theories related to technology use, the fourth edition of Rogers’ book published in 1995, which had expanded more on the topic, had become the mainly cited source for this theory.



certain channels over time among the members of a social system (Rogers 1995, p.5). Rogers identified five general attributes of innovations that helped to explaining the different rate of adoption. A number of technology diffusion studies confirmed that these, attributes, consistently influence adoption (Moore and Benbasat 1991). The Attributes are defined as follows:

**1- Relative Advantage:** the degree to which an innovation is perceived as being better than the idea it supersedes.

**2- Compatibility:** the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters.

**3- Complexity:** the degree to which an innovation is perceived as being difficult to understand and use.

**4- Trialability:** the degree to which an innovation may be experimented with on limited bases.

**5- Observability:** the degree to which the results of an innovation are observable to others (Rogers 1995); or, the ability to measure, observe, and communicate the results of using an innovation (Moore and Benbasat 1991).

The theory proposes that there are five stages for the “innovation decision process” (which is an IT utilization process). The stages are knowledge, persuasion, decision, implementation, and confirmation; such that the adopters re-evaluate their earlier acceptance decision during a final "confirmation" stage and decide whether to continue or discontinue using an innovation (Bhattacharjee 2001). The **knowledge** stage starts when an individual is exposed to an innovation’s existence and then gains an understanding of how it functions (Rogers 1995, p.171). It is a mental activity which could be described as cognitive. In the **persuasion** stage of the innovation–decision process, an individual forms a favorable or unfavorable attitude toward the innovation that is very much dependent on feelings (Rogers 1995, p.174). Rogers describe the “attitude” as a relatively enduring organization of an individual’s beliefs about an object that influences his or her action. Third, the **decision** stage, which takes place when an individual engages in activities that lead to a choice to adopt or reject (not adopt) an innovation (Rogers 1995, p.177). After that, the implementation stage where the individual puts an innovation to use. Until this stage, the process of decision making is still a mental exercise. Finally, the confirmation stage, which is the stage when the individual seeks reinforcement for the

innovation-decision already made, and may reverse this decision if exposed to conflicting messages about the innovation (Rogers 1995, p.189)

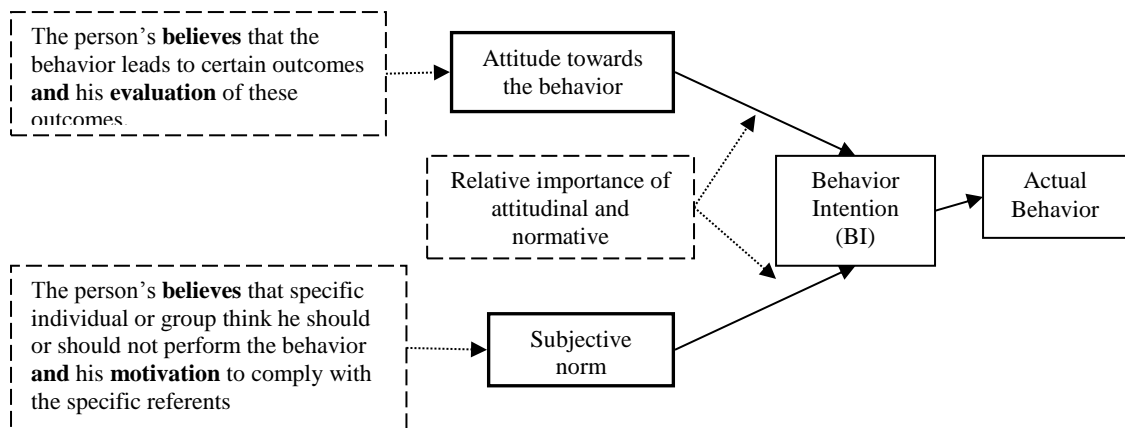
Moore and Benbasat (1991) developed an instrument to measure users' perceptions of adopting an IT innovation to be used as a tool to study an individual initial intention to adopt a new IT innovation and diffusion within the organizational context, while implementing an IS. In their study, Moore and Benbasat (1991) focused on how potential users' perceptions influence their adoption of an IT innovation by identifying a set of characteristics for using an innovation. They believed that it is much more important to focus on the perceptions of using the innovation rather than perceptions of the innovation itself (Moore and Benbasat 1991).

Their work was initially based on the Diffusion of Innovation Theory and was developed further by adding voluntariness and image as attributes of measuring individuals' intention to adopt IT innovation. **Voluntariness** was defined as the “degree to which the use of the personal workstation is perceived as being voluntary”; and **Image** was defined as “the degree to which the use of the personal work station enhances one's image or status within the organization” (Moore and Benbasat 1991, p.195). In addition, the authors believed that **Observability**, as originally defined by Rogers, appeared to be joining two different constructs, namely, **Demonstrability** and **Visibility** which are the output results of a system and the ability to notice these results. Thus, they were separately distinguished, and two different scales were developed and included in their model. As a result, the modified and extended model, which was named *Perceived Characteristics of Innovating* (PCI), encompassed eight constructs; Image, Voluntariness, Result Demonstrability, visibility, Relative Advantage, Compatibility, Trialability, and Ease of Use (which is the same as complexity in the DOI theory).

➤ **Theory of Reasoned Action (TRA)**  
**Ajzen and Fishbein (1980)**

Ajzen and Fishbein (1980) stated that people “consider the actions before they decide to engage or not to engage in a given behavior, such that their behavior is not difficult to predict, and that most actions of social relevance are under volitional control”. The purpose of their theory was to predict individual’s behavior, and the intention to perform or not to perform a certain action.

According to their theory, ‘intention’ is the determinant of a person’s action, and a person’s intention is a function of two basic determinants; one is personal in nature and the other is a reflection of the social influences. The personal determinant, which is called **attitude toward the behavior**, is the individual positive or negative evaluation and judgment of performing the behavior and whether it is good or bad. Generally, a person who believes that performing a given behavior will mostly lead to positive outcomes will hold a favorable attitude toward performing the behavior. The “**behavior beliefs**” (**intentions**) are those beliefs that cause a person’s attitude toward the behavior (Ajzen and Fishbein 1980).



**Figure 2-2: Factors determining person behavior (TRA)**

The “**subjective norm**”, is the second determinant of a person’s intention. It reflects the “perception of the social pressures” that is put on a person to perform or not perform a particular action of behavior, and the motivation to comply with specific referents. For example, the demands coming from his superiors, (e.g., employer, parents, teachers). Figure 2-2 present the structure of the theory of reasoned action as proposed by Ajzen and Fishbein.

➤ **Theory of Planned Behavior (TPB)**

**Ajzen (1985); Ajzen and Madden(1986)**

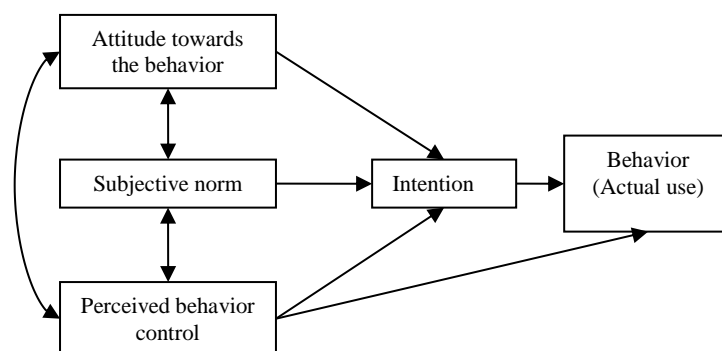
The theory of planned behavior attempted to fix some fundamental problems which existed in the theory of reasoned action. It considers the intention to perform a certain behavior is a goal in which its accomplishment is somewhat uncertain. The behavior goal units and intentions are plans of action to pursue behavior goals. The **perceived behavior control** refers to “the person’s belief as to how easy or difficult performance of the behavior is likely to be” (Ajzen and Madden 1986). The theory also suggests that intentions will not be significant predictors of behavior unless one has total control over the behavior goal, and can decide whether he/she will perform the action or not. Therefore, the authors tend to assess the level of individual’s control over their behavior goal to ensure the accuracy of the prediction of the behavior.

In order to have this strong association between the intention and the behavior:

1- the intention measure should correspond to the behavior criterion; and

2- the intention should remain the same during the time from which it was initiated until the time the behavior is performed. The longer the interval is between those incidents, the more likely to have other circumstances and factors influencing the intentions. Therefore, the accuracy of prediction would depend on the time interval between the measurement of intention and the achievement of behavior (Ajzen and Madden 1986).

Figure 2-3 demonstrates the Theory of Planned Behavior (TPB) Model.



**Figure 2-3: Theory of Planned Behavior (TPB)**

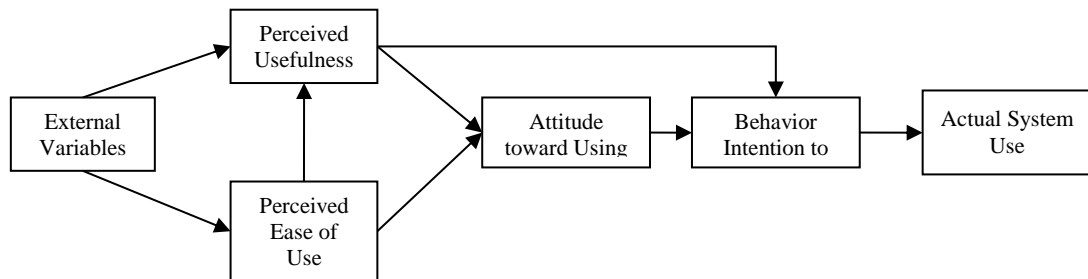
The factors that could affect the control of the persons’ intended behavior could be either internal, like the sufficient ability to plan, sufficient knowledge, and skills; or external, like time, opportunity, and dependence on other people’s help (Ajzen and Madden 1986). By empirically testing the TRA and TPB models, the authors concluded that the addition

of the “Perceived Behavior Control” (PBC) construct has added greater value and provided increased explanation to the prediction of intentions.

➤ ***Technology Acceptance Model (TAM)***

***Davis (1989); Davis et al. (1989)***

The Technology Acceptance Model (TAM), proposed by Davis (1989), Davis *et al.* (1989), is based on the theory of reasoned action (TRA). The authors assert that in TAM, the concept of Usefulness from the IS prospective (which is influenced by external factors, such as system design characteristics, task characteristics, nature of the development or implementation processes, political influences, organizational structure, and user characteristics including cognitive style and other personality variables), indirectly influence behavior through influencing attitude and subjective norm (Fishbein and Ajzen 1975; Davis *et al.* 1989). Therefore, the authors find TRA to encompass the internal psychological variables, which are studied in the IS literature and found to have effect on the user acceptance of Technology. Additionally, Davis *et al.* (1989) argue that TRA mediates the impact of controllable and uncontrollable variables affecting user behavior. Figure 2-4 shows the TAM model presented by Davis et al (1989). The model can be referred to as TAM<sub>1</sub> since an extension to this model is denoted TAM<sub>2</sub> will be presented shortly.



**Figure 2-4: Technology Acceptance Model (TAM<sub>1</sub>) (Davis *et al.* 1989)**

Like TRA, TAM also hypothesizes that computer acceptance and use is determined by one’s intention. However, they differ in that the behavioral intention in TAM is determined by an individual’s attitude as well as his/her perceived usefulness. In the first TAM, Davis (1989) used the “attitude” construct to mediate the effects of beliefs on intentions but it was removed from the specification of TAM in Davis et al. (1989).

By introducing TAM, the authors propose that this model will help provide a basis for tracing the impact of external factors on internal beliefs, attitudes, and intentions through: explaining the determinants of computer acceptance; and Identifying why a certain system may be unacceptable (rejected) and consequently taking corrective actions. Essentially, TAM examines the mediating effect of Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) on the relation between the external variables and the probability of using an IT.

TAM suggests that these two particular beliefs directly influence computer acceptance behaviors and they are PU and PEOU, such that, the easier the system is to use, the more useful it would be. **Perceived Ease of Use** refers to the degree to which the user expects the system to be free of effort (Davis 1989; Davis *et al.* 1989). **Perceived Usefulness**, on the other hand, is defined as the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational context (Davis 1989; Davis *et al.* 1989). Some researchers have also found significant relationship between system characteristics and measures similar to perceived usefulness (e.g., Moore and Benbasat 1991).

The TAM only explained around 40% of the intention and use behavior (Chau and Hu 2001; Legris *et al.* 2003; Hsieh and Wang 2007). The model has been validated and tested many times and in different contexts (e.g., e-commerce, e-government, organization internal-users) and has been favored by some researcher. However, it has also been criticized by others in that it has a number of shortcomings.

For example, while analyzing TAM empirical studies, Legris *et al.* (2003) found that the results were not totally clear or consistent. They have concluded that there are significant factors missing from the model. Therefore, TAM should be integrated into a broader model which encompasses variables related to human and social change processes and related to the adoption of the innovation model (Legris *et al.* 2003). This means that there is a need for TAM to be incorporated with other additional factors to provide a stronger model and account for specific tasks (Moon and Kim 2001; Legris *et al.* 2003; Wangpipatwong *et al.* 2008).

Venkatesh and Davis (2000) proposed TAM<sub>2</sub>, as an extension to TAM, in an attempt to improve the understanding of user adoption behavior (Venkatesh and Davis 2000). TAM<sub>2</sub> was developed to investigate and explain the Perceived Usefulness and technology use intentions in terms of social influences and cognitive processes. The social influence processes include subjective norm, voluntariness, and image; while the cognitive instrumental processes include job relevance, output quality, result demonstrability, and perceived ease of use. Those constructs cited in (Venkatesh and Davis 2000) are defined as follows:

**Image** is defined as “the degree to which use of an innovation is perceived to enhance one’s status in the individual social system” (Moore and Benbasat 1991).

**Subjective norm** is defined as the “person’s perception that most people who are important to him think he should or should not perform the behavior” (Fishbein and Ajzen 1975).

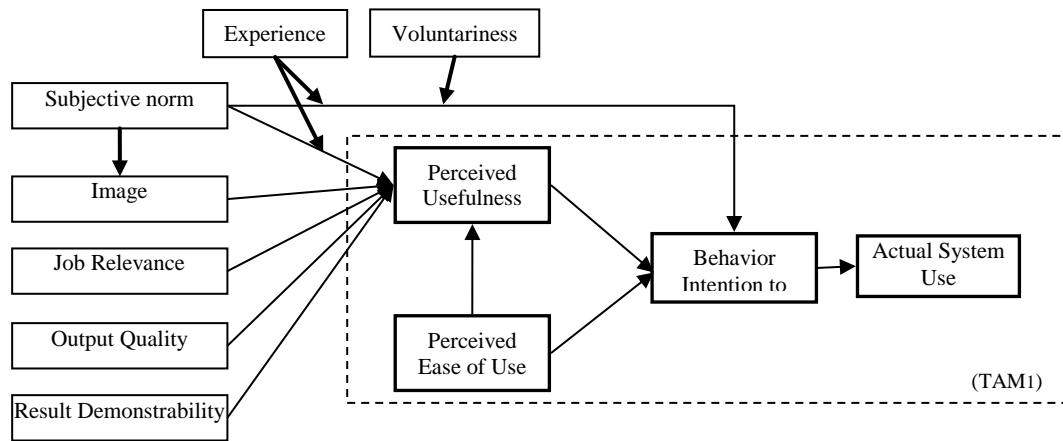
**Voluntariness** is a moderating variable and is defined as “the extent to which potential adopters perceive the adoption decision to be non-mandatory” (Moore and Benbasat 1991).

**Job relevance** is defined as an individual’s perception regarding the degree to which the target system is applicable to his or her job.

**Output quality** is related to what tasks a system is capable of performing and how well the systems perform those tasks.

**Result demonstrability** is “the tangibility of the results of using the innovation” (Moore and Benbasat 1991).

The model was validated to suit the voluntary and mandatory use in different IS implementation stages. It was found to be strongly supported and a considerable percentage of the usefulness perceptions and the use intentions variance was explained (Venkatesh and Davis 2000). Figure 2-5 shows the TAM<sub>2</sub> as an extension of TAM<sub>1</sub>.



**Figure 2-5: Extended Technology Acceptance Model (TAM<sub>2</sub>) Venkatesh and Davis (2000)**

In 2003, Venkatesh *et al.* proposed a unified model that integrated elements from eight models to study user intention and acceptance of information technology. The eight models were, the theory of reasoned action, the technology acceptance model, the motivational model, the theory of planned behavior (TPB), the model of PC utilization (MPCU), a model that combines TAM and the theory of planned behavior, the diffusion of innovation theory (DOI), and the social cognitive theory (SCT) (Venkatesh *et al.* 2003). Using data collected from four organizations, the authors empirically tested the models, compared the results, and evaluated the similarities and differences. The authors based their final model on the conceptual empirical similarities and chose the significant constructs to form their final model. The final model of the Unified Theory of Acceptance and Use of Technology “UTAUT” was then tested for validity. As shown in Figure 2-6, UTAUT consisted of 4 constructs and 4 moderators.

The constructs were Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating conditions and are defined in Table 6. Variables such as Users’ experience, gender and age, and Voluntariness of Use were encompassed in the model as moderators to balance between the effort expected and behavior intention.



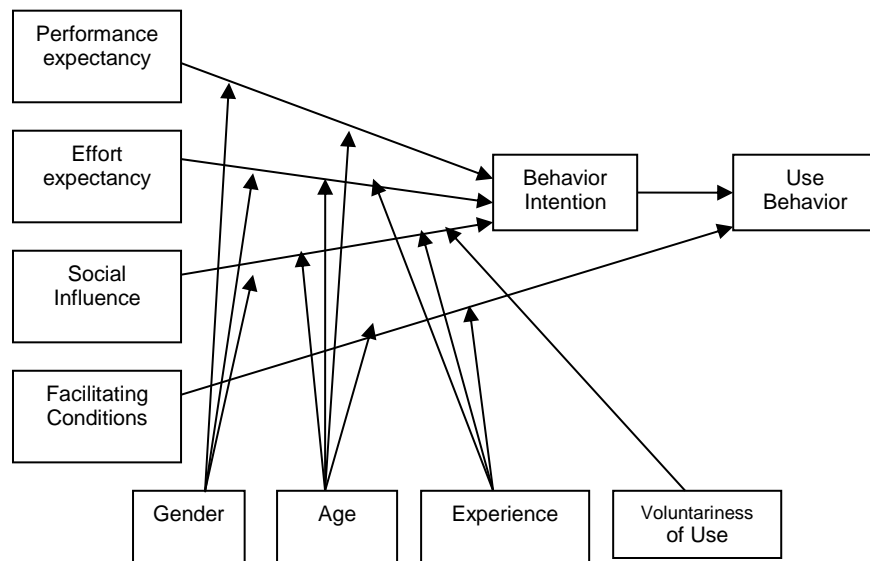


Figure 2-6 Venkatesh *et al.* (2003) UTAUT

Table 6: UTAUT constructs definitions by Venkatesh, et al. (2003)		
Constructs	Definition	concept reflected
Performance Expectancy	“the degree to which an individual believes that using the systems will help him or her to attain gains in job performance”	Perceived Usefulness in (TAM, C-TAM, TPB)
Effort Expectancy	“the degree of ease associated with the use of the system”	Perceived Ease of Use in (TAM), Complexity in (MPCU), Ease of Use in (DOIT)
Social Influence	“the degree to which an Individual perceives that important others believe he or she should use the new system”	Subjective norm in (TRA, TAM2, TPB/DTPB and C-TAM-TPB), Social factors in (MPCU), and Image in (DIOT)
Facilitating conditions	“the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system”	Perceived behavioral control (TPB/ DTPB, C TAM-TPB). Facilitating conditions (MPCU), and compatibility (DOIT)

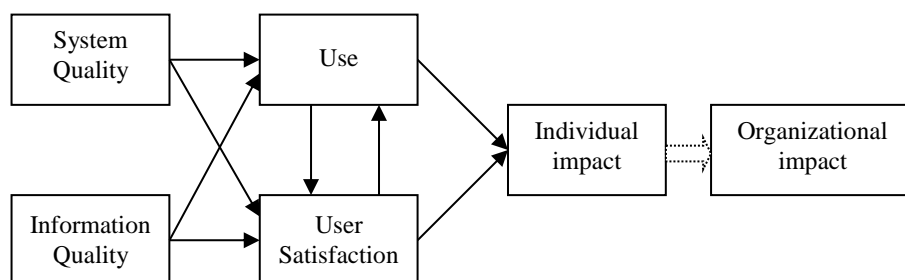
Venkatesh *et al.* claim that UTAUT provides a useful tool to assess the likelihood of success for a new technology. It also helps “understand the drivers of acceptance in order to proactively design intervention (including training, marketing) targeted at populations of users that may be less inclined to adopt and use new systems” (Venkatesh *et al.* 2003, p.426).

➤ ***DeLone & McLean IS Success Model (D&M)***

**DeLone and McLean (1992); (2003)**

As part of the contribution to the IS literature to measure IS success and based on the previous measures introduced by IS researchers, DeLone and McLean (1992) summarized their findings by proposing a model using user satisfaction as a proxy to measure individual and organizational impacts, and consequently, the IS success. The model posits six variables, namely: **System Quality**, **Information Quality**, **System Use**, **User Satisfaction**, **Individual Impact**, and **Organizational Impact**. All six attributes measure the effectiveness or influence of the information system.

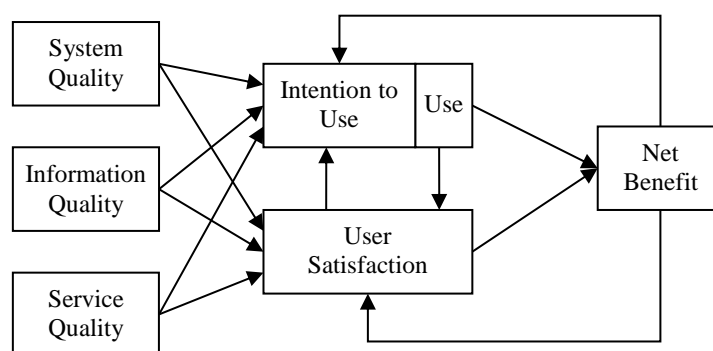
**System Quality** measures the technical aspect and the information processing system itself. **Information Quality** measures an IS output such as accuracy, timeliness, and meaningfulness; which fall in the semantic category. **System Use** reflects the recipient consumption of the output of an IS. **User Satisfaction** is the recipient response to the use of the output of an IS. **Individual Impact** represents the effect of information on the behavior of the recipient. **Organizational Impact** reflects the effect of information on organizational performance. Figure 2-7 illustrates the model of DeLone and McLean for measuring IS success.



**Figure 2-7: DeLone & McLean IS success model 1992** (DeLone and McLean 1992)

Seddon (1997) argues that System Use is a behavior and it is appropriate to include it in a process model; but in the causal sense, as in the DeLone and McLean model, it precedes the impact and benefit and does not cause them. DeLone and McLean disagree and believe that Use is an appropriate success measure especially in voluntary situations (DeLone and McLean 2003). Furthermore, they argue that the assumption that greater Use will lead to increased benefit, is not necessarily true. It is, therefore, crucial to consider the nature, extent, quality, and appropriateness of this System Use (DeLone and McLean 2003). For that same reason, they suggest that Use should also be included as an attribute of system-success measurement, even in mandatory situations, as it will significantly influence the system's realized benefits (DeLone and McLean 2003).

While empirically testing and validating the DeLone and McLean (1992) IS success model, researches emphasized the importance of including service quality as another attribute to measure IS success, which was initially lacking in D&M (1992) success model (Kettinger and Lee 1994; Li 1997; Seddon 1997; van Dyke *et al.* 1997). Accordingly, DeLone and McLean refined their model in 2003 by including the service quality measure, and changing the individual and organization impacts constructs to one construct which is referred to as “net benefit”. It reflects the most important IS success measure and balances the positive and negative aspects from using an IS. A diagram of the updated model is shown in Figure 2-8



**Figure 2-8: Updated D&M IS success model (2003) (DeLone and McLean 2003)**

Based on the IS/ e-commerce literature, DeLone and McLean have suggested a success metrics to be used in the e-commerce environment, and are shown in Table 7.

Table 7: E-commerce success measures and item components	
<b>Systems quality</b> <ul style="list-style-type: none"> <li>• Adaptability</li> <li>• Availability</li> <li>• Reliability</li> <li>• Response time (i.e., download time)</li> <li>• Usability</li> </ul> <b>Service quality</b> <ul style="list-style-type: none"> <li>• Assurance</li> <li>• Empathy</li> <li>• Responsiveness</li> </ul> <b>Information quality</b> <ul style="list-style-type: none"> <li>• Completeness</li> <li>• Ease of understanding</li> <li>• Personalization</li> <li>• Relevance</li> <li>• Security</li> </ul>	<b>System Use</b> <ul style="list-style-type: none"> <li>• Nature of use</li> <li>• Navigation patterns</li> <li>• Number of site visits</li> <li>• Number of transactions executed</li> </ul> <b>User satisfaction</b> <ul style="list-style-type: none"> <li>• Repeat purchases</li> <li>• Repeat visits</li> <li>• User surveys</li> </ul> <b>Net benefits</b> <ul style="list-style-type: none"> <li>• Cost savings</li> <li>• Expanded markets</li> <li>• Incremental additional sales</li> <li>• Reduced search costs</li> <li>• Time savings</li> </ul>

The D&M (2003) model was also applied in different contexts and found to be sufficiently explaining the phenomena of User Satisfaction and gained benefit. The explained variance ranges exceeded 53% (e.g., McGill *et al.* 2003; Roldán and Leal 2003). This shows that the D&M updated model provides more explanation than TAM, which generally did not provide more than 42% in the empirical studies (Chau and Hu 2001; Legris *et al.* 2003; Hsieh and Wang 2007). However, when PU is added to the system attributes as determinants of US, the explained variance of US was found to increase up to 75% in the non mandatory environment (Seddon 1994).

Wang and Liao (2008) validated the DeLone and McLean (2003) updated success model in the e-government context and claim that it fits well into the (G2C) e-government service context. They assert that this validated “EGS success model” can serve as a tool and a useful framework for government managers for evaluating EGS success. However, continued research is needed to investigate and test a comprehensive model of EGS success based on the DeLone and McLean update model.

Finally, it should be noted that, of those most popular and recent models that were extensively used, empirically tested, and have proven their reliability; were the DeLone

& McLean (D&M) IS success model (1992), (2003), and Davis Technology Acceptance Model (TAM) (1989). The D&M Model mostly focused on the perceptions of system qualities (presented in Table 7) as determinants of User Satisfaction, such that the level of satisfaction is used as a proxy to indicate an IS success; and consequently, the net benefit. If users are satisfied, they are more likely to use the system and gain benefits (DeLone and McLean 1992). This model has been extensively tested for reliability, analyzed, and compared with other models (Petter *et al.* 2008), such as Seddon's (1997) model, and TAM (Wixom and Todd 2005).

On the other hand, TAM, which was also used in the literature as a measurement for IS success, focused on the behavior intention, and hence, the behavior itself ("actual" System Use), rather than the "attitude" of users (Davis *et al.* 1989). It assumes that the more users perceive the system to be useful to them, the more likely they will use it.

Moreover, it was assumed that once the users are satisfied with a system, their intention to use the system will be influenced, and accordingly, their use behavior of that system will be affected as well. Furthermore, it was proven that there is a direct link between US and Use and they are closely interrelated, such that the use affects the level of satisfaction and vice versa; see for example, (Baroudi *et al.* 1986; DeLone and McLean 1992; Seddon 1997; Garrity and Sanders 1998; Gelderman 1998; Kumar *et al.* 2007).

In other words, in the causal sense, positive experience with Use will lead to higher User Satisfaction, likewise, increased user satisfaction will lead to increased Intention to Use (Bhattacharjee 2001), and thus Use (DeLone and McLean 2003). It appears that both Use and User Satisfaction can be used, interchangeably, to measure the systems performance effectiveness and success, mostly in voluntary settings. It mainly depends on the objectives, context in which it is being used, and parameters of interest.

### ***2.3.2.3 Constraints to Selecting a Particular Model - A Critical View***

Generally, a researcher's decision of employing a particular model for a particular system is dependent on whether that model can adequately: fit within the context of the investigation; and answer the research question and produce the required results from that investigation.

Even though some proposed models have been extensively used and empirically validated, there has been a call from researchers to extend these models to provide a more accurate and comprehensive view for explaining the investigated phenomenon. As demonstrated earlier, while reviewing the theories and models related mainly to user satisfaction and IS success, we concluded that there are some shortcomings in sticking to a single model such as TAM (Davis, 1989) or DeLone and McLean (2003) to adequately answer our research question. The reasons for that are explained below.

Our proposed model is aimed to investigate citizens' obtained benefits, including both, User Satisfaction and Tangible Benefits. However, the attainment of these potential benefits could only be realized through the actual use of an EGS. Thus, TAM by itself, as suggested by Davis (1989), is not sufficient in explaining beyond the use action (i.e., cannot describe the consequences of using EGS). The "model" needs to be extended such that Satisfaction and Tangible Benefits are added to follow the actual use.

Also, Perceived Usefulness (PU), which is a psychological variable reflecting one's belief that utilizing a particular system will produce some benefits, in particular, enhancing one's task performance, is regarded as an important variable in TAM. We also believe that PU is an important determinant of citizens' acceptance in using an EGS, but not the only factor that determines User Satisfaction, intention, or behavior. For the purpose of our study, other variables need to be included to determine citizens' Use behavior, behavioral Intention, and Satisfaction, and most importantly, the Tangible Benefits.

Furthermore, TAM suggests that PU plays as a mediating role between the external factors, and user acceptance of the system (resembled in Use / Intention to Use). A good example of an external factor is system performance which is determined by its characteristics and the tangible system measures which are generally categorized as Information Quality, Service Quality, and System Technical Quality (Hong *et al.* 2001).

Those variables were introduced in the D&M (2003) model to determine User Satisfaction and Use. Neither the system attributes were explicitly suggested in TAM, nor was the cognitive beliefs measure, namely, Perceived Usefulness, included in the D&M (2003) model. In summary, neither D&M nor TAM can sufficiently answer our research question. Each model lacked attributes that exist in the other model while there was also a need to consider attributes to be incorporated in the proposed conceptual model.

#### ***2.3.2.4 Measuring US: Approaches Drawn from the Literature***

While User Satisfaction (US) was studied as an IS success measurement, many studies in the literature have, consequently, attempted to identify the antecedents for the US (e.g., Ives *et al.* 1983; Doll and Torkzadeh 1988).

In the US literature, researchers have introduced several approaches to measure US or to provide a more comprehensive view of measuring IS success in different contexts and IS applications; see for example, (Moon and Kim 2001; Carter and Belanger 2005; Garrity *et al.* 2005).

Studies have set the US measurement based on various theories and models. A number of scholars used D&M (1992, 2003), some used Perceived Usefulness, and some used the “Diffusion of Innovation theory” (DOI) to measure users' perceptions of adopting an information technology (IT) innovation (i.e., Moore and Benbasat 1991). Another group of studies endeavored to combine different models and theories in an attempt to produce a more comprehensive model and sounder results (e.g., Wixom and Todd 2005), while others added extra constructs assuming that it would enhance the accuracy of the result and provide a more comprehensive and accurate view (e.g., Garrity *et al.* 2005). For example, some studies attempted to merge the concepts of two models such as TAM and D&M (Wixom and Todd 2005), combine TAM, DOI and the trustworthiness variable (Carter and Belanger 2005), add system factors, organizational culture, individual factors, and Perceived personal utility with TAM (Hamner and Qazi 2009), add trust in e-government as a construct to D&M (Teo *et al.* 2008), add perceived playfulness to TAM (Moon and Kim 2001), add a trust attribute to TAM (Gefen *et al.* 2003).

However, there were studies that cautioned about the methodological and conceptual difficulties (Galletta 1989), especially when some measurements items that are used with US are cognitive, such as perceptions and believes towards the characteristics of a system, and affective (emotional) aspects, which are the attitudes towards using the system (Etezadi-Amoli and Farhoomand 1996).

In studying and measuring US, different approaches have been used. A single scale item was employed but it was found to provide little information, while multiple-item US measures were found to be more explanatory of the US construct, and thus were more commonly used (Ives *et al.* 1983).

Doll and Torkzadeh (1988) proposed a second-order factor model of US that consists of five first-order factors (content, format, accuracy, ease of use, timeliness) measured by twelve items, to be used as a standardized instrument to measure the US (Doll and Torkzadeh 1988). However, it is important to take caution when attempting to measure user satisfaction (Ives *et al.* 1983; Galletta 1989; DeLone and McLean 1992; Chin and Newsted 1995). For that reason, studies, such as the confirmatory factor analysis for the US instrument conducted by Doll *et al.* (1994; 1995), focused on investigating how to measure US rather than what US is, and what its components are (Doll *et al.* 1994). In order to accept using the “US” as a standardized instrument, Doll *et al.* (1994) have applied rigorous and systematic tests to examine the validity and reliability of US constructs and its components, and compared it with the alternative models. They have concluded that, one second-order US and four and five first-order factors were satisfactory; and thus, the item components were also supported. For more details, see (Doll *et al.* 1994; Doll *et al.* 1995).

Bailey and Pearson (1983) developed an instrument to measure US. They based their conclusion on reviewing twenty two studies devoted to studying computer user-interface and the factors affecting “computer user-satisfaction” (US). From the thirty six distinct factors, they have identified ten measurement-items and classified them into two main groups. The first group was composed of the five most important factors that influence US while the other group consisted of the five least important ones. The important factors which were in the first group were accuracy, reliability, timeliness, relevancy, and



confidence (trust) in the system. The factors in the second group, on the other hand, were the feeling of control, volume of output, vendor support, degree of training, and the organizational position on electronic data processing (EDP) (Bailey and Pearson 1983).

Furthermore, due to the increased number of individuals using computers and IT, Amoli and Farhoomand (1996) proposed an instrument that measures satisfaction and evaluates the success of an IS environment when used to improve user performance. They wanted to take into account the performance related attributes in measuring the IS success rather than only depending on cognitive/affective attributes. This is particularly essential in the organization perspective assessment.

By using Explanatory Factor Analysis (EFA)<sup>32</sup>, Amoli and Farhoomand (1996) identified the measurements parameters, and then explored their relationship with US, using the structural equation modeling technique. Their model showed that the attributes they used for US, explained significant portion of users' performance (Etezadi-Amoli and Farhoomand 1996). Six latent variables were incorporated in their model and they included a total of twenty seven items. These latent variables were Documentation, Ease of Use, Functionality of System, Quality of Output, Support, and Security, and they were all antecedents to user performance.

Amoli and Farhoomand (1996) suggested that since one main characteristic of a system is that it is "goal-oriented", it is therefore important to take into account the individual and organizational impact while evaluating the IS success. Therefore, they have relied on the D&M (1992) IS success model which conceptualizes that user satisfaction will have impact on both the organization and the user himself. The authors conducted their study in an inter-organizational user context and suggested that users' satisfaction with a system quality and its output, based on their perception, will eventually lead to improved performance, and, consequently, IS success. Their model basically depended on management measurements, which focused on the user's response, rather than the scientific measurements, which focus on the object being measured (Etezadi-Amoli and Farhoomand 1996). The model's dependent variable, which was the 'users performance', reflected the concept of net individual and organizational benefit, including satisfaction,

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<sup>32</sup> The concept of EFA will further be explained in the Methodology chapter, Section (1.a).

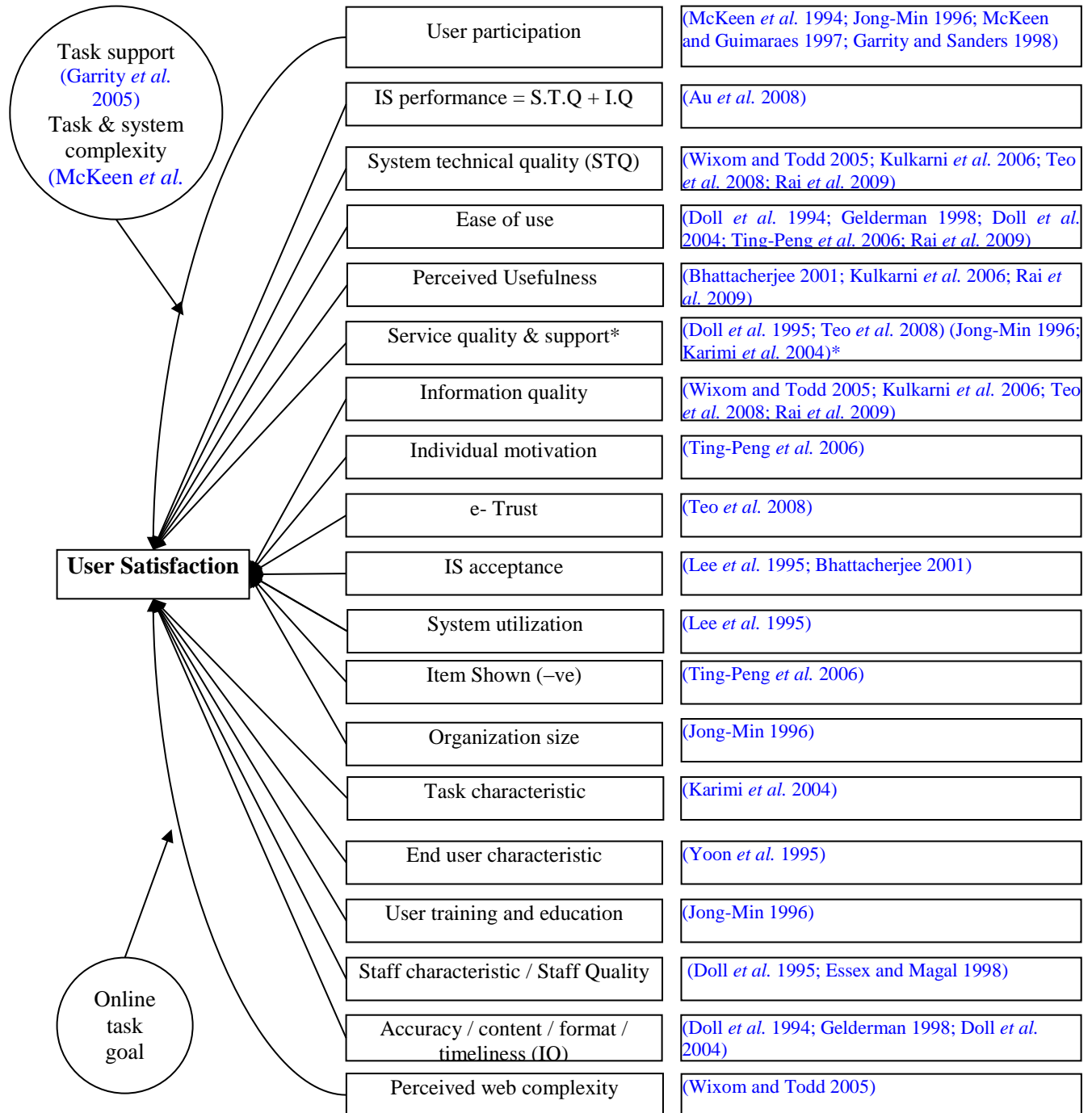
and relied on studying the impact of the overall system quality on four aspects by measuring their performance: namely, improving quality of work, making job easier, fulfilling users' needs and requirements, and saving time.

#### ***2.3.2.5 Empirical Findings in the US Literature***

In the literature, US has been hypothesized to be significantly related to various attributes. Venkatesh *et al.* (2003) stated that “researchers are confronted with a choice among a multitude of models and find that they must ‘pick and choose’ constructs across the models or choose a ‘favored model’ and largely ignore the contributions from alternative models” (p. 426). Thus, there is a need to conduct a thorough review to arrive at constructing a reasonable model that suffices in achieving the first objective of this study. Accordingly, we endeavor to study US from the research model by systematically reviewing the IS user satisfaction related literature. Subsequently, employ the significant constructs in the conceptual model in which the interrelations between the constructs, as well as, the model overall would fit the context of this study. Then, to understand and confirm the interrelations between the constructs of the conceptual model, further comprehensive review of the relevant literature need to be conducted, including psychology, marketing, IS, and e-government literature.

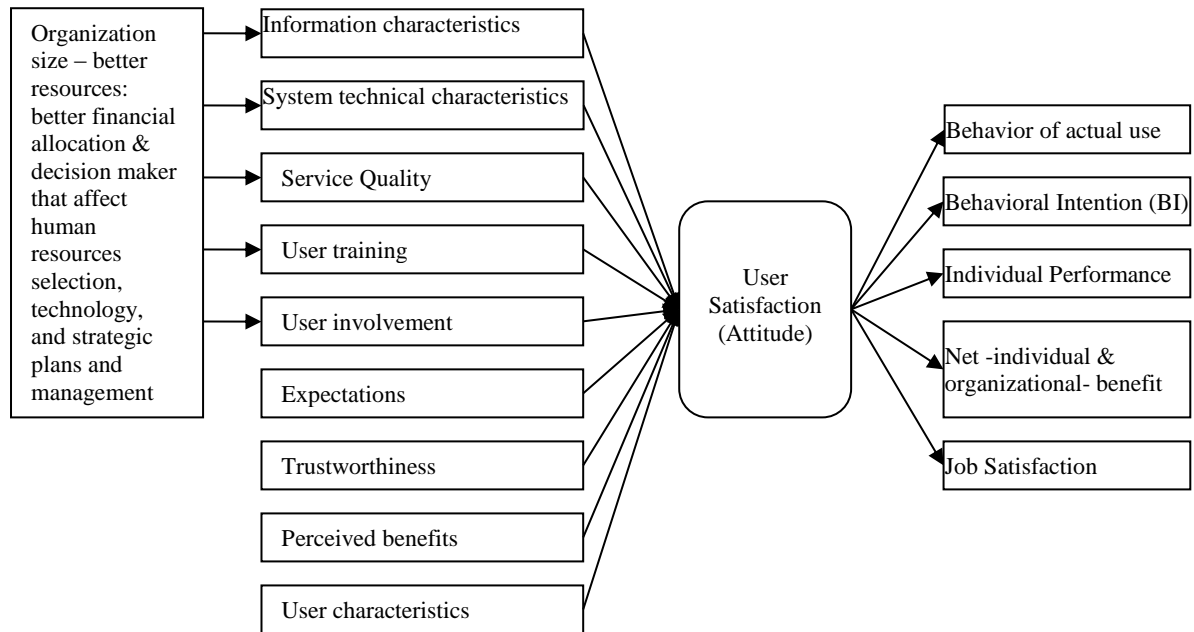
Based on the empirical studies for the period between (1995-2009) in three A\* journals: namely, Management Information Systems Quarterly (MISQ), Journal of Management Information Systems (JMIS), and Information Systems Research (ISR); we have focused on the variables that were found to be most significant determinants of user information satisfaction (see Figure 2-9). Figure 2-9 shows the variables that were found to be significantly correlated with user satisfaction in the twenty-two reviewed studies from the journals mentioned above. From Figure 2-9 we can see that there are some attributes that overlap and could be joined in one group representing one latent variable. For instance, Ease of Use reflects the system quality and is actually part of it (Rai *et al.* 2002). The attributes, timeliness, format, content, and accuracy, are all attributes of the information quality. Therefore, they were reduced to a relatively concise set of determinants to be included under one construct in some studies (DeLone and McLean 1992; Gatian 1994; Wang and Strong 1996; DeLone and McLean 2003; Negash *et al.* 2003; Nelson *et al.* 2005; Wixom and Todd 2005). For example, DeLone and McLean (1992, 2003) have

integrated the common variable under one latent variable; namely, System Quality which measures reliability, ease of use, flexibility, accessibility, response, and integration; and Information Quality, which includes timeliness or currency, accuracy, completeness, and format. Similarly, IS performance encompasses information and system qualities.



**Figure 2-9: US direct antecedents and their moderators in the empirically validated models**

Based on the literature, Figure 2-9 shows the user information satisfaction construct as dependent variable (DV) and as independent variables (IV).



**Figure 2-10: Common antecedents and dependent Variables to US**

## 2.4 System's Attributes: Output Quality & Performance

An IS performance and effectiveness represent how well a system and each of its major components operates (Alter 1999), while organization success reflects its performance success from all aspects, such as financially, strategically, quality of products/services. The notion of system success also means “system performance success”, in which all system attributes function effectively. As presented earlier, DeLone and McLean (2003) have categorized these attributes into three main groups and are considered as IS success components; and they are Information Quality (IQ), System Technical Quality (STQ), and Service Quality (SQ). Some researchers have used IS performance as a single construct measured by these three attributes (e.g., Au *et al.* 2008), and others simply used the system attributes as distinct variables. These attributes are discussed in the next sub-sections in detail.

However, before discussing each of these attributes, it is worth noting that, generally, the concept of a particular variable (construct), with a particular title/name, could differ depending on the context or field in which it is used and thus its measurement are expected to differ accordingly. The difference of interest in each research field

determines the main focus of the conducted study, such as the difference of focus between the IS and marketing researches. Thus, it is important to first pay careful attention on the concept of the chosen construct and ensure its fit within the context of the study, and that there is no overlapping between the concepts of each variable. The mismatch and inconsistency in defining the variables will, likely, encompass redundant notions which will lead to confounding effects, and hence, credibility and validity issues. Therefore, while discussing the IS attributes in the following sub-sections, any existing variation in the definitions of each attribute will be highlighted. This is necessary for the construct operationalization later on.

### 2.4.1 Information Quality (IQ)

The perception of Information Quality (IQ) is reflected by the cognitive beliefs about the favorable or unfavorable characteristics of the timeliness, accuracy, completeness, relevance, and reliability of the exchanged information generated by an information system (Seddon 1997; Nicolaou and McKnight 2006). Good IQ can be defined as “information which satisfies criteria of appreciation specified by the user, together with a certain standard of requirement” (Salaün and Flores 2001, p.26).

The criteria used in this study to measure IQ are all extracted from the IS literature which were found significantly related to User Satisfaction, such as relevance, accuracy, timeliness, availability, and presentation. **Relevance** refers to the relevance of information available to the task it is needed or used for. **Timeliness** (currency) refers to the recent and up-to-date information. **Availability** (completeness) refers to the accessibility of information that meets the needs for the various functions and tasks (comprehensiveness), and available when needed. **Presentation** refers to the layout of information in which it is clear, well laid and presented, and understandable. **Accuracy** refers to sufficient and correct precise information.

IQ was extensively used in the IS as a determinant variable of User Satisfaction because of its great influence on organizations’ performance, effectiveness, and success (DeLone and McLean 1992; Gatian 1994; Etezadi-Amoli and Farhoomand 1996; Palmer 2002; Rai *et al.* 2002; DeLone and McLean 2003; Negash *et al.* 2003; Nelson *et al.* 2005; Wixom and Todd 2005; Wang and Liao 2008; Chiung-Ju and Hui-Ju 2009; Chung and Kwon

2009). In this study, we focus on the relation between information quality and the overall system quality and performance. Therefore, we hypothesize that:

***H1: Information Quality has significant positive impact on Overall EGS Performance Quality.***

While users approach online information, they would expect good-quality information, which they would need to use and benefit from. Users' assessment of information is based on their expectation of the continuous maintenance of the excellent standards in terms of the availability of documents which also describe the aspect of reference for which it is used (Salaün and Flores 2001).

Salaün and Flores (2001) suggest that existing information should be created jointly with the customer. This means that the information should not be exclusively produced by an organization; users/customers should also take a part in this process, especially if it involves transaction and saving of personal information. They argue that effective IQ enhances mutual understanding and fulfillment of users' needs. Good IQ also reflects credibility of the party providing the information, and hence, leads to improved transparency. This would in turn improve users' trust and satisfaction of the website and the information provider. The relation between IQ and Trust will be further discussed in Section (2.5.1.4).

#### **2.4.2 System Technical Quality (STQ)**

The context in which the term system quality is used differs among researchers. Some researchers refer to the system quality as a whole, in which other components are subsets; such as products/services, information, business processes, technological characteristics, and employees (e.g., Alter 2002). Others use "system quality" to refer to the technical perspective only (e.g., DeLone and McLean 1992). In our study, the term 'system quality' will be clearly identified with the term 'system technical quality' to indicate that it reflects the technical aspect of a system.

System Technical Quality (STQ) refers to the desirable characteristics of an information system (Petter *et al.* 2008). It is concerned with the interface structure and consistency, ease of use, quality of documentation, whether or not there are bugs/flaws in the system,

and sometimes, quality and maintainability of the program code (Seddon 1997). It could be measured by (Aladwani and Palvia 2002; Zeithaml *et al.* 2002; Petter *et al.* 2008):

1. System reliability in terms of the characteristics of
  - a. accessibility (i.e., the period and frequency of downtime);
  - b. confidentiality (i.e., security and privacy features and standards);
2. Availability of links between pages;
3. Availability of integration and shared information between the various parties (i.e., government agencies;
4. Website (interface) characteristics and complexity (such as layout/design, navigation);
5. Loading (response) time;
6. Flexibility (ease of use); and
7. Ease of learning.

Several researchers suggested that ‘**website-design quality**’, as an interface, accounts as part of the STQ, which influences users’ perception, and subsequently, their trust and satisfaction (Agarwal and Venkatesh 2002; Aladwani and Palvia 2002; Palmer 2002; Gefen *et al.* 2003; Cyr 2008; Zhou *et al.* 2009b). Clearly, this interface is essential for an organization’s image where it plays an important role in attracting customers to start and continue using its website. Website-design quality includes aspects relevant to information design and layout, visual design and appeal, and navigation design and easiness (Cyr 2008). Although it is not always the case, some users may consider the web’s layout to be very poor, yet do not regard it as an important criterion that determine their satisfaction (Verdegem and Verleye 2009). This could be true in the case of public services websites rather than in commercial websites where users browse the web for pleasure or added convenience rather than to fulfill a task. So it may be preferable to assign a lower weight of importance to this aspect, but this is dependent on the context in which the assessment is occurring.

STQ has been represented in prior researches by ‘ease of use’ (EOU), which is defined as “the degree to which a system is user friendly” (Doll and Torkzadeh 1988; Davis 1989). According to Davis (1989), Ease of Use (EOU) is defined as “individuals’ beliefs that using a particular system will be free of effort” (p.320), and it can reflect the overall

experience from the ease of using a system. That notion could logically include the ease of finding information and make use of it if the information was of good quality. Similarly, in a particular online service channel, the availability of sufficient e-services would also help the user to reduce their efforts in conducting a particular task offline.

The perceived input effort, which is very close to the notion of perceived ease of use (PEOU) or the degree where IT use is free of effort, is an important factor that determines the level of satisfaction or intention to repeat the behavior; e.g., reuse the technology, repurchase, etc. Venkatesh *et al.* (2003) empirical findings of the UTAUT confirmed the importance of effort expectancy construct. The effort experience is a significant predictor for the behavioral intention in both the mandatory and voluntary contexts. However, it becomes non-significant when usage is extended for long periods of time.

When studying the outcome expectations with respect to the consequences of the use behavior, Compeau and Higgins (1995) found that the user's intention to use vs. not to use an IS was affected by the fact of whether the user will be able to increase his/her work output without having to put more effort.

The effort input is determined by, the user's unfamiliarity with the system, and the weak system design. Overcoming the first hurdle, in the internal-user context, is possible through sufficient employee training; whereas, in the external-user context, repeated use and/or provided instructions would probably resolve this issue. Generally, frequent or repeated Use of a website to redo a specific task would make the user more proficient in the task being conducted. This will, accordingly, lead to a less time consumed even when performing other similar tasks.

However, there are circumstances where effort input remains high and does not change with time or experience. Such cases, which are not controlled by users, would occur as a result of weak web design and technical issues, such as downloading time, unavailable links, and inconsistency of the information provided or processed in performing online services, etc.

The ease of using a website and navigation, downloading time, loading of pages and images, and the quick searching mechanism are all important factors that determine the



website technical quality and affect users' efficiency in saving their time and effort (Yang 2001; Santos 2003). Weak system characteristics remain an obstacle for effective and efficient Use and this can only be overcome by redesigning the system or fixing its flaws.

From that point of view, the concept of EOU seems to be used to reflect the STQ. Accordingly, we can assume that the hypothetical relation of a system's EOU that precedes PU, as in TAM, is conceptually similar to the relation of the STQ preceding PU. Therefore, there is no need to incorporate EOU as a distinct construct in our proposed conceptual model preceding PU because the STQ is being considered in the model. We believe, however, that STQ reflects a bigger notion than the EOU; and hence, we opt to include the EOU as a measurement item to the STQ. However, it is important to note that EOU, which is used in TAM and other studies as an "*expectation*" of the future outcomes from using an EGS website, is conceptualized, in our model, to reflect "*current*" perception.

If the notion of PEOU is exclusively relevant to the technical quality in terms of the easiness of finding information or using an e-service; then, there is no need to add PEOU to our conceptual model if STQ is being included. In the study, we prefer to substitute PEOU with STQ instead, which reflects the website characteristics, as it is deemed more comprehensive and includes the concept of PEOU within it (Wang and Liao 2008). Therefore, the PEOU construct which appears in TAM will be excluded from the model to avoid redundancy, and the STQ, which is also measured from the citizens' perspective, is used to reflect the technical interface of an EGS.

There is no doubt that STQ has significant impact on IS success. This conceptualization was empirically confirmed to have a positive relationship with the system success and performance (Etezadi-Amoli and Farhoomand 1996). The better the system design is, and the easier the system is to use, navigate, and learn; the higher the level of the user's satisfaction. Also, the more reliable the system is, in terms of the appropriateness of links, processing, loading time, downtime, and security; and the better it performs, the more satisfied users will be. Based on the previous discussion we hypothesize that:

***H2: System Technical Quality has a significant positive impact on the Overall EGS Performance Quality.***

### **2.4.3 Service Quality (SQ)**

#### ***2.4.3.1 IS research versus Marketing Research***

It appears that there is some confusion as to what ‘Service Quality’ (SQ) refers to and what the attributes that SQ covers in each of these research fields. Therefore, before discussing SQ, it is important to first distinguish between what SQ refers to in the IS versus the marketing context.

In the IS context, SQ refers exclusively to the services provided by the employees, online or offline, to customers or even employees. It is related to the personal assistance provided to others, to fix or update a system, respond to and process customers’ requests online. With the emergence of WISs, the notion of SQ started to include the services provided through websites to conduct tasks independently or request services electronically from service providers (i.e., e-services). Therefore, the notion of SQ in IS is limited to the responsiveness and support of employees to customers or clients, and sometimes the availability of adequate e-services online.

In the marketing research context, on the other hand, researchers focus on the services as a core interest, which influences the customers’ level of satisfaction and, ultimately, affect the organization’s profitability. So, here, the SQ concept, which emerged initially from the marketing literature, generally, reflects the services provided by an organization or its employees to customers. Thus, the SQ in marketing resembles the ‘Overall Service Quality’ (OSQ) – (see Section (2.4.4) for more detail).

However, when organizations have turned to using online trading (i.e., e-commerce), online customers assessments of the quality of the services provided have been according to their perceptions of the quality of all the aspects related to their purchasing experience along with their perception of the provided products or services, starting from logging on to the website, to receiving the purchased material. For instance, when using an online interface, the quality of information, website characteristics, design, security, and ease of use, availability of e-services that an online vendor provides, all account as part of the service quality provided to customers.

Although most researchers, and sometimes from the IS literature, too (e.g., DeLone and McLean 2003), refer or conceptualize the SQ as the OSQ; many researchers in the IS literature, are more focused on the quality of IS components. Hence, they distinguish between the different attributes that constitute an IS and subcategorize them mainly into three categories differentiating between the SQ, STQ, and IQ.

In brief, the main difference between SQ in IS and marketing literature is that, in the IS-external-user context, SQ is generally looked at and assessed as a component of a system such as the IQ or STQ. On the other hand, in the marketing literature, the term SQ reflects the services provided to customers inclusive to everything offered to and used by customers, whether offline, online, or both, depending on which aspect is being assessed.

To avoid misinterpretation, confusion, redundancy, or overlapping concepts of the variables, we distinguish between the notion of ‘**total/overall service quality**’ (OSQ), which reflects the overall performance quality and effectiveness of a WIS, and the ‘**service quality**’ as a subset of the total/overall service quality reflecting a construct that is distinct from the information and technical qualities. By that we mean that we will consider the SQ to be limited to the electronic transactional services<sup>33</sup> provided online, in addition to the staff quality in terms of their responsiveness and competency in updating the system and completing the business processes to fulfill customers’ requirements.

#### ***2.4.3.2 Service Quality in IS: Internal versus External-User Contexts***

SQ is used in the literature as a determinant of US, but it varied in the ways it was measured based on context. When assessing user’s satisfaction in the organization *internal-users context*, the service quality, usually, measures the support users get from the IT staff with respect to technical issues, as well as the support they get when further help or learning is needed to use the system (e.g., Maish 1979; Au *et al.* 2008). In this case, by default, staff quality is a component measure of the service provided.

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<sup>33</sup> Other researchers have acknowledged the connection between the website-design quality and service quality in which e-services are options provided on the website interface to allow customers send inquiries or conduct other services. However, the promptness and efficacy in responding to the electronic requests reflect the organization’s service quality (Zhou *et al.* 2009b). In our study we opt to consider the e-services, though on the website, as part of the service quality attributes.

For the organization *external-users context* using a WIS, like e-commerce and e-government, SQ usually reflects the services provided online; i.e., the services provided in the electronic interface such as purchasing, order tracking, and responsiveness of staff in replying to queries; in addition to the unobserved steps in which the online orders are processed and completed by employees. For instance, in the case where products are purchased, customers expect “good-quality” staff at the backend to process the online order (Alter 2002; DeLone and McLean 2004). In this case, the SQ construct measures both, the electronic aspect of the services provided by the vendor such as online support and transactional options, as well as, the human aspect in completing the online services, whenever required.

However, for other researchers, SQ attribute does not include the ‘e-services’ provided online as being part of the actual services, it only concerns investigating the attention given to users by staff, see for example, (Wang and Liao 2008). In this case, the notion of SQ is similar to the notion of quality of service and support provided in the traditional interaction channels. For example DeLone and McLean (2004) refer to SQ in the e-commerce environment to comprise responsiveness, personalized after-sale service, following-up service, electronic/online support (including FAQ, inquiry reply, order tracking service).

#### ***2.4.3.3 Staff Quality: A Component of SQ***

Zhou *et al.* (2009b) distinguish between website-design quality and service quality, but stress that both are complementary to each other in determining the external-user/online-customer satisfaction. The reason behind this is that, having a good quality technical interface, on its own, which allows posting inquiries and executing certain transactions, is not enough for the external-users/online-customers. It is essential to have a good SQ, which is concerned with the processes performed by the people behind the website, and is reflected by the quick and accurate response in providing services to the online-customers (Zhou *et al.* 2009b).

In a WIS context, such as e-commerce and e-government, the websites as are built as means of interaction and to minimize, if not replace, the traditional physical interaction. Despite the fact that there is low personal interaction between users and the

organization's employees, they are still considered a very important part of WIS. The employees complete business processes and provide services for system users. As mentioned earlier (in Section (2.2.5.6.2)), customers in the e-commerce context will not be happy or satisfied if they received the wrong item, the item was delivered late, or was not delivered at all. Customers expect the used system to be apt and appropriately integrated as a whole. So no matter how convenient and easy it is to use a website, navigate, and place an order online; the processing of the required task is extremely vital. Thus, the outputs of service quality are accounted for and are indirectly and ultimately sensed by the external-users/online-customers. This implies that an effective system performance needs to be wholly integrated rather than focused on specific attributes over others, such as a good website design with poor response, and vice versa.

Employees' training and characteristics, such as attentiveness and supportiveness, are important factors that influence one's assessment of an IS success. 'Staff quality' gained a substantial attention from researchers, where they have investigated its relation with IS projects implantation and its significance on the technology utilization, IS effectiveness, and success (e.g., Sanders and Courtney 1985; Thompson and Higgins 1991; Compeau and Higgins 1995; Lee *et al.* 1995; Yoon *et al.* 1995; Simon *et al.* 1996; Venkatesh 1999; Hamner and Qazi 2009; Hung *et al.* 2009). As a vital step in implementing an IS, an organization needs to ensure adequate training for its staff, otherwise, it will face the risk of failing the project (Azab *et al.* 2009).

Staff quality is usually investigated in the literature, particularly marketing, as a measurement item<sup>34</sup> of SQ, which appears when customers communicate with the service provider (Kettinger and Lee 1994). Zeithaml. *et al.* (1988) assert that SQ is highly dependent on the performance of employees, who are a vital organizational resource that contribute to its success, yet uncontrollable and unstructured like tangible goods. Staff responsiveness, whether they are administrative or sales agents, and their understanding of what they should do, are factors influencing customers' perceptions and decisions to continue repurchasing or using the service.

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<sup>34</sup> A measurement item reflects the aspect that need to be assessed for a particular construct reflected by the questions of a survey.

Kim and Stoel (2004) conducted a study to explore the hierarchy of the ‘website quality’ scale and their results showed poor fit and were not supported. The researchers infer the poor fit of the proposed model due to the used attributes in exploring the ‘overall’ website quality where measurement scale did not capture the service quality and were mainly focused on the information and technical quality. A recent study, on the other hand, considered the importance of including the citizens’ interactivity as a measure in the citizen-centric evaluation scale for e-government quality which reflects the support that citizen’s get in their ‘quest’ of performing their online task. This kind of assistance includes providing ‘help pages’ and user friendly guidelines, Frequently Asked Questions, as well as responding to citizens’ inquiries and assisting them in solving their problems through emails or message boards (Papadomichelaki and Mentzas 2012).

It is therefore important to assess the perspective of staff quality from the citizen’s point of view as part of the SQ. So, rather than looking at the SQ as a reflection of the overall performance of a system, SQ is regarded as a subset of the perceived EGS performance. Accordingly, the assessment criteria of SQ, in the context of this study, encompass two important attributes:

- 1- the e-services that are available on the website to execute various transactions (including the availability of downloadable forms), and
- 2- the process in which government employees perform behind the scene through updating the system with individuals’ status and completing the parts of services that have been requested online and need to be finalized at the back-end.

Accordingly, in this study, the SQ construct refers to ‘the quality of the services provided through the Internet, such as the availability and variety of the e-services online in addition to the quality of employees responsiveness and accuracy of completing the required task(s)’.

Based on the previous discussion on SQ and its importance as a component of a WIS, such as EGS; and its influence on the overall system performance quality and effectiveness, we postulate that:

*H3: Service Quality has significant positive impact on the Overall EGS Performance Quality.*

#### 2.4.4 Overall System Performance Quality

As mentioned in the previous section, the concept of system performance quality in the IS literature, as perceived by users, is sometimes deemed to be equivalent to the concept of the overall service quality (OSQ) used in the marketing literature. The notion of ‘total/overall service quality’ is sometimes shortened, for simplicity, to the term ‘service quality’, which is commonly used in the literature, particularly, in marketing. This concept of OSQ<sup>35</sup> was introduced by Gronroos (1982) to refer to the customers’ perception of the difference between the expected service and the perceived service (Santos 2003).

Thus, perceived OSQ in the WIS context is based on customers’ evaluation where they compare between their expectation of the services that an organization should provide and their perception of the organization’s performance and what it provided (Gronroos 1984; Parasuraman *et al.* 1988). Santos (2003) referred to perception of service quality as “the overall evaluation of service performance” where users’ perception of the attributes qualities of a particular system is based on an overall evaluation and judgment that indicates the level of its success through the excellence and quality of its overall functionality/performance. Hence, good system performance indicates that the system components are effective and the system as a whole is effective in producing the anticipated outputs. The relationship between the perceived OSQ provided by an online vendor and customers/user satisfaction was empirically shown to be significant (Parasuraman *et al.* 1985; Yang 2001).

Based on the previous definitions, individuals’ perception of the overall WIS performance quality, refers to the perception of the overall IS outputs quality; while the perception of the OSQ refers to the perception of the quality of services provided to individuals through a WIS, such as e-commerce or e-government. Both notions seem to be similar<sup>36</sup> because they are directed to the external-users (customers/citizens), and both are perceptual measures in which external-users evaluate the received output of a used IS.

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<sup>35</sup> In all cases, the service quality or overall service quality is assessed based on the customer-users’ perceptions, so, they are all perceived qualities. Thus, for simplicity, the word ‘perception’ is sometimes discarded from the sentences.

<sup>36</sup> The notion ‘Overall System Performance quality’ can be regarded as equivalent to Overall Service Quality when the ‘service’ in the latter is provided to customers through a system; and ‘Performance’ in the former refers to the performance of the system in delivering the services.

Therefore, the two terms within the context of this study may be used interchangeably to refer to the same thing.

It is important to note that total/overall performance quality in the context of this study *does not* encompass other aspects of performance, such as financial performance. The overall system performance quality is exclusive to the perception of the output aspects that external-users receive from using a WIS. In other words, an IS performance is considered to have a high-quality performance if its components are of high qualities.

Parasuraman *et al.* (1985) proposed 10 overlapping measurements that impact the perceived OSQ (SERVQUAL). His perception-based SERVQUAL measurement scale was referred to and used by many researchers (e.g., Grover *et al.* 1996; Balasubramanian *et al.* 2003; Connolly 2007; Zhou *et al.* 2009b). The measures proposed were, tangibles, reliability, responsiveness, communication, credibility, security, competence, courtesy, understanding/knowing the customer, and access which involve approachability and ease of contact (Parasuraman *et al.* 1985).

These attributes were categorized later by Parasuraman *et al.* (1988) into five main groups; and they were:

- 1- *Tangibles*: refers to the physical facilities, equipments, and appearance of personnel.
- 2- *Reliability*: refers to the ability to perform the promised service dependably and accurately.
- 3- *Responsiveness*: refers to the willingness to help customers and provide prompt service.
- 4- *Assurance*: refers to the knowledge and courtesy of the employees and their ability to inspire trust and confidence.
- 5- *Empathy*: refers to the caring and the individualized attention the firm provides to its customers.

After refining the service quality measurement scale, the seven attributes, communication, credibility, security, competence, courtesy, understanding/knowing customers, and access; were included in “assurance” and “empathy”.



Although a huge group of scholars have used service quality measurements (SERVQUAL) introduced by Parasuraman *et al.* (1985) for different context in their studies (e.g., Negash *et al.* 2003; Sung *et al.* 2009; Wangpipatwong *et al.* 2009; Akter *et al.* 2010); another group of researchers raised their concerns about the validity and applicability of using this instrument in the different contexts and/or industries (Carman 1990; van Dyke *et al.* 1997). In fact, it is suggested that, to accurately measure OSQ, some items must be customized in each service setting, and accordingly, many items may need to be added and many may need to be excluded, depending on those various settings and contexts (Carman 1990). Moreover, in the case where customers find several service functions are being provided, these functions should be distinguished so that the instrument is better administered for each function separately (Carman 1990). Differentiating between the types of services is also applied to the understanding of the differences between the offline and online modes of service which utilize an ICT to provide its services.

To enhance the performance and quality of the services provided and its effectiveness, ICT has been increasingly adopted in organizations. There is no debate that organizations that do not incorporate IT/IS in its infrastructure to exploit new innovations such as web-based services or a WIS, are outperformed by others which do (Voss 2000); and this has been empirically confirmed (Santhanam and Hartono 2003). Since the emergence of Internet, organizations found a great opportunity to provide services to their customers through this new channel, while making sure they attract a new segment of the population and enhance their competitive opportunities (Ajit and Mark 1998; Torkzadeh and Dhillon 2002; Soliman and Janz 2004).

Nevertheless, among those organizations that utilize web-based services, for an organization that wants to pioneer, its e-services should be upgraded to include additional features, such as faster response time and automated response including e-mailing receipt confirmation and online status checking (Voss 2000). This is especially important for the organization to gain customers' trust (Lee and Turban 2001; Komiak and Benbasat 2004; Cazier *et al.* 2006; Bolton *et al.* 2008; Zahedi and Song 2008).

Thus, the traditional conceptualization of the OSQ, after the introduction of the Internet and the online services, has evolved to encompass new measurements related to the online attribute. These measurement criteria are considered significant factors that influence customers' perception of the services provided through a WIS (Connolly 2007).

After the expansion of the Internet and particularly the use of e-commerce, many studies in the literature have attempted to investigate website quality and service quality through the online channel reflected by the OSQ. However, they differed in their approaches and the goal of study. Most of them were dedicated to studying the quality and perceptions of value of the WIS and how it would affect one's loyalty, satisfaction, behavior and behavioral intention; as well as studying the determinants of these dependent variables. This is because delivering superior service quality using the Internet, requires a clear understanding of how customers perceive and assess the online services; which subsequently assists in offering high quality measures (Parasuraman *et al.* 2005).

Most studies have basically depended on SERVQUAL scale introduced by Parasuraman *et al.* (1988); but each study proposed additional variables to endeavor explaining more variance of the phenomena while taking into account the context of the online environment and its characteristics (Zeithaml *et al.* 2002). Attributes which already existed and were proposed by previous researchers, where applied, to fit the online environment. Consequently, the term that reflects the overall services provided to customers, which originally was applied for the offline service channel, has changed to 'e-services' to be applied on the online service channel using a WIS, see for example, (Eileen *et al.* 1999; van Riel *et al.* 2001; Yang 2001; Santos 2003; Kettinger *et al.* 2009).

For that reason, users/customers generally assess a WIS and its services as an overall process, rather than evaluating a single process or a particular attribute of the system by its own; unless it stands out positively or negatively (van Riel *et al.* 2001). Customers' assessment of the performance quality of a WIS is based on their perception of the OSQ they receive, including all attributes affecting the functionality and quality of that service channel, and how it impacts them (Teo *et al.* 2008).

Accordingly, ‘overall’ e-services quality in this sense, which reflects the OSQ provided by a WIS to customers, encompasses several attributes, like the physical appearance and quality, information/content quality, variety of electronic transaction options, equipment, and employees' responsiveness and empathy (Balasubramanian *et al.* 2003). It can, therefore, be defined as the “the extent to which a Website facilitates efficient and effective shopping, purchasing, and delivery” (Parasuraman *et al.* 2005, p.2017 ). Based on this definition, the ‘overall e-services quality’ is interpreted to mean the perceived overall WIS performance quality or effectiveness. In the marketing sense, services tend to be “performance oriented”, such that the ‘overall’ service quality appears through service delivery, and involves customer interaction with the service provider (Kettinger and Lee 1994).

Parasuraman *et al.* (2005) acknowledged the different contexts of SQ through the traditional channel vs. the online, and argue that the assessment of customers’ perception of the ‘overall’ service quality in the online environment requires to be extended to fit that context and reliably reflect the actual nature of different attributes. In other words, since customers interact with an organization using a new channel (i.e., WIS interface), then this service delivery channel encompasses the technology attribute. Consequently, the customers incorporate the interface as an interaction channel in their assessment as part of the overall services provided through a WIS (Parasuraman *et al.* 2005). Hence, Parasuraman *et al.* (2005) have reviewed the relevant literature to come up with a suitable scale for the perceived OSQ of an online vendor. After comparing and critically analyzing the Web-Quality scales presented by other researchers, they proposed four measurements for ‘overall’ e-service quality; namely, efficiency, system availability, fulfillment, and security and privacy (Parasuraman *et al.* 2005). However, researchers who investigated the e-commerce context focused merely on the website quality discarding some important aspects, such as fulfillment<sup>37</sup> (e.g., Barnes and Vidgen 2002).

Of the most comprehensive studies published that was related to identifying the perceptual and significant attributes of a website for an e-vendor was by Zeithaml *et al.* (2000). However, it was lacking greater emphasis on the measurements of information quality attribute. The authors introduced eleven e-service quality attributes which are

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<sup>37</sup> By fulfillment, we mean the reliability of the customer service in delivering the accurate purchased item on time.

presented in Table 8 below. In order to clarify and avoid confusion, we have categorized these attributes and presented those that can fit the EGS context.

<b>Table 8: The e-Service Quality attributes introduced by Zeithaml <i>et al.</i> (2000)</b>		
<b>Attribute</b>	<b>Definition</b>	<b>Aspect (Applicability to e-government context)</b>
<b>Reliability</b>	Correct technical functioning of the site, accuracy of service promises (having items in stock, delivering what is ordered and when promised), billing, and providing product information.	Technical & operational competencies (i.e., technical and service quality, respectively)
<b>Responsiveness &amp; assistance</b>	Responsiveness: Quick response and the ability to get help if there is a problem or question.	Service quality (from staff)
<b>Ease of navigation</b>	Site contains functions that help customers find what they need without difficulty, has good search functionality, and allows the customer to maneuver easily and quickly back and forth through the pages.	Technical quality
<b>Efficiency</b>	Site is simple to use, structured properly, and requires a minimum of information to be input by the customer.	Technical quality
<b>Site aesthetics</b>	Appearance of the site (Layout)	Technical quality
<b>Security &amp; privacy</b>	Degree to which the customer believes the site is safe from intrusion and personal information is protected.	Perceived trustworthiness of the security and privacy features in the technical quality
<b>Assurance &amp; trust</b>	The confidence that a customer feels in dealing with the site based on the reputation of the site, the quality of products or services it sells, as well as truthful and clear information presented.	Trust/ perceived trustworthiness based on the technical quality, service quality, information quality
<b>Access</b>	Ability to get into the site quickly and to reach the company when needed.	Technical quality
<b>Customization / personalization</b>	How much and how easily the site can be tailored to individual customers' preferences, histories, and ways of shopping	Not Applicable (N/A)
<b>Price knowledge</b>	Extent to which the customer can determine shipping price, total price, and comparative prices during the shopping process.	(N/A)
<b>Flexibility</b>	Choices of ways to pay, ship, buy, search for, and return items.	(N/A)

In general, the OSQ and the effectiveness or performance provided through a WIS, such as in the context of e-commerce or e-government, is determined by the customers/ users perceptions of (Voss 2000; Wolfinbarger and Gilly 2003):

- 1- the quality of the services provided online including responsiveness and replying to inquiries;
- 2- the quality of service in terms of the reliability and fulfillment of the service promised such as delivering the purchased items;
- 3- the website design which reflects the technical quality (including site effectiveness and functionality such as navigability, loading/ downloading time, and easiness in completing a transaction;
- 4- the information quality such as availability of information and the frequency of updating the information;
- 5- the availability of electronic services online; and
- 6- the security and privacy standards and their trust.

In addition, the previously presented examples of studies show that the notion of perceived overall service quality appears to reflect a combination of two types of service performance qualities, technical and functional.

Technical quality reflects the interface with which the customers interact to obtain what they require, and that includes the interface characteristics and the available online e-services. It can be said that it reflects the IS output quality, which is evaluated on the actual delivered outputs of products and services. For example, website design and quality, security and privacy standards, information content and quality, staff support and responsiveness, order processing and delivering mechanism (of products). As mentioned before, these measures plus some additional ones were categorized, aggregated, and introduced in DeLone and McLane (2003) study as three general attributes reflecting system's attributes, namely, information quality, technical quality, and service quality (see Table 7). The service quality in their study is just a segment of the overall system quality and performance. Although technical (output) quality is important; it is not sufficient by itself to obtain customer satisfaction. The output quality is influenced by the way of how it was, functionally, executed ([Kettinger and Lee 1994](#)).

The functional quality is related to how the output was performed and delivered to customers with relation to employees, resources, and activities of the service provider ([Kettinger and Lee 1994](#)). In other words, it is dependent on employees support,

responsiveness, and competency in conducting the customer-related business processes. All of these criteria are integrated under one concept reflecting the perceived OSQ (Kettinger and Lee 1994; van Riel *et al.* 2001).

The previously mentioned factors reflect the level of the WIS effectiveness in a similar way to the OSQ or performance, and affect the system's external-users. Voss (2000), for example, argues that WIS effectiveness is based on the service effectiveness of that website in terms of how well the users' needs are met. His suggested effectiveness measures are:

- 1- The task performance attributes in terms of the average time consumed for an average user to perform an average task online.
- 2- The subjective satisfaction with the site.
- 3- The outcome quality for the user.

This indicates the importance of measuring all attributes that would affect the WIS in order to identify its success more realistically.

From the previous discussion, we conclude that a WIS success, such as an e-commerce or an EGS, can be evaluated through two perspectives, and they are related mostly to understanding:

- 1- The WIS' overall output quality and performance.

This perspective consists of the characteristics quality of the website, such as navigability, loading time, ease of use, clarity and availability of information which helps in using the e-services, and consequently, determining the time consumed on the website by an ordinary user to perform a specific task.

- 2- How the system overall output quality impacts its users in terms of their task performance or efficiency as part of the outcome quality.

In the context of this study, the outcome quality on the system external-users includes the obtained task efficiency or Tangible Benefits, and ultimately, users' satisfaction. Clearly, the second point is dependent on the first, which is the 'overall system characteristics' or 'overall service' provided.

Rayport and Sviokla (1994) propose that the overall value or benefits that a customer receives, aggregates three magnitudes: content, context, and infrastructure (Rayport and

Sviokla 1994). In other words, the obtained benefits are influenced by the context in which they were received (e.g., face-to-face vs. electronic service channel), and are dependent on the content (i.e., information) and infrastructure (IT) which is related to the technical quality; and all fall under the quality of the service provided. Thus, perceived performance determines the level of satisfaction or dissatisfaction (Tse and Wilton 1988). Therefore, to encourage citizens to use an e-government portal and exploit the e-services, it is crucial to design the business processes and analyze the transactions processes for an effective e-service (Voss 2000).

When citizens need to interact with a government agency to perform a specific task, their decision of whether to choose the online channel vs. the traditional face-to-face channel is dependent on the overall performance quality and effectiveness as perceived by them, and how this quality would consequently affect them.

As discussed earlier, the increased adoption of the ‘good-quality’ EGS might contribute in reducing the number of visitors and work pressure on government employees. However, even though the service performance of government employees in front-line might improve; citizens who are capable of using the Internet will likely be more inclined to use the EGS over the offline mode for its preferable potential consequences.

Individuals’ perception of the usefulness of a system overall is dependent on their perception of the credibility of information, technical quality, and service quality (Teo *et al.* 2008). When good-quality services are provided through a WIS as an interaction channel, and users believe that this service delivery channel is credible, they will perceive it to be useful. Perceiving an EGS to be useful will encourage more System Use. The better provided quality, the more potential value.

In general, perceived quality is defined as the customer's judgment about an entity's overall excellence or superiority (Zeithaml 1987). It is deemed to be a form of attitude that is related, but not equivalent, to satisfaction (Parasuraman *et al.* 1988). It is a significant antecedent to perceived value (Zeithaml 1988), where perceived value is based on individual’s assessment of the aggregate perceptions of the various outcome

benefits and the associated tradeoffs (Zeithaml 1988; Turel *et al.* 2010); and hence, it would affect the level of individual's satisfaction (Chiou 2004; Chen and Chen 2007).

While studying a systems' performance evaluation from the users perspective, in the IS context, the empirical findings revealed a strong relationship between the quality of perceived service performance, and the users' satisfaction with the information service function (e.g., Kettinger and Lee 1994). In fact, both the concept of perceived overall WIS performance or service quality, and the attributes of information, technical, and service qualities, which are all the factors determining the system performance, were all found in the literature to be significantly correlated with the users' satisfaction (e.g., Parasuraman *et al.* 1985; van Riel *et al.* 2001; Devaraj *et al.* 2002; Balasubramanian *et al.* 2003; DeLone and McLean 2003; Santos 2003; Cenfetelli *et al.* 2008; Teo *et al.* 2008; Wang and Liao 2008; Chiung-Ju and Hui-Ju 2009; Kettinger *et al.* 2009; Sung *et al.* 2009; Xiaohong *et al.* 2009; Zhou *et al.* 2009b).

Devaraj *et al.* (2002) proposed a model that suggested that individuals preference of particular interaction channel (i.e., online vs. face-to-face) is dependent on their level of satisfaction, which is determined by the overall service quality, online transactional costs, and technology acceptance with respect to website usage (Devaraj *et al.* 2002).

Based on the previous discussion on the notion of a WIS performance quality, and how its attributes influence its users' perceptions and task performance, and consequently their level of satisfaction, particularly in the e-government context, we can postulate that:

*H4: Perceived Overall EGS Performance Quality has significant positive impact on User Satisfaction.*

*H5: Perceived Overall EGS Performance Quality has significant positive impact on the individual's Perceived Usefulness of the EGS.*

*H6: Perceived Overall EGS Performance Quality has significant positive impact on the citizens' Intention to Use/reuse the online service.*



***POSQ as a global construct*** – The previous discussion showed how all system attributes are important in determining the overall WIS performance, which in turn, impact users' experience, task performance, obtained benefits, and ultimately, their satisfaction. Accordingly, all of these factors will impact users' intention to use the system, especially in the voluntary-use context.

IS overall performance quality has been conceptualized and empirically proven in the IS literature to include those three independent attributes (DeLone and McLean 2003; Au *et al.* 2008). Both, the concept of perceived overall WIS performance or service quality, and the attributes of Information, Technical, and Service Qualities, which are all the factors determining the system performance; were found in the literature to be significantly correlated with the users' satisfaction (e.g., Parasuraman *et al.* 1985; van Riel *et al.* 2001; Devaraj *et al.* 2002; Balasubramanian *et al.* 2003; DeLone and McLean 2003; Santos 2003; Cenfetelli *et al.* 2008; Teo *et al.* 2008; Wang and Liao 2008; Chiung-Ju and Hui-Ju 2009; Kettinger *et al.* 2009; Sung *et al.* 2009; Xiaohong *et al.* 2009; Zhou *et al.* 2009b).

Although the concept of overall IS performance quality or overall service quality with the relation to other factors, such as satisfaction or behavioral intention, was conceptualized to be significant in the literature, it was not used as a single construct. Rather, in most studies, the IS attributes were assessed separately as first-order constructs with direct link with other variables in the models. The researchers have accordingly used their empirical findings to support their conceptualization of the significant relationship between the overall IS performance quality or overall service quality with and the ultimate dependent variable/s in their models.

There were scholars that studied the IS overall performance quality and service quality as a higher-level construct. Parasuraman *et al.* (2005), for example, suggested that the perception of system attributes (e.g., information and technical qualities), would impact the OSQ perceived value, which in turn, influences one's use behavior and behavioral intention. Thus, in their study, they have treated and measured OSQ as a higher-order construct representing the overall perceived WIS quality and value. It included a wide range of evaluation criteria for variables and measures that affect the perception of quality and value of a WIS (Parasuraman *et al.* 2005). The first-order factors were set as

reflective<sup>38,39</sup> to the higher-order construct, i.e., the Perceived Overall IS Performance Quality.

Similarly, Au *et al.* (2008) investigated the IS performance quality as a higher-level construct of user evaluation reflecting the three categories of the commonly known attributes (Au *et al.* 2008). Their study was focused on understanding the determinants of user IS satisfaction in the organization internal environment. One of the determinants of US, in their model, was the ‘perceived’ IS performance quality (Au *et al.* 2008). However, they have also measured the perceived IS performance quality as a reflective latent variable composed of Information Quality, System Technical Quality, and support and Service Quality, i.e., they have considered a higher-level construct measured by the three attributes as items.

Although there are researchers that measure the WIS overall performance quality as a reflective high-order construct, we believe that the measures or first-order attributes are not outcomes that are caused by the WIS performance. In addition, none of these first-order attributes can solely reflect the ‘overall’ perception of the IS quality and performance, as in the case with reflective measures. In the contrary, they actually, altogether, contribute in forming or determining the overall WIS performance. We agree with the other group of researchers who conducted their empirical studies on the bases of having this construct as a formative latent variable (e.g., Cenfetelli *et al.* 2008). The formative latent variable is an outcome that is dependent on lower-order independent attributes, which in fact form the higher or overall concept. In other words, the first-order constructs represent a distinct contribution in causing the higher-order latent variable, which serves as a formative global construct (Chin 1998a; Gefen *et al.* 2000; Pavlou and Gefen 2005; Cenfetelli *et al.* 2008; Sung *et al.* 2009).

The approach of aggregating first-order variables into a higher-order conceptualization<sup>40</sup>, to provide a better model fit and explain a particular perspective of the phenomena, e.g.,

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<sup>38</sup> The concepts of reflective/formative are explained in more detail in the methodology chapter, Section 3.4.2) and (3.4.2.3).

<sup>39</sup> Some researchers used the notion of overall service/WIS performance quality as a reflective global latent variable (i.e., reflect other attributes) rather than formative (i.e., formed by the lower order attributes) (e.g., Parasuraman *et al.* 2005; Au *et al.* 2008; Tan *et al.* 2008; Akter *et al.* 2010).

<sup>40</sup> A second-order concept involves more than one attribute, thus, comprise several first order constructs (Pavlou and Fygenson 2006; Wetzels *et al.* 2009).

perceived overall quality or user satisfaction, has been supported (Turel *et al.* 2010), and have been applied in numerous studies in the literature (e.g., Zeithaml 1988; Kettinger and Lee 1994; Pavlou and Fygenson 2006; Lankton and Wilson 2007; Cenfetelli *et al.* 2008; Mohamed *et al.* 2009; Sung *et al.* 2009; Wetzels *et al.* 2009; Turel *et al.* 2010).

For that reason, it may be worthwhile to investigate the Perceived Overall EGS Performance Quality construct in the proposed conceptual model as a multiattributed global measure/factor as it may explain all the co-variation among the first-order attributes (Chin 1998a); i.e., Information Quality, System Technical Quality, and Service Quality. The notion of the overall performance or service quality, even as a higher-order (global construct), was empirically validated and found to be significantly correlated with Perceived Usefulness and the individual's Intention to Use a system (Cenfetelli *et al.* 2008; Tan *et al.* 2008).

## **2.5 *Individuals' Attributes of Cognitive Beliefs***

### **2.5.1 Trust (T)**

With the introduction of e-commerce and e-government systems, the notion of "Trust" has increasingly become a prominent construct, especially in the external-user context when using a WIS (Cullen and Reilly 2007). Trust and perceived trustworthiness has been investigated in numerous studies and various contexts and disciplines, such as sociology, economics, psychology, marketing, organizational behavior, and information systems (Bhattacharjee 2002). Even in the IS literature, particularly in the WIS context, researchers have attempted to explore online trust from the point of view of different stakeholders (Shankar *et al.* 2002). Trust has been thoroughly investigated conceptually and empirically in different contexts in IS literature, such as a general concept (e.g., Mayer *et al.* 1995) as well as in the organization (e.g., Goo *et al.* 2009) and workspace internal-user context (e.g., Cook and Wall 1980; Nelson and Coopridge 1996; Gregor and Benbasat 1999; Piccoli and Ives 2003; Gefen 2004; Paul and McDaniel Jr 2004; Kanawattanachai and Yoo 2007; Rai *et al.* 2009; Robert Jr *et al.* 2009).

The concept of trust is considered more prominent in the e-commerce context and has been incorporated in numerous studies (e.g., Anderson and Weitz 1989; Culnan and Armstrong 1999; Lee and Turban 2001; Ba and Pavlou 2002; Belanger *et al.* 2002; Bhattacharjee 2002; McKnight *et al.* 2002b; McKnight *et al.* 2002a; Balasubramanian *et*

*al.* 2003; Gefen *et al.* 2003; Pennington *et al.* 2003; Komiak and Benbasat 2004; Levin and Cross 2004; Johnson and Grayson 2005; Komiak and Benbasat 2006; Lim *et al.* 2006; Nicolaou and McKnight 2006; Pavlou and Fygenson 2006; Stewart 2006; Bliemel and Hassanein 2007; Bo and Benbasat 2007; Awad and Ragowsky 2008; Choudhury and Karahanna 2008; Cyr 2008; Kim 2008; Turel *et al.* 2008; Vance *et al.* 2008; Wang and Benbasat 2008; Zahedi and Song 2008; Chiung-Ju and Hui-Ju 2009; Sia *et al.* 2009).

However, compared to the abundant trust studies conducted in the e-commerce context, and the large number of research published in top ranking journals, studies that discussed trust in the e-government context, though increasing, were relatively limited and not very comprehensive. These trust-related studies started to appear in the last few years, due to the recency of this domain (Kim *et al.* 2007).

Researchers have proposed Trust to have relationships with other constructs. Some scholars have empirically studied the dependent variables for trust, such as its relation with IS success, Intention to Use, User Satisfaction; and others have investigated its antecedents. Therefore, “Trust” has been defined in different disciplines in the literature and in different contexts (Barney and Hansen 1994; Pennington *et al.* 2003; Everard and Galletta 2005).

### ***2.5.1.1 The Concept of Trust***

As mentioned above, Trust has been investigated in different contexts and from different perspectives. Despite the lack of agreement on a single unified definition of trust in an online-interaction channel, all definitions have referred to the ‘risk-taking’ issue, which originally emerged from the marketing literature and then applied to the online context (Belanger *et al.* 2002). Also, based on the previous research, nearly all definitions have implied, in one way or another, that trust reflects a belief, an attitude, an expectation of a certain action, or an outcome by another entity to being acceptable (Sitkin and Roth 1993).

Mayer *et al.* (1995) have recognized the issue of the variability of the definition in the literature and proposed a generalized definition for trust which is the “willingness to be vulnerable to another party” (Mayer *et al.* 1995, p.726). Due to the variability of trust definitions and the angles from which it was looked at, we present a number of these definitions in Table 9.

Table 9: Examples of Trust definitions presented in the literature	
Authors	Definition
(Schlenker <i>et al.</i> 1973)	“reliance upon information received from another person about uncertain environmental states and their accompanying outcomes in a risky situation”
(Cook and Wall 1980)	"the extent to which one is willing to ascribe good intentions to and have confidence in the words and actions of other people"
(Anderson and Weitz 1989)	“one party's belief that its needs and requirements will be fulfilled in the future by actions undertaken by the other party”
(Bradach and Eccles 1989)	“a type of expectation that alleviates the fear that one's exchange partner will act opportunistically”
(Sitkin and Roth 1993)	“individuals’ expectations in which the required task will be accomplished reliably”
(Hosmer 1995)	“the optimistic expectation by one person, group, or firm of the behavior of another person, group, or firm in a common endeavor or economic exchange, under conditions of vulnerability and dependence on the part of the trusting party, for the purpose of facilitating cooperation between both parties that will result in an ultimate joint gain but, given the lack of effective contractual, hierarchical, legal, or social enforcement methods, with reliance upon a voluntarily accepted duty by the trusted party to protect the rights and interests of all others engaged in the endeavor or exchange”
(McAllister 1995)	“the extent to which a person is confident in, and willing to act on the basis of, the words, actions, and decisions of another”
(Robinson 1996)	“the expectations, assumptions, or beliefs about the likelihood that another's future actions will be beneficial, favorable, or at least not detrimental to one's interests”
(Rousseau <i>et al.</i> 1998)	“a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another”
(Lorenz 1999)	“the judgment one makes on the basis of one's past interactions with others that they will seek to act in ways that favor one's interests, rather than harm them, in circumstances that remain to be defined. Trusting judgments inevitably remain tentative, rather than certain, since they are based on a limited knowledge of others rather than a precise calculation of their interests”
(Pennington <i>et al.</i> 2003)	“one party's willingness to depend on another party with a feeling of relative security even though negative consequences are possible”

### ***2.5.1.2 Trust versus Trustworthiness***

Trust and trustworthiness has been interchangeably used in the literature, this has led to some confusion. Robert *et al.* (2009) addressed the calls in recent studies to distinguish between trustworthiness and trust. However, the common concept of trust is developed based on a cognitive process of comparing the trustworthiness of one party with the perceived risk of a situation occurring (Robert Jr *et al.* 2009).

Trustworthiness is usually a reflection of individuals' perception of the organization capability, integrity, and goodwill of a certain perspective, such that the image and picture that the organization forms influences their actual trust (trustworthiness beliefs) which they act upon. In other words, perceived trustworthiness of the perceived environmental security and operational competency, impacts the formation of trust or trusting beliefs (Lee and Turban 2001; Belanger *et al.* 2002), and is a significant antecedent of an individual's satisfaction (Balasubramanian *et al.* 2003; Zahedi and Song 2008; Rai *et al.* 2009).

Customers assess all system characteristics and focus on the important features, which they believe that they could harm them if not sufficient enough according to their perception (Mayer *et al.* 1995). Consequently, an online user's trust does not only involve the relationship between the organization and the user, but also involves the system which is used to execute the online operation. This emphasizes the importance of the technical-competency trust from the users' perspective, which could be enhanced through an effective interface design (Belanger *et al.* 2002).

Therefore, trustworthiness is conceptualized as "the perception of confidence in the electronic marketer's reliability and integrity" (Belanger *et al.* 2002, p.252). By introducing this definition, Belanger *et al.* (2002) assert that e-commerce firms need to reliably protect and secure the users' private information and use it with integrity in order to increase electronic customers' trust. Also, trust is influenced by an individual's trust propensity/disposition factor (Mayer *et al.* 1995; Balasubramanian *et al.* 2003; Stewart 2006; Wang and Benbasat 2007; Zahedi and Song 2008; Robert Jr *et al.* 2009). Trust propensity/disposition is associated with the individual differences (truster's characteristics) and his/her ability to trust things regardless of whether the other party is trustworthy or not (Mayer *et al.* 1995). For example, one could trust another party, even if

the other party is not trustworthy, simply because he/she is inclined to trusting things easily. Therefore, it is seen sometimes that individual's trust propensity mediates the effect between trust and trustworthiness (Mayer *et al.* 1995). Mayer *et al.* (1995) defines propensity as the general willingness to trust others and is proposed to be a personal feature that affects the likelihood that the party will trust. That is, propensity determines how much trust an individual has for a trustee before there are information about that particular party being available (Mayer *et al.* 1995).

### 2.5.1.3 Types of Trust

Leimeister *et al.* (2005) claim that social scientists have classified trust into three types: **interpersonal trust**, **system trust**, and **dispositional trust**. This classification reflects individuals' reactions in terms of their feelings, judgments, and actions towards other parties' perceived characteristics which is based on the trusters' previous experience in addition to their own personal tendency towards trusting other things.

The **interpersonal trust** is agent and context specific, such that the trust of one party of another is based on personal level. The interpersonal trust has three different aspects of trust types, i.e., **cognitive** (knowledge-based), **affective/emotional**, and **behavioral trust** (behavior based on the trusting believes) (Lewis and Weigert 1985). These three sub-categories of trust also reflect the stages in which a person would normally go through on the individual level.

a- **Cognitive trust** reflects the trusting beliefs and is based on rational expectations of certain attributes related to the trustee (Komiak and Benbasat 2006) and has three types: perceived integrity, benevolence, and competence of the other party (Komiak and Benbasat 2004; Johnson and Grayson 2005; Komiak and Benbasat 2006).

b- The **affective/emotional trust** reflects the trusting feelings and attitude to certain use intentions including individuals' inner feelings of evaluating and believing in something or someone, and it could be either rational or irrational (Komiak and Benbasat 2006). It simply refers to feeling comfortable and secure in relying on the other party (Komiak and Benbasat 2004; Zahedi and Song 2008). Komiak and Benbasat (2006) focused mostly on the **cognitive** and **emotional** trust, which involve reasoning and feeling respectively, as they are very important



in determining one's behavioral intention (Johnsongeorge and Swap 1982; Koufaris and Hampton-Sosa 2004; Komiak and Benbasat 2006; Teo *et al.* 2008).

c- **Behavioral trust** is for one party to act confidently as if the other party (trustee) is going to behave in the future ethically and competently (Lewis and Weigert 1985). It is obvious that the concept of behavioral trust reflects the intention and actual behavior of one party which is based on trusting the other party. This means that behavior is determined by the cognitive and emotional trust.

**System trust** is the second type of trust and it is based on the perceived quality of the system's attributes. McKnight *et al.* (2002a) defined the 'Institution-based' trust as "the belief that needed structural conditions are present (e.g., in the Internet) to enhance the probability of achieving a successful outcome in an endeavor like e-commerce" (p.339). It is suggested that institution-based trust includes structural trust and situational normality. The structural assurance reflects the legal and technical internet protections such that the website system is secure from hackers and unauthorized access of personal information by encrypting data and protecting privacy, financial, and identity information (McKnight *et al.* 2002a; Choudhury and Karahanna 2008). The situational normality, on the other hand, is related to one's belief that the environment, such as the online one, to be appropriate for conducting a task, in terms of competence, integrity, and benevolence (which will be explained later in this chapter) (McKnight *et al.* 2002a).

**Dispositional trust or trust propensity** is determined by the individual characteristics and is defined as the "extent to which a person displays a tendency to be willing to depend on others across a broad spectrum of situations and persons" (McKnight *et al.* 2002a, p.339). **Dispositional trust** is unaffected by a designated operation or transformation, and is independent of any party or context, such that the trust is a general attitude towards trusting itself (Leimeister *et al.* 2005).

Furthermore, Ba & Pavlou (2002) introduced another two classifications of trust types: **benevolence** or **goodwill** and **credibility**. Credibility includes the "belief that the other party is reliable, honest, and competent", whereas benevolence reflect the "belief that one partner is genuinely interested in the other partner's welfare and has intentions and



motives beneficial to the other party even under adverse conditions for which a commitment was not made” (Ba and Pavlou 2002, p.246).

#### **2.5.1.4 Importance of Trust<sup>41</sup>**

Trust is an important issue that people think about when using the Internet. The environment of WIS context, especially with relation to online transactions, may seem to be uncertain and risky. It is deemed that the Internet user faces potential opportunism, and will be unlikely willing to share or reveal any confidential information, personal or financial, with an untrustworthy party, even in an e-government context (Hoffman *et al.* 1999; Bhattacharjee 2002; Pieterse *et al.* 2007; Alsaghier *et al.* 2009).

Shneiderman (2000) suggests that users’ decision of participating in an online transactions or a relationship with an organization is based on their level of trust, which is affected by the assurance they receive; e.g., reliable reports about previous performance and truthful declaration of future guarantees (Shneiderman 2000)\_120.\_Shneiderman,\_B.. As mentioned in the previous sub-section, one’s trust reflects the person’s belief in the **organization operational competency, and security and privacy issues** (Balasubramanian *et al.* 2003; Palvia 2009). Hence, lack of trust in the security environment and *operational competency* discourages Internet users from performing trust-related behavior, such as sending information or conducting financial transactions, and hinders their e-commerce adoption (Hoffman *et al.* 1999; Bhattacharjee 2002; McKnight *et al.* 2002a).

Individuals’ *privacy* reflects their right in determining how, when, and to what extent their information is to be used and shared with other parties (Culnan and Armstrong 1999; Kim 2008). The perceived ‘privacy-concern’ reflects individuals’ concerns of the likelihood or intention of e-vendors’ unauthorized use or disclosure of the individual confidential information that has been collected during the transactions; such as unauthorized sharing of personal information, spam from the online retailer, and disclosure of the customer’s shopping behavior patterns (Kim 2008).

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<sup>41</sup> The importance of trust is looked at in terms of being a significant antecedent to behavioral intentions and actual behavior; and being an important attribute of the WIS success and as perceived as trustworthy and reliable. Hence, it is important to be included in the model.

*Security* refers to freedom from danger, risk, or doubt (including financial insecurity during service processes) (Santos 2003). This protection can be maintained by enforcing high security standards. The perceived ‘security-protection’ refers to individuals’ perception that the e-vendor will fulfill security requirements, such as authentication, integrity, encryption, and non-repudiation, when they send confidential information online (e.g., credit card information) (Kim 2008). Even though in cases where some users care less about having their personal information collected, they would still like to know how this information is being used (Lim *et al.* 2006).

Therefore, privacy issues and security standards are very important factors which users consider when performing online transactions, and without sufficient guarantees they will unlikely conduct such actions (Tang *et al.* 2008). Perceived security and privacy standards as well as structural assurance<sup>42</sup> were suggested and found to be significant antecedents to trust, especially in the online environment (e.g., Culnan and Armstrong 1999; Lee and Turban 2001; Belanger *et al.* 2002; McKnight *et al.* 2002a; Balasubramanian *et al.* 2003; Gefen *et al.* 2003; Pavlou *et al.* 2007; Kim 2008; Lean *et al.* 2009).

Trust, in the e-government context, represents the level of citizens’ trust in the EGS in terms of handling of information, the appropriateness of job to be completed, and the privacy and security issues. Balasubramanian *et al.* (2003), for example, had emphasized the importance of trust on satisfaction and explained the relation between trust and other factors related to the performance of the online services. The authors claim that in the online or WIS context, which is self-service oriented, there is little human interaction; so the service quality measures have become less relevant. Instead, the ‘trustworthiness’, for the WIS users, started to become a more important factor in determining their satisfaction. Customers, especially those who perform online transactions, would interact with the service provider if they believe that the online order or request will be completed accurately, on time, and with no complications, and that the personal and/or financial information are securely handles and protected.

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<sup>42</sup> Structural assurance refers to the perceived safety of the web environment (McKnight *et al.* 2002a).

Although the customer's trust and assurance are determined by experiencing or observing employees' responsiveness and knowledge, which are attributes of Service Quality; trust is evaluated separately (Balasubramanian *et al.* 2003). The empirical findings revealed that the perceived trustworthiness of the service provider is a significant antecedent to the customers' satisfaction, and that the perceived security and operational competence impacts the formation of trust (Balasubramanian *et al.* 2003). It was found that more than 75% of the variance was explained in the satisfaction and perceived trustworthiness.

The importance of trust is looked at in terms of being a significant antecedent to behavioral intentions and actual behavior; and being an important attribute of WIS success when it is perceived as trustworthy and reliable. Hence, it is important to include trust in our model.

#### ***2.5.1.5 Most Common Antecedents to Trustworthiness and Trust***

Researchers have empirically investigated trust and perceived trustworthiness in both internal and external contexts (e.g., Mayer *et al.* 1995; Ba and Pavlou 2002; Bhattacharjee 2002; Piccoli and Ives 2003; Gefen 2004; Komiak and Benbasat 2004; Pavlou and Fygenson 2006; Wang and Benbasat 2007; Wang and Benbasat 2008; Zahedi and Song 2008; Robert Jr *et al.* 2009). However, it seems that there is a lack of agreement on how they are defined, classified, and what their determinants and moderators are.

The most common trust-related attributes that were found in the trust literature are the ones proposed by Mayer *et al.* (1995). Mayer *et al.* (1995) proposed three antecedents to trust that are relevant to the trustee; namely, benevolence, integrity, and ability.

**Benevolence** (good-will) refers to “the extent to which a trustee is believed to want to do good to the truster, aside from an egocentric profit motive” (p.718);

**Integrity** (truthfulness and reliability) involves “the truster's perception in which the trustee adhere to a set of principles that the truster finds acceptable” (p.719); and

**Ability** (competence) refers to “the skills, competencies, and characteristics that enable a party to have influence within some specific domain” (p.717) (Mayer *et al.* 1995).

Some researchers suggested that these three aspects are components of a trust construct (e.g., Ba and Pavlou 2002; Bhattacharjee 2002; Piccoli and Ives 2003; Gefen 2004; Komiak and Benbasat 2004; Bo and Benbasat 2007; Wang and Benbasat 2007; Wang and

Benbasat 2008; Zahedi and Song 2008); while others considered them as antecedents to trust (e.g., Mayer *et al.* 1995; Lee and Turban 2001; Pavlou and Fygenson 2006; Robert Jr *et al.* 2009).

Another group of researchers chose only two of the three variables as antecedents to trust or perceived trustworthiness, such as integrity and competence (e.g., Komiak and Benbasat 2006), or benevolence and competence (e.g., Cook and Wall 1980; Levin and Cross 2004; Leimeister *et al.* 2005). Many researchers took into account another significant determinant of trust, which is propensity/disposition to trust (e.g., McKnight *et al.* 2002a; Balasubramanian *et al.* 2003; Stewart 2006; Wang and Benbasat 2007; Wang and Benbasat 2008; Zahedi and Song 2008; Robert Jr *et al.* 2009); while others suggested that it has moderating effect (e.g., Mayer *et al.* 1995; Lee and Turban 2001). Also, previous experience and familiarity were also found to have significant impact on one's trust and perceived trustworthiness (e.g., Culnan and Armstrong 1999; Lee and Turban 2001; Bhattacharjee 2002; Gefen *et al.* 2003; Gefen 2004; Komiak and Benbasat 2006; Bo and Benbasat 2007; Awad and Ragowsky 2008; Turel *et al.* 2008; Wang and Benbasat 2008; Zahedi and Song 2008).

In addition, some scholars added the trustee's reputation (e.g., Anderson and Weitz 1989; Ba and Pavlou 2002; McKnight *et al.* 2002a; Johnson and Grayson 2005; Lim *et al.* 2006; Stewart 2006; Bo and Benbasat 2007; Zahedi and Song 2008), and others emphasized peoples' experience and word of mouth to be significantly correlated with one's trust (e.g., Johnson and Grayson 2005; Awad and Ragowsky 2008; Sia *et al.* 2009). The reputation attribute, however, does not apply in the context of e-government.

Moreover, website features, such as IQ, STQ, and SQ, of an online vendor have also been suggested to have a significant influence on customers' perceived trustworthiness of a trustee and subsequently their level of trust.

A person's trust in IQ refers to trusting the information to be reliable, valid, and accurate. This has been noted by several researchers to be very important, (e.g., Salaün and Flores 2001; Pavlou and Fygenson 2006; Bliemel and Hassanein 2007; Pavlou *et al.* 2007; Choudhury and Karahanna 2008; Kim 2008; Zahedi and Song 2008; Chiung-Ju and Hui-

Ju 2009). For example, people navigate the web to search for information acquisition, whether for personal interest or to use it for transactional purpose. Therefore, one's trust is built on sharing knowledge and developing common experience, and without them, it is hardly possible to build up trust (Salaün and Flores 2001).

The relations between perceived IQ and Trust have been suggested and empirically found to be significant (e.g., Salaün and Flores 2001; Nicolaou and McKnight 2006; Bliemel and Hassanein 2007; Choudhury and Karahanna 2008; Zahedi and Song 2008; Chiung-Ju and Hui-Ju 2009). Trust has also been suggested to moderate the relationship between IQ and individual satisfaction (Chung and Kwon 2009). Some researchers even argued that high-content quality would account for the perceived competence of an organization (Leimeister *et al.* 2005). Nevertheless, it has been found by a small group of researchers that IQ is not significantly correlated with one's trust (e.g., Chiung-Ju and Hui-Ju 2009) but the authors refer this insignificance to the sample respondents and suggested further validation is needed. However, based on the majority of studies that validated the relationship between IQ and Trust, we will assume in this study that IQ plays an important role in determining individual's trust in a website and we will assess whether this assumption is correct or not.

Pavlou & Fygenson (2006) assert that the competency and integrity attributes are the most reflective of the vendor's information credibility. In addition, **system technical quality**, which includes the "integrity" and technical competency attributes, (Lee and Turban 2001; Stewart 2006; Bo and Benbasat 2007; Wang and Benbasat 2007; Choudhury and Karahanna 2008; Kim 2008; Chiung-Ju and Hui-Ju 2009); as well as the **service quality**, which includes the "operational competency/ability and fulfillment" attribute, have been hypothesized to be significantly correlated with a user's trust (Anderson and Weitz 1989; Balasubramanian *et al.* 2003; Paul and McDaniel Jr 2004; Johnson and Grayson 2005; Chiung-Ju and Hui-Ju 2009).

Furthermore, a group of researchers suggested that, in general, the website quality of the e-vendor is a significant antecedent to trust and perceived trustworthiness (e.g., Belanger *et al.* 2002; McKnight *et al.* 2002b; Everard and Galletta 2005; Chiung-Ju and Hui-Ju 2009). For example, they hypothesized that visual design/layout, appeal, and navigation,

which are usually measurement items (components) of the website quality attribute, have a significant impact on one's trust (e.g., Shneiderman 2000; Flavián *et al.* 2006; Jin and Park 2006; Wang and Benbasat 2007; Cyr 2008; Zhou *et al.* 2009a), though in some of the studies, the empirical findings did not support this hypothesis (Jin and Park 2006; Zhou *et al.* 2009b). The quality of the website-related attributes certainly have an impact on individuals' satisfaction (Cyr 2008) because of their role in making it easier for users to use and benefit from the website. This is likely to be true when the quality of the website-related attributes is mutually and simultaneously associated with the most important factors that impact perceived trustworthiness. Being able to sufficiently use a website may enhance users' trust; however, they are not significant determinant of one's trust on their own.

Teo *et al.* (2008) investigated citizens' "trust" in an EGS<sup>43</sup> and its impact on using the EGS, based on the D&M (2003) model. Citizens' trust in an EGS included two aspects, trust in the technology and trust in the government (Teo *et al.* 2008). The authors explained that e-government trust is essential for an EGS success but through different mechanisms, because citizens would be discouraged to use the system if the government failed to persuade them of its integrity and credibility (Teo *et al.* 2008).

In their model, Teo *et al.* (2008) placed the trust construct preceding the system attributes, i.e., IQ, STQ, & SQ constructs. Their empirical findings suggested that the relation between trust and satisfaction is partially mediated by the system and service quality, while the relation between trust and intention to continue using is partially mediated by IQ. They also suggested that trust in the government is more important than trust in the technology.

Having the EGS attributes preceded by the 'EGS trust' implies that if citizens trust the EGS, they would perceive the system and its attributes (IQ, STQ, and SQ) to be good. A recent study conducted by Papadomichelaki and Mentzas (2012) to study the quality of an EGS, also placed trust as a determinant that impact citizens' perception of an EGS quality.

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<sup>43</sup> Teo *et al.* (2008) referred to an EGS as an 'e-government website'.

However, we believe that trust is not a determining factor of the quality or perception of quality of an EGS. The logical sequence seems to be the other way around where perception of the EGS attributes comes first in influencing users' trust in the system. That is because trust is a product of one's previous personal experience of the providers' reliability and competency, or induced by other's word of mouth. Carr (2006) states that unhappy users will tell others about their satisfaction / dissatisfaction experience (Carr 2006). Same concept applies in the e-government context.

Voss (2000) suggests that a successful performance of an organization that provides e-services, will turn browsers into buyers and will increase customers loyalty in which they become frequent clients (Voss 2000). This fact is a result of one's trust in a vendor or service provider which evolved from the customer noticing, experiencing, or hearing from others that it provides good services, and is trustworthy. This confirms Teo *et al.* (2008) proposition that IQ, STQ, and SQ are success factors which affect the final outcome of an EGS in terms of efficiency and effectiveness (Teo *et al.* 2008); though their model was set oppositely. Thus, "trust" encourages users to use an e-service through their "intention to use" the website and then actually using it. It is one important determining variable of an IS success; yet, very challenging as it is hard to gain and maintain, while it is easy to lose (Voss 2000).

*Definition of trust:* Based on the literature, the previously presented definitions, and components of trust, the trust or e-trust, within the context of this study, is define as **"a citizen's confidence of the quality of information, technical and operational competency of an EGS in which the citizen is willing to rely on the system and use it to obtain the anticipated benefits"**.

#### ***2.5.1.6 Trust Hypothesis***

Due to the significant role of trust in impacting IS systems users, the interest in investigating "trust" and its impact on Satisfaction and System Use is increasing, particularly in the e-government and e-commerce contexts. The trust-satisfaction interrelated relationship was found to be significant; few examples are (Hoffman *et al.* 1999; Shneiderman 2000; Voss 2000; Welch and Hinnant 2002; Balasubramanian *et al.* 2003; Gefen *et al.* 2003; Koufaris and Hampton-Sosa 2004; Carter and Belanger 2005;

Flavián *et al.* 2006; Cullen and Reilly 2007; Wang and Head 2007; Grimsley and Meehan 2008; Teo *et al.* 2008; Palvia 2009). Therefore, to understand how it would influence citizens' satisfaction and use intention in the e-government context, the trust construct is incorporated in our proposed model.

Mayer *et al.* (1995) stated that:

*“Even though the level of trust is based on ability, benevolence, integrity and disposition to trust and may be static, yet trust consequences will be determined by the contextual factors, such as stakes involved, the balance of power in the relationship, the perception of the level of risk, and the alternatives available to the truster. Similarly, the assessments of the antecedents of trust (ability, benevolence, and integrity) are affected by the context”.* (p.726)

Accordingly, trust and its antecedents are adjusted in the model to suit the scope and context of this study. We will focus on the cognitive beliefs of trust that are determined by the system technical quality and security as well as the operational competency.

However, it is noteworthy that, citizens' perception of trust with government is different from interpersonal trust (Cullen and Reilly 2007). Even though the trust disposition has been suggested to significantly determine individuals' tendency towards trusting, this issue has been debated among some researchers who suggested that this assumption does not have solid grounds. For instance, some researchers believed that global trust disposition (i.e., attitudinal/ affective which are related to personality) is an important determinant of individuals trust only in specific social or exchange situations (Balasubramanian *et al.* 2003). Johnson-George and Swap (1982), explained that for those scales that are used to predict one's "willingness to trust across target persons and situations, they do not accurately determine an individual's trust in another under particular circumstances" (p.1307), and are only be reasonable to use in ambiguous and unstructured situations (Johnsongeorge and Swap 1982). Therefore, the concept of dispositional trust, in the government-interaction context, is deemed to have limited, if no significant influence on citizens' tendency to trust.



In addition, unlike in the e-commerce context, the “benevolence” or the perception of government’s goodwill is not suitable within this context, and does not cause a significant concern to citizens. Citizens assume that the government will, naturally, care for their interest and welfare. Hence, “benevolence” is also not included in our proposed model. The two remaining trust perspectives, integrity and competency will be considered in our study. The integrity of the security and privacy aspects will be investigated with the system technical quality variable, and the operational competency will be explored while studying the perceived service quality.

Therefore, we propose that there is a significant relationship between citizens’ trust and their perception of the overall system performance quality because:

- 1- the relationship between the trust construct and the various attributes of the EGS has been empirically shown to be significant, such as those we propose to incorporate in this research model; and
- 2- the system attributes altogether explain and form “perceived overall system performance quality” as a higher concept construct. The concept of overall system quality in the IS context was suggested by some researchers to be strongly related to perceptions and trust (e.g., Gummesson 1979; Grover *et al.* 1996; Voss 2000; Tan *et al.* 2008), and was empirically found to be significantly correlated with trust (Zhou *et al.* 2009b).

Accordingly we hypothesize that:

*H7: Perceived Overall EGS Performance Quality has significant positive impact on citizens’ Trust in the EGS.*

Since we postulate that the overall EGS performance quality have a positive significant impact on users’ trust in an EGS, and since we assume that IQ, STQ, and SQ reflect the overall EGS performance quality; we can assume the following embedded hypotheses:

*H7a: Information Quality has a significant positive impact on the citizens’ trust in the Information Credibility.*

*H7b: System Technical Quality has significant positive impact on citizens’ Trust in the Integrity, Privacy and Security of an EGS.*

*H7c: Service Quality has a significant positive impact on citizens’ Trust in the operational competency of an EGS.*

Some researchers, such as Gefen *et al.* (2003), had empirically confirmed this logical relation between Perceived Usefulness, Trust, and Behavioral Intention to Use a system; where Trust was an antecedent to Perceived Usefulness, and both Trust and PU were direct antecedents to Intention to Use (Gefen *et al.* 2003; Gefen 2004).

Whether it is because of others word-of-mouth or personal experiences, when citizens perceive an EGS performance as good and trustworthy, they would have greater trust in the EGS with respect to the security and privacy issues, as well as e-government operational competency. This trust will, in turn, influence individuals' intention to use the system for initial uses of the system, and ultimately continue using the system. **Trusting Intentions** means that "the truster is securely willing to depend or intends to depend on the trustee" (McKnight *et al.* 2002a, p.337).

Considering a system to be trustworthy will logically impact one's perception of its usefulness. If a system is not perceived as trustworthy, users will not opt to use it and attain any benefits. The significant relation between trust or perceived trustworthiness, as an antecedent to Perceived Usefulness, has been shown in several studies (e.g., Gefen *et al.* 2003; Gefen 2004; Horst *et al.* 2007; Tan *et al.* 2008; Mahadeo 2009; Yoon 2009).

Also, it was found that both Trust and Perceived Usefulness affect individual's attitudes and intentions (Yu *et al.* 2005; Cho 2006; Hung *et al.* 2006; Pavlou and Fygenson 2006; Lean *et al.* 2009). System Use behavior reflects the **trust-related behavior**, and it refers to the actions that demonstrate dependence on a Web vendor, that make one vulnerable to the vendor, or increase one's risk (Mayer *et al.* 1995; McKnight *et al.* 2002a).

In addition, perceived trust was found to be a significant antecedent to perceived value (benefit) (Chiou 2004). In other words, trusting the system, for instance, will make one believe that the system is more valuable. This implies that trust will encourage an individual to carry out an action knowing that it will pay off in the future (Rayport and Sviokla 1994; Keeney 1999; Torkzadeh and Dhillon 2002). The concept of this relationship, where trust is a significant predictor of one's intention and behavior has been empirically validated in numerous studies in the literature, including in the WIS context, see for example: (Belanger *et al.* 2002; McKnight *et al.* 2002a; McKnight *et al.*

2002b; Gefen *et al.* 2003; Pennington *et al.* 2003; Chiou 2004; Komiak and Benbasat 2004; Liu *et al.* 2004; Pavlou and Gefen 2004; Carter and Belanger 2005; Everard and Galletta 2005; Pavlou and Gefen 2005; Yu *et al.* 2005; Cho 2006; Dahui *et al.* 2006; Dinev and Hart 2006; Hung *et al.* 2006; Komiak and Benbasat 2006; Nicolaou and McKnight 2006; Wang and Head 2007; Awad and Ragowsky 2008; Choudhury and Karahanna 2008; Tan *et al.* 2008; Teo *et al.* 2008; Turel *et al.* 2008; Vatanasombut *et al.* 2008; Lean *et al.* 2009; Mahadeo 2009; Palvia 2009; Sia *et al.* 2009; Yoon 2009; Zhou *et al.* 2009b; Ozkan and Kanat 2011).

Therefore, from the previous discussion we hypothesize that:

*H8: Trust has a significant positive impact on citizens' Intention to Use/reuse an EGS*

*H9: Trust has a significant positive impact on citizens' Perceived Usefulness of an EGS.*

While studying users' trust, satisfaction, and loyalty in the e-commerce context, we found that, in determining customer's loyalty and commitment, some researchers allocated trust and satisfaction in their models in parallel positions under the influence of different factors (e.g., Carr 2006; Cyr 2008). Other researchers placed trust as a moderator between satisfaction and system quality attributes (i.e., Information and technical qualities) (e.g., Chung and Kwon 2009). However, most scholars proposed a direct link between trust and satisfaction, but differed by how they looked at trust and satisfaction in the different contexts. For example, few researchers proposed a mutual interrelation between satisfaction and trust where there was a feedback relation, and this interrelation have been empirically validated (e.g., Wang and Head 2007). A number of researchers proposed and confirmed the significance of trust as it precedes satisfaction (Balasubramanian *et al.* 2003; Chiou 2004; Jin and Park 2006; Bliemel and Hassanein 2007; Teo *et al.* 2008; Zahedi and Song 2008; Palvia 2009; Rai *et al.* 2009); while others proposed the opposite relation, where satisfaction<sup>44</sup> is an antecedent to trust (Flavián *et al.* 2006; Chiung-Ju and Hui-Ju 2009; Zhou *et al.* 2009b).

Flavián *et al.* (2006) study is one example in which the authors placed satisfaction as an antecedent to trust. They have used in their model the term perceived website usability instead of perceived website performance as a latent variable that measures website

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<sup>44</sup> Satisfaction is an outcome of the previous experience, which was found in the literature as a significant antecedent to trust and perceived trustworthiness.

characteristic and functionality (Flavián *et al.* 2006). In their model, trust was determined by website characteristics and satisfaction. However, their model revealed low explained variance ( $R^2$ ) for Trust, Satisfaction, and Loyalty; thus concluded that there may be other variables that influence their results, and should be included.

In the causal sense, it is more appropriate to assume that the gained level of trust determines the users' level of satisfaction, not the other way around. This might be a contributing factor to the low explained variance shown in Flavián, (2006) study. However, when satisfaction is a result of a previous experience of a particular outcome, trust can be formed based on the perceived outcome and received service. In which case, satisfaction can play a significant role as an antecedent to trust and perceived trustworthiness, as found in some studies in the literature. It is, therefore, important to take into account the perspective of the study and the context in which trust is investigated in order to better determine the appropriate allocation of the Trust and Satisfaction constructs in the model (i.e., direction of the path between Trust and Satisfaction).

For the purpose of this study, we believe that it is appropriate to consider the mutual interrelation between trust and satisfaction where both influence each other, and adaptively change over a period of time while using the EGS. Therefore, we hypothesize that:

*H10: Trust in an EGS has a significant positive impact on citizens' obtained psychological benefits (Satisfaction).*

*Feedback H10: Citizen-users' obtained psychological benefits (Satisfaction) has a significant positive impact on their trust in an EGS.*

### **2.5.2 Perceived Usefulness (PU)**

Motivation theories suggest that there are two kinds of motivations that drive people to conduct a specific action, namely, intrinsic and extrinsic motivations (Davis *et al.* 1992). **Extrinsic motivation** is defined as “The perception that users will want to perform an activity because it is perceived to be instrumental in achieving valued outcomes that are distinct from the activity itself, such as improved job performance, additional payment, or promotions” (Davis *et al.* 1992, p.1112). In other words, extrinsic motivation causes an

individual to perform a particular action in order to attain tangible benefits and that could involve the user believing that he/she would save time and money. **Intrinsic motivation**, on the other hand, drive people to perform an action just for the sake of gaining pleasure through the performance of the action itself. Davis *et al.* (1992) define it as the “performance of an activity for no apparent reinforcement other than the process of performing the activity per se” (Davis *et al.* 1992). Intrinsic motivation has been commonly studied in the e-commerce context (e.g., Yu *et al.* 2005; Wright 2010 ).

Therefore, Perceived Usefulness is considered an example of extrinsic motivation (Churchill Jr *et al.* 1974; Compeau and Higgins 1995); and perceived “enjoyment” is an example of intrinsic motivation (Churchill Jr *et al.* 1974; Compeau and Higgins 1995; Teo *et al.* 1999). Enjoyment can be defined as the extent to which the activity of using the computer is perceived to be enjoyable in its own right, regardless of any expected performance consequences (Davis *et al.* 1992). This means that the action is driven by personal preferences.

Generally, the expected consequences (Triandis 1971), or perceived consequences, as was re-named later (Triandis 1980), are considered to be one important factor that influences the intention to use an IT innovation, and subsequently influences the behavior itself of using IT (DeLone and McLean 2003). Therefore, one will conduct a particular action if he/she perceives it to be useful.

Thompson and Higgins (1991) suggested that the perceived consequences construct is consistent with the expectancy theory of motivation proposed by Vroom (1964), which was further developed by Porter and Lawler (1968). The basic ground of the expectancy theory is that “individuals evaluate the consequences of their behavior in terms of potential rewards and base their choice of behavior on the desirability of the rewards” (Thompson and Higgins 1991). While adapting Triandis (1980) behavior theory and testing it, Thompsons *et al.* (1991) identified the components of perceived consequences, which were complexity, job fit, and long-term consequences; and found them to be supported as predictors of PC utilization. The job-fit and long-term consequences had significant positive influences on utilizing PCs, while perception about complexity had negative relation with the utilization.

When the expected consequences of using a system, for example, are perceived to be positives, the system would consequently be perceived as useful. Usefulness is a psychological attribute that is influenced by external factors such as motivations and/or expectations to adopt the innovation. Therefore, “**Perceived Usefulness**” (PU) can be defined to be a perceptual variable which represents the expected or perceived impact on individuals while using a certain system. It is the degree to which the user *believes* that using a particular system *would* enhance his or her job/ task performance (Davis 1989), or his/her group's or organization's performance (Seddon 1997). PU is adaptive and changes over time upon the use of technology, such that the more a user uses the technology, the more his/her perception of the innovation will be. Moreover, PU reflects the persons' internal cost-benefit analysis (Parent *et al.* 2005). Accordingly, a system is considered useful only if it produces ‘net’ benefits. In fact, it reflects the same construct of relative advantage in the DOI theory (Moore and Benbasat 1991; Carter and Belanger 2004).

In addition to the organizational context, the notion of PU have been also used in the non-organizational context (i.e., system external-users such as e-commerce) (Agarwal and Karahanna 2000; Chin *et al.* 2003; Gefen *et al.* 2003; Yu *et al.* 2005; Pavlou and Fygenson 2006; Barnes and Vidgen 2009; Jaeger and Matteson 2009; Yoon 2009). Venkatesh *et al.* (2003) clarifies the similarity between the concept of Usefulness and other constructs such as, usefulness and extrinsic motivation (Davis *et al.* 1989), usefulness and job-fit (Thompson and Higgins 1991), Usefulness and relative advantage (Davis *et al.* 1989; Moore and Benbasat 1991), and usefulness and outcome expectations (Davis *et al.* 1989; Compeau and Higgins 1995).

However, other researchers (e.g., Agarwal and Karahanna 2000), argue that Perceived Usefulness is determined by intrinsic motivation. They suggest that cognitive interest, which is reflected by individual's motivation, is important in determining the technology use behavior. That's because it serves as a key antecedent to relevant beliefs about IT (Agarwal and Karahanna 2000). Agarwal and Karahanna (2000) suggest that cognitive absorption, which they defined as “a state of deep involvement with software”, is an intrinsic motivation related variable. They hypothesize that cognitive absorption is an

underlying determinant of the Perceived Usefulness, which in turn, influences the behavioral intention to use the technology.

It is worth noting that Perceived Usefulness was investigated in the Online context as the targeted technology (e.g., Yu *et al.* 2005; Wright 2010 ), and this is probably the logical reason behind looking at the perspective of Perceived Usefulness as an intrinsic motivation. Also, individual differences, which were found to have significant effect on the acceptance and usage of an IT (Nelson 1990; Agarwal and Prasad 1999; Hong *et al.* 2001; Park *et al.* 2007), determine the level of motivation at which they intend to adopt that IT or not. This is because motivation encompasses the aspect of forces by which an individual performs an action either to attain tangible values, like time saving; or psychological ones, such as pleasure.

PU has a significant positive relationship with System Use and User Satisfaction; and subsequently impacts users' Intention to Use a system (Carter and Belanger 2004; Lean *et al.* 2009). Many researchers have conceptualized and empirically confirmed this significant relation between Perceived Usefulness and behavioral intention; (e.g., Oliver 1980; Yang 2001; Weiss 2002; Chiou 2004; Wangpipatwong *et al.* 2005; Kulkarni *et al.* 2006; Horst *et al.* 2007; Tan *et al.* 2008; Wangpipatwong *et al.* 2008). Therefore, Perceived Usefulness is included in the model as it influences the Intention to Use the online channel over the traditional one. Hence, we hypothesize:

***H11: Perceived Usefulness has a significant positive impact on citizens' Intention to Use/reuse an EGS.***

Because citizens' perceptions or beliefs that using a system is of value to them, they tend to use the system to ultimately attain those benefits (Wangpipatwong *et al.* 2008). The obtained benefits, particularly with respect to the tangible ones, play a role in influencing one's beliefs in the system's contribution to his task accomplishment. Thus, the actual attainment of benefits, such as time and effort saving, reinforce individuals' beliefs of the usefulness of the system (Rayport and Sviokla 1994; Keeney 1999; Torkzadeh and Dhillon 2002). This would consequently develop a feedback relationship with the Perceived Usefulness, which keeps changing over time with repeated usage in an adaptive manner.

Wangpipatwong *et al.* (2008) suggested that TAM, though generally used to explain individuals' intention to adopt a system, has been used in models to predict users' intention to use the system after using it for a period of time. Researchers have confirmed that Perceived Usefulness remains a significant determinant of individuals' behavioral intentions over time (Wangpipatwong *et al.* 2008). Therefore we hypothesize that:

*H12: Perceived Usefulness has a significant positive impact on users' Obtained Psychological Benefits (User Satisfaction)*

*Feedback H12: The obtained Tangible Benefits, in particular, have a significant positive impact on users' Perceived Usefulness of an EGS.*

***Perceived Usefulness versus Obtained Benefits*** – Some researcher consider PU and obtained benefits or “net benefit” to reflect the same notion, especially that both could be considered as perceptual measures (Wang and Liao 2008). We disagree and argue that they are different. First, a “perception” is relative as it reflects an individual's belief of a particular phenomenon or an impression about something, such as the perceptions of system quality and trustworthiness.

Thus, the concept of a perception includes the probability that it may or may not be true, and does not necessarily reflect the actual nature of the particular perspective. For instance, if a user perceives the system's technical quality as poor, e.g., not user friendly, that does not mean that the system is actually poor in quality or that this perception is 100 percent accurate. There are several factors that may influence such perception. For example, the user might be newly exposed to the system/website where he/she lacks sufficient training or familiarity about the system-related technical aspects or simply has limited computer literacy and experience. Another example could be related to the user's previous experience where he/she consciously or unconsciously compares the current website with another previously used one which was perceived as better or easier.

From that point of view, PU reflects a perception, an expectation, or a belief that some positive consequences will occur in the future if a system is used. The obtained benefits, on the other hand, whether satisfaction, convenience, or tangible are, in fact, concerned with the impact on the individual himself, and they reflect what actually occurred (i.e., actual attainment of benefits) (Seddon 1997; DeLone and McLean 2003).



Seddon (1997) distinguished between the actual gain of ‘net benefits’ and the expectations about the net benefits of future IS use, which are based on beliefs and are very similar to the concept of Perceived Usefulness. Generally, the expectation of a future attainment of benefits could be based on a previous experience of obtained benefit, or based on others’ word of mouth. In Seddon’s model (see Figure 2-11), an individual’s satisfaction with an IS would also affect the perception of future gained benefits (Perceived Usefulness). In other words, the sum of the actual benefit gains from using a system, including satisfaction and time saving, etc., influences the expectation of the future benefit gain (i.e., future expectations vs. actual gain). In addition, a future IS use is influenced by the expectation of future net benefits gain (Seddon 1997).

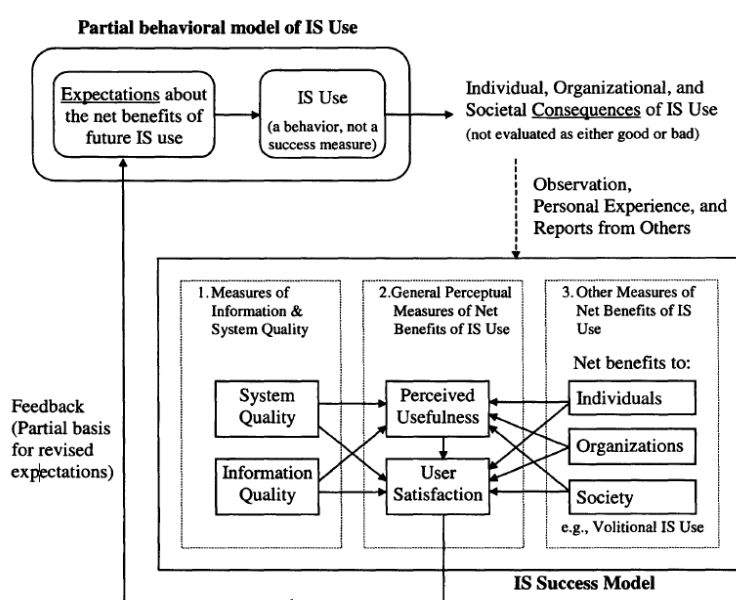


Figure 2-11: Seddon<sup>45</sup> (1997) Re-specified Version of DeLone and McLean’s (1992) Model of IS success

The previous discussion affirms the argument that PU is not the same concept as obtained net benefit. In our study, we use the same ground as in Seddon’s study with respect to differentiating between PU and actual obtained benefits; as well as, the feedback relation between US and PU. However, according to Seddon’s definition, Perceived Usefulness basically refers to the task performance post hoc, rather than expectations of future

<sup>45</sup> According to Seddon (1997), Volitional IS Use is unlike Perceived Usefulness and User Satisfaction, which are both perceptual measures, Volitional IS “use” is an objective indicator that Net Benefits-as perceived by the person(s) who decides if the system will be used-exceed zero. In some circumstances, more Volitional IS use may imply more benefits. In others, Volitional IS Use is just a binary indicator that net benefits are thought to be positive.

gained benefits and increased efficiency in performing a task, as suggested by Davis *et al.* (1989) in TAM. We stand by Davis *et al.* (1989) definition of PU.

## ***2.6 Individuals' behaviors and behavioral intentions***

### **2.6.1 Intention to Use (IU)**

Many studies were dedicated to studying the concept of Intention to Use a particular innovation, as mention earlier in this chapter. In their theory of reasoned action discussed in Subsection (2.3.2.2), Ajzen and Fishbein (1980) postulated that most social actions are under volitional control. They studied the individual's intention to perform/not perform a behavior as the intermediate determinant of the action. According to TRA, an individual's intention is a function of two basic determinants; one is personal in nature and reflects the individual's positive attitude towards the behavior and whether performing this behavior is good or bad; while the other reflects social influences. Davis (1989) proposed the technology acceptance model based on this theory to be applied within the context of an IS environment (Davis *et al.* 1989).

Grimsley and Meehan (2008) suggested that the key elements that determine citizens' willingness to reuse an EGS, is based on their personal trust in the service provider and their positive personal experience of the service, which is based on the service provision and outcomes. We can infer from this that citizens' positive attitudes to an EGS rely on their positive experience of the system and their trust in the service provider.

In fact, Parasuraman *et al.* (2005) found that customers' assessment of the efficiency and fulfillment when assessing the overall service or system performance quality to be significantly correlated with their perceived value and behavioral intentions (Parasuraman *et al.* 2005).

More recent studies explored the relationship between US and IU or continue use (e.g., Bhattacharjee 2001; DeLone and McLean 2003; Teo *et al.* 2008; Zhou *et al.* 2009b). The studies confirmed the significant relation between the user's behavioral intentions to use a system and their satisfaction and gained benefit(s). Individuals' perceptions of a particular system's attribute quality, benefits, and trustworthiness would contribute to motivating them to use the system for the first time. Subsequently, the attainment of the

anticipated benefits will reinforce the continuance intention to use the system (Oliver 1980; Bhattacharjee 2001; Teo *et al.* 2008; van Dijk *et al.* 2008; Kettinger *et al.* 2009). In other words, Intention to Use a system is found to be a significant determinant of the actual System Use (Venkatesh *et al.* 2003; van Dijk *et al.* 2008).

In several empirical studies, System Use is placed as a dependent variable, and is emphasized in the WIS context as a success measurement, where System Use is voluntary, and is considered as a substitute to Intention to Use (Wang and Liao 2008). Likewise, most researchers have referred to the behavioral intention of using a system as being a dependent variable in their models, assuming that, by default, users who have the intention to use a system will actually use it (the behavioral intention will subsequently lead to the actual behavior); see for example, (Hong *et al.* 2001; DeLone and McLean 2003; DeLone and McLean 2004; Carter and Belanger 2005; Garrity *et al.* 2005; Nicolaou and McKnight 2006; Wangpipatwong *et al.* 2008; Lean *et al.* 2009; Yoon 2009).

In addition, external-users' perception of the Usefulness of a system, in terms of assisting them getting their required task done with less effort, dependencies, and time; encourages them to adopt the system. Individuals' circumstances initiate their expectation and beliefs toward its potential values/benefits. They would then think that this service channel is useful in terms of increasing one's independency in conducting certain task in an easy way while still being able to save time and effort, and not having to physically travel.

Governments' awareness campaigns through other media, such as TV, radio, and newspapers, about the site and its usefulness; as well as the availability of online instructions on how to use and make value of the website and e-service; would all contribute in encouraging citizens to adopt the online system. Moreover, the EGS attributes and the perceived overall system quality, as well as the system perceived trustworthiness, are important variables that play significant roles in determining the user initial and continuous intention in utilizing the system.

Whatever the reason that induces one's behavioral intention to use an EGS, it is deemed that the relation between citizens' Intention to Use an EGS and their System Use is significantly correlated. Therefore, we hypothesize that:

*H13: Intention to Use/reuse an EGS has a significant positive impact on the System Use.*

As users obtain the expected benefits from an EGS, even if partially, they will have the intension to continue using the system, given that this level of obtained benefit is sufficient enough to encourage them to reuse it again.

This means that

*Feedback H13: The Obtained Benefits have a significant positive impact on citizens' Intention to Use/reuse the EGS.*

In particular, we hypothesize that

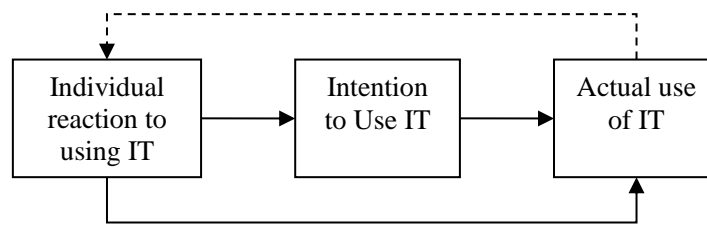
*Feedback H13a: The Obtained Psychological Benefits (User Satisfaction) have a significant positive impact on the Intention to Use/reuse an EGS.*

*Feedback H13b: The Obtained Tangible Benefits have a significant positive impact on the Intention to re-Use an EGS.*

## **2.6.2 System Use (Use)**

System Use (Use) is a behavioral measure that represent the degree to which the user is dependent on the IS for the execution of their tasks (Rai *et al.* 2002). Seddon (1997) suggested that, it is expected that resources, such as human effort, will be consumed as the system is used. Thus, System Use could be measured by hands-on hours (duration), hours spent analyzing reports, frequency of use, number of users, or simply as a binary variable: use/non-use (Seddon 1997).

The general concept, behind the technology acceptance model and other related theories, in the IS literature, is simplified and presented in Figure 2-12. It suggests that users' reaction to IT and their use behavior are interdependent variables. Typically, individuals' reactions to using technology, e.g., perceptions, or degree of satisfaction, determine the actual use behavior of that technology; and vice versa, the experience resulting from using a technology influences individuals' reaction, and so forth in an adaptive manner.



**Figure 2-12: Basic concept underlying IT acceptance models (adapted from (Venkatesh *et al.* 2003))**

Similarly, to actually evaluate the positive impact of an EGS on citizens, citizens must perceive that adopting a new innovation is really useful, and accordingly, continue to use it. Citizens will, consequently, be able to sense the actual and accumulated benefits. Having actually used an EGS, whether it was based on predetermined intentions or was due to sudden circumstances, citizens will be able to acquire the anticipated benefits. Therefore, a feedback loop from “actual use” to “reaction to” use has been added in the diagram above, indicating the adaptive attitude. The adaptive process takes into account the increased competency and change of perception over time towards that particular used EGS through the repeated use and constantly benefiting from it.

In addition, System Use influences individuals’ preset perceptions and beliefs about the usefulness of the system. If someone’s initial PU was high and the experience with using the system was relatively good, this will in turn reinforce his initial perception. If the experience of System Use was better than the expectation of the Perceived Usefulness, then a person’s perception of the system’s value in accomplishing his/her required task will improve more; and vice versa, if the experience was bad. In other words, the use experience of a particular system impacts a user’s perception of its usefulness and the potential benefits including the level of his/her satisfaction. Therefore, we hypothesize that:

***H14: System Use of an EGS has significant positive impact on users’ Obtained Benefit.***

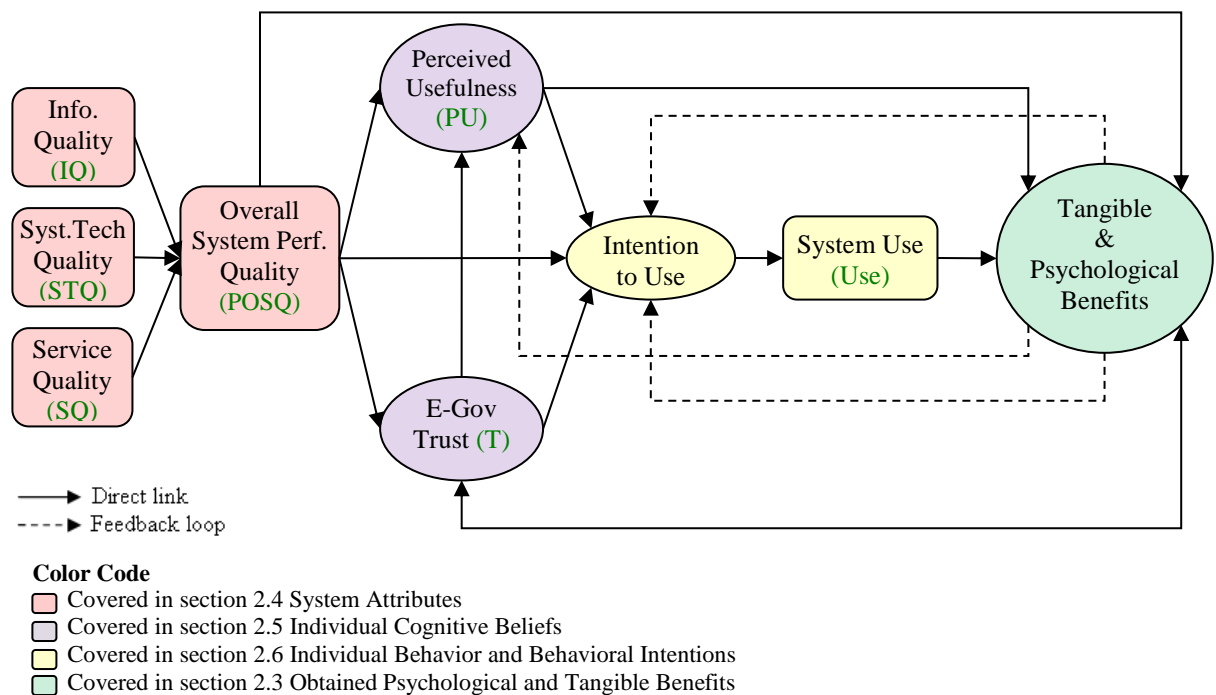
***In particular;***

***H14a: System Use has significant positive impact on the Obtained Psychological Benefit (User Satisfaction).***

***H14b: System Use has significant positive correlation with the Obtained Tangible Benefits.***

## 2.7 The proposed conceptual model

Based on the previous discussions and the theoretical and empirical studies in the literature, our initial conceptual CEM is presented in Figure 2-13 with the ‘obtained Net Benefit’ as a higher, second-order construct that comprises both Psychological and Tangible Benefits. The reason for that is simply to show the interrelations between the constructs and the concept of the final outcome or consequence of using an EGS, which is the main focus of this study.



**Figure 2-13: CEM with first order constructs of net benefit**

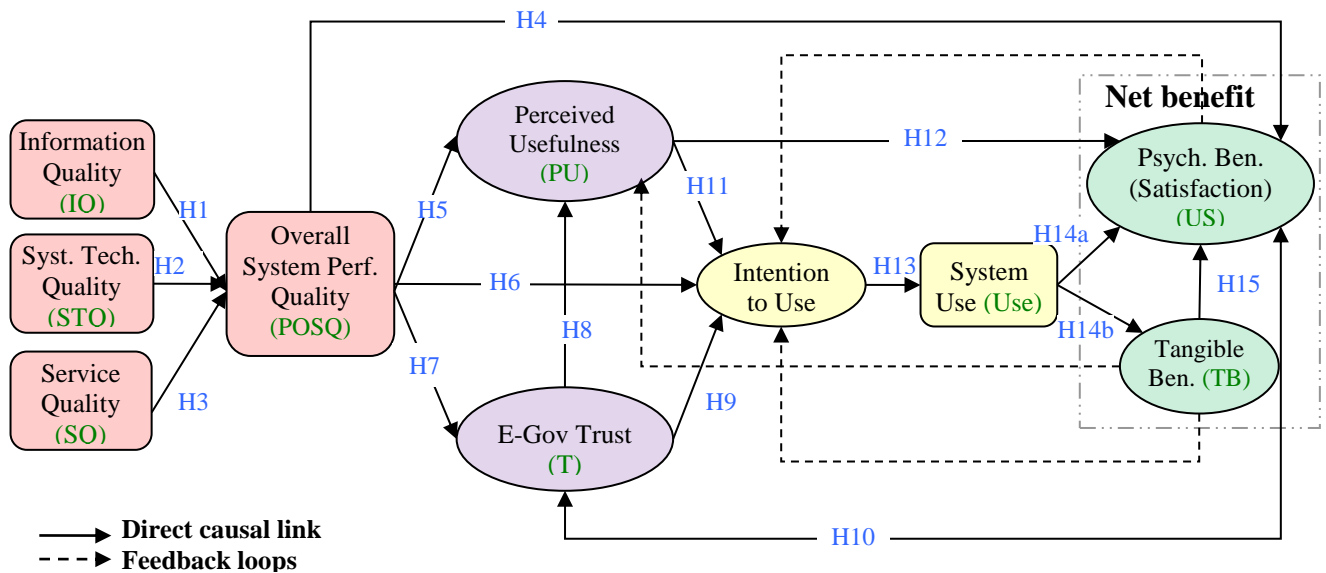
In Sedera *et al.*'s. (2004) study, the variables that reflect the ultimate consequences, i.e., Psychological and Tangible Benefits, were combined under one dependent variable. This is because combining all similar elements that fall under the individual impact and benefit realization and integrating them under one construct (i.e., a higher-order construct) could give more explanatory power and would, accordingly, explain more of the variance in the investigated phenomenon (Sedera *et al.* 2004).

Although our study is also focused on measuring the consequences in terms of the obtained final benefits from using an EGS with a particular output performance quality, which include both the Psychological and Tangible Benefits, we opt for separating both

attributes and measure them on the lower or first-order level. That is because, in this study we focused on the need to measure the Tangible Benefits of citizens who use an EGS, which is an important variable in this context, yet was poorly studied in the e-government literature. In order not to undermine the value of explicitly measuring the Tangible Benefits that might be obtained for the citizens who use an EGS, we propose a second model using the two first-order constructs, Tangible Benefits and psychological benefits as separate constructs. This will enable us to:

- 1- Clearly visualize the interrelations between the two components of obtained benefits (tangible and psychological) and the other constructs in the model which will also allow a better understanding of those interrelations.
- 2- Draw the interrelations between the benefits components and the other constructs in the model more accurately based on the literature.

Figure 2-14 below present the conceptual CEM with the obtained benefits attributes shown as separate, first-order constructs.



**Figure 2-14: The proposed conceptual CEM showing the hypotheses**

However, as a consequence of distinguishing between the Psychological and Tangible Benefits in the second version of the model (shown in Figure 2-14), we also need to validate the relationship between the tangible and the psychological benefits. Based on the literature and as explained earlier, individuals' satisfaction with a WIS, including an

EGS, is significantly influenced by the quality of the system's outputs. Moreover, the quality of the system's output are related to the quality of the services that users receive, and the system's outcomes which are mostly related to the 'tangible' consequences of using the system (saving time, effort, cost, etc.). Therefore, we additionally hypothesize that:

*H15: The citizen-users' Obtained "Tangible Benefits" has a significant positive impact on their Satisfaction.*

Table 10 lists the hypotheses of the direct/indirect paths of our proposed model (CEM) incorporated with some supporting references from the literature.



<b>Table 10: The hypothesis of the direct/indirect paths and samples of supporting literature</b>		
<b>H1</b> IQ → POSQ	Information Quality has significant positive impact on the Perceived Overall EGS Performance Quality	(Au <i>et al.</i> 2008; Teo <i>et al.</i> 2008; Chae-Eon <i>et al.</i> 2009)
<b>H2</b> STQ → POSQ	System Technical Quality has significant positive impact on the Perceived Overall EGS Performance Quality	(Au <i>et al.</i> 2008; Teo <i>et al.</i> 2008)
<b>H3</b> SQ → POSQ	Service Quality has significant positive impact on Perceived Overall EGS Performance Quality	(Au <i>et al.</i> 2008; Teo <i>et al.</i> 2008)
<b>H4</b> POSQ → US	Perceived Overall EGS Performance Quality has significant positive impact on User Satisfaction.	(Devaraj <i>et al.</i> 2002; Balasubramanian <i>et al.</i> 2003; DeLone and McLean 2003; Santos 2003; Au <i>et al.</i> 2008; Cenfetelli <i>et al.</i> 2008; Teo <i>et al.</i> 2008; Wang and Liao 2008; Chiung-Ju and Hui-Ju 2009)
<b>H5</b> POSQ → PU	Perceived Overall EGS Performance Quality has significant positive impact on the individual's Perceived Usefulness of the EGS.	(Cenfetelli <i>et al.</i> 2008; Tan <i>et al.</i> 2008)
<b>H6</b> POSQ → IU	Perceived Overall EGS Performance Quality has significant positive impact citizens' Intention to Use an EGS.	(Parasuraman <i>et al.</i> 2005; Cenfetelli <i>et al.</i> 2008; Tan <i>et al.</i> 2008)
<b>H7</b> POSQ → T	Perceived Overall EGS Performance has significant positive impact on citizens' Trust in the EGS	(Voss 2000; Tan <i>et al.</i> 2008; Teo <i>et al.</i> 2008)
<b>H7a</b> IQ → IC	Information Quality has significant positive impact citizens' trust in Information Credibility provided in an EGS	(Nicolaou and McKnight 2006; Bliemel and Hassanein 2007; Chiung-Ju and Hui-Ju 2009)
<b>H7b</b> STQ → IPS	System Technical Quality has significant positive impact on citizens' Trust in the Integrity, Privacy and Security of an EGS.	(Aladwani and Palvia 2002; McKnight <i>et al.</i> 2002b; Cyr 2008; Chiung-Ju and Hui-Ju 2009)
<b>H7c</b> SQ → OC	Service Quality has significant positive impact on citizens' Trust in the Operational Competency of an EGS	(Anderson and Weitz 1989; Balasubramanian <i>et al.</i> 2003; Chiung-Ju and Hui-Ju 2009)
<b>H8</b> T → IU	Trust in an EGS has a significant positive impact on citizens' Intention to Use/reuse an EGS.	(Yu <i>et al.</i> 2005; Cho 2006; Hung <i>et al.</i> 2006; Pavlou and Fygenson 2006; Teo <i>et al.</i> 2008; Lean <i>et al.</i> 2009)
<b>H9</b> T → PU	Trust has significant positive impact on citizens' the Perceived Usefulness of an EGS.	(Gefen 2004; Horst <i>et al.</i> 2007; Tan <i>et al.</i> 2008; Yoon 2009)
<b>H10</b> T → US	Trust in an EGS has a significant positive impact on User Satisfaction.	(Balasubramanian <i>et al.</i> 2003; Chiou 2004; Bliemel and Hassanein 2007; Teo <i>et al.</i> 2008; Palvia 2009; Rai <i>et al.</i> 2009);
<b>FH10</b> US → T	<i>User Satisfaction has a significant positive impact on citizen-users' Trust in an EGS.</i>	(Flavián <i>et al.</i> 2006; Chiung-Ju and Hui-Ju 2009; Zhou <i>et al.</i> 2009b)
<b>H11</b> PU → IU	Perceived Usefulness has a significant positive impact on citizens' Intention to Use/reuse an EGS	(Chiou 2004; Yu <i>et al.</i> 2005; Cho 2006; Hung <i>et al.</i> 2006; Pavlou and Fygenson 2006; Horst <i>et al.</i> 2007; Tan <i>et al.</i> 2008; Wangpipatwong <i>et al.</i> 2008; Lean <i>et al.</i> 2009)
<b>H12</b> PU → US	Perceived Usefulness has significant positive impact on User of Satisfaction	(Seddon 1997; Bhattacharjee 2001)
<b>FH12</b> TB → PU	<i>Obtained Tangible Benefits have a significant positive impact on users' Perceived Usefulness of an EGS</i>	
<b>H13</b> IU → U	Intention to Use the EGS has significant positive impact on the System Use.	(Venkatesh <i>et al.</i> 2003; van Dijk <i>et al.</i> 2008)
<b>FH13a</b> US → IU	<i>User Satisfaction has a significant positive impact on the Intention to Use/reuse an EGS</i>	(Oliver 1980; Teo <i>et al.</i> 2008)
<b>FH13b</b> TB → IU	<i>The obtained Tangible Benefits have a significant positive impact on the Intention to Use/reuse an EGS.</i>	
<b>H14a</b> U → US	System Use of an EGS has a significant impact on users' Obtained Psychological Benefits (i.e., US)	(Wang and Liao 2008)
<b>H14b</b> U → TB	System Use of an EGS has significant positive impact on users' Obtained Tangible Benefits.	(Wang and Liao 2008)
<b>H15</b> TB → US	The citizen-users' Obtained Tangible Benefits have a significant positive impact on their satisfaction.	(DeLone and McLean 2003; Teo <i>et al.</i> 2008; Chae-Eon <i>et al.</i> 2009)

Based on the literature review, Table 11 identifies the operational definitions of the constructs in the model.

<b>Table 11: Summary of the operational definition of the model constructs</b>	
<b>Construct</b>	<b>Operational definition</b>
Information Quality ( <b>IQ</b> )	It is the extent to which the information provided by an EGS is accurate, relevant, comprehensive, recent, understandable and clearly presented.
System Technical Quality ( <b>STQ</b> )	It is the extent to which an EGS is accessible, user-friendly, consistent, fast, reliable, secure, and is easy to use and navigate.
Service Quality ( <b>SQ</b> )	Refers to: the availability of e-services, the suitability of e-services to the needs of users, and the promptness of government employees in updating an EGS or completing online requests.
Perceived Overall EGS Performance Quality ( <b>POSQ</b> )	Refers to: the perception of the overall EGS performance quality among users that an EGS fulfills their various needs, by providing good quality information and e-services through an accessible user-friendly, reliable and secure interface.
E-government Trust ( <b>T</b> )	It is the extent to which a user is confident of the reliability of an EGS in terms of the information quality, technical quality, and the operational and service competency.
Intention to Use/reuse the EGS ( <b>IU</b> )	Refers to the citizen's intention to use an EGS in the future.
Perceived Usefulness ( <b>PU</b> )	It is the extent to which a user believes that using an EGS will produce actual benefits such as helping to accomplish a task, saving time, reducing effort, and reducing dependence on others.
System Use ( <b>Use</b> )	Refers to: the extent to which a user exploits an EGS to fulfill his/her needs and requirements.
Net benefit ( <b>NB</b> )	Is a combination of a users' satisfaction with the output of an EGS, Tangible Benefits such as increased efficiency, saving time, reducing effort, and reducing dependence on others.
User Satisfaction ( <b>US</b> )	Refer to: the user's satisfaction with the output and /or the consequences of using an EGS
Tangible Benefits ( <b>TB</b> )	Refer to: the user's obtained material benefits such as increased efficiency in terms of saving time, and reducing effort, cost, and dependence on others

## ***2.8 Conclusion***

This chapter has introduced a detailed discussion on the available relevant literature. The chapter started with a presentation of the e-government literature including an explanation of what we refer to when talking about an e-government and an EGS, a background on e-government, an explanation of the benefits and challenges for introducing an EGS, and the literature of EGS success and evaluation. The next sections presented a discussion of the literature on the attributes that should be incorporated in the proposed model including the system and the individual's attributes, and the benefits that citizens obtain from using an EGS, including User Satisfaction and Tangible Benefits. At the end of this chapter, the proposed conceptual CEM was introduced along with the proposed hypotheses.

In the next chapter, we will present the methodology which explains what the objectives and sub-objectives are, and how they will be addresses in this research.

### 3 RESEARCH APPROACH AND METHODOLOGY

#### 3.1 Introduction

The previous chapter presented a thorough discussion of the literature concerning e-government and the constructs used in the proposed conceptual model, and then, presented the proposed conceptual CEM. This chapter introduces the approach which this research uses to conduct the study.

As stated in Chapter 2, the current research poses the question: *“is there a valid model that can be used to assess an EGS performance and quality and the obtained psychological and tangible benefits for the citizens who use it?”* Consequently, the main aim of this research is to develop a model and a corresponding measurement instrument that can be used to assess the success of an EGS in terms of its effectiveness, its quality and its impact on the Psychological and Tangible Benefits obtained by citizen users. The proposed conceptual model should help in measuring and understanding;

- A. the effectiveness and quality of an EGS itself, as perceived by the citizens who use it;
- B. how the different attributes (constructs) of the model interact with each other, particularly how they influence citizens’ use of and intention to use an EGS; and,
- C. the obtained benefits of satisfaction and increased efficiency through savings in time, effort and cost, as a result of EGS use.

In order to accomplish this aim, we need to complete the following objectives and the steps to be followed in developing and validating the conceptual model;

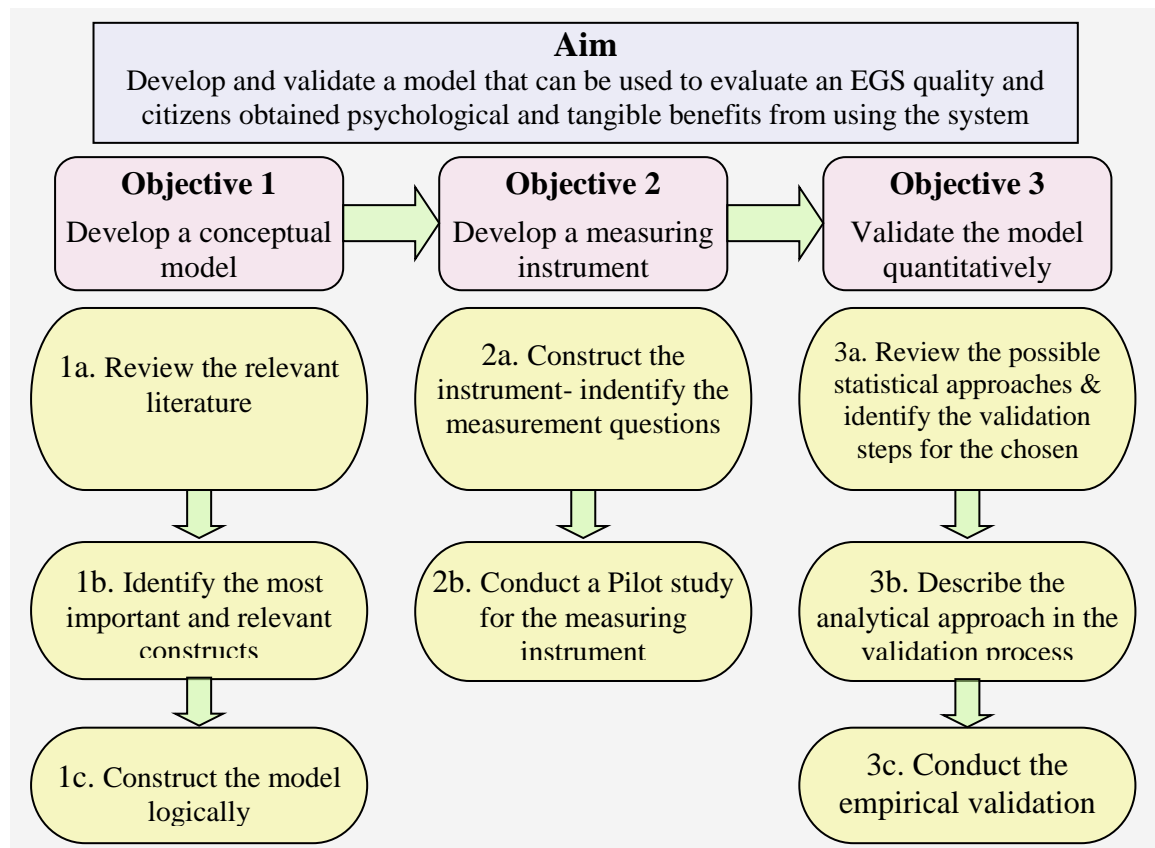
1. Develop a conceptual citizen-centric model of EGS assessment, incorporating the following constructs, to show how the quality of the EGS used influences the benefits obtained by citizen users:
  - i. the system attributes,
  - ii. the factors that influence citizens’ use, and
  - iii. the citizens’ psychological and tangible benefits.

This is done by:

- a. Conduct a comprehensive literature review of relevant fields, including IS, marketing, e-commerce, management, business administration, psychology.
- b. Identify the most important and relevant constructs to our study
- c. Construct the model while connecting constructs in a logical sequence.

2. Develop a measurement instrument that can be used to collect the data and to validate the proposed conceptual citizen-centric model of EGS assessment.
  - a. Construct the measurement instrument by identifying the questions used as measurement items whenever available.
  - b. Conduct a pilot study for the measurement instrument.
3. Quantitatively validate the proposed conceptual citizen-centric model of EGS assessment.
  - a. Review the possible approaches to be used for the empirical validation and choose the most suitable statistical approach. This includes identifying and following the acknowledged steps of statistical validation for the chosen approach.
  - b. Describe the analytical approach in the validation process
  - c. Conduct the empirical validation<sup>46</sup>

The next three sections explain in detail, the approach and methods used to achieve the research objectives.



**Figure 3-1: A summary of the objectives and sub-objectives of this study**

<sup>46</sup> The actual validation of the model is conducted and presented with the results and discussions in chapter 4

### ***3.2 Developing the conceptual model***

Given that the first objective of this study is to develop a conceptual model, it was important to extract the constructs and relationships between constructs from previous relevant studies in the literature. The proposed conceptual model implicitly gives rise to a set of 15 hypotheses, which are shown in Table 10 (see Section 2.7). This section includes a detailed explanation of how the model was developed and the guidelines that were followed while reviewing the literature to develop the proposed conceptual model.

#### **3.2.1 Guidelines and aspects of focus during development of the conceptual model**

The application of the guidelines was based on the following procedure:

##### ***1. Taking User Satisfaction as a starting point for reviewing the literature***

User Satisfaction (US) appears to be the most important dimension to start the review of the literature. First, US has been widely used in the IS literature and has been regarded and empirically found to be a proxy to IS success in all contexts. Second, an individual's perception of the system's output quality is reflected and can be measured by their satisfaction. In other words, US is the psychological benefit of using a good-quality system so US can be used as an indicator of the overall output quality. Third, US also plays an important role in influencing the behavior and behavioral intention to use a system. Moreover, using a good system would subsequently lead to obtaining Tangible Benefits related to increased efficiency through saving time and effort. The attainment of Tangible Benefits as a consequence of using an EGS would also impact one's satisfaction.

##### ***2. Conducting a systematic search on US to identify the antecedent and dependent variables***

A systematic search was conducted in three top-ranked journals (MISQ, ISR, and JMIS) for the period between (1995-2010) to review the empirical studies of US and identify the significant antecedents and dependent variables to US – (See Section (2.3.2.5)). “Systematic review is a tool used to summarise, appraise and communicate the results and implications of a large quantity of research and information. It is particularly valuable as it can be used to synthesise results of many separate studies examining the

same question, which may have conflicting findings. The purpose of a systematic review is to provide the best available evidence on the likely outcomes of various actions and, if the evidence is unavailable, to highlight areas where further original research is required. It is, therefore, a tool to support decision-making by providing independent, unbiased and objective assessment of evidence (Vedung 2010, p.274)”. A proper structured, systematic review would provide a more reliable and better synthesis and understanding of the literature (Webster and Watson 2002).

The reason for why top three journals were chosen versus the basket of six or eight other IS or HCI journals is due to the time constraints (Webster and Watson 2002). Also, the focus on top journals was justified as the major contribution is expected to be in the leading journals (Webster and Watson 2002) with empirical studies being rigorously reviewed. Top journals are well established in their field and provided the needed empirical US based studies as opposed to reviewing relatively new fields such as e-government which would not introduced adequate number of US studies. In addition, the results found based on the review for the empirical studies for the 10 year period in the chosen three journals were deemed to be sufficient in providing a good background for determining the significant antecedents and DV. This process was the initial literature review with a primary focus on US, an in-depth literature review of all the variables was conducted in step 4. The results of this review are presented in Figure 2-9.

### *3. Selecting the variables that are the most important to the model*

After identifying the significant antecedent and dependent variables to US, the variables that were deemed to be most important and most relevant to the purpose of our study were selected. The variables that were added to the proposed model were chosen based on a number of considerations serving our aim:

- a. Considering the variables that were found in the reviewed empirical studies to be significant antecedent to the other variable relevant to our study.
- b. Considering the variables that fit within the e-government context serve the purpose of our study and the goal of the conceptual model. This includes considering the attributes that are used to evaluate the success of a web-based IS but to be costumed to fit the e-government context.

- c. Considering the possible factors that influence citizens' EGS adoption. The significant interrelationship between individuals' adoption of a particular system and the attainment of the satisfaction 'as a psychological benefit' has been empirically validated in the literature. And since the attainment of any potential tangible or psychological benefits can only be obtained after actually using the EGS, it is important to thoroughly understand the determinants that impact individuals' use or intention to use the web-based information system, particularly, in the e-government context.
- d. Categorizing the variables into four groups including, the ultimate dependent variable of the benefits comprising US and Tangible Benefits, which reflect the system's outcome, the system attributes which reflect the system's output, the citizens' psychological attributes that drive them to use the EGS, and finally citizens' use and intention to use.
- e. The interrelations between the considered variables should be logical and match with the literature.

#### 4. *Further analysis and a need for a more comprehensive literature review*

After filtering the constructs for the proposed conceptual model to construct the actual conceptual model, it was vital to perform further analysis and a comprehensive review for the relevant literature to confirm that all the constructs fit within the conceptual model and relate to each other. Also further analysis of the literature was needed to ensure that the interrelations between the model's constructs are clearly and thoroughly understood. The process of reviewing and synthesizing the literature is a fundamental step to extract the conceptual model to extend the existing research ([Webster and Watson 2002](#)). This part of discussion and review of the literature was presented in chapter 2, Section (2.3).

The proposed conceptual model is designed to fit within the e-government context, which is part of a broader web-based information systems (WIS) context. There are several disciplines that are associated with WIS applications, which is an interdisciplinary field straddling other disciplines ([Webster and Watson 2002](#)). Hence, the attributes that were designed to be included in the model relate to different areas of the literature. For example, constructs such as Perceived Usefulness (PU), Trust/Trustworthiness (T), and Intention to Use (IU) or continue to use a system, which



previous studies have identified to be significantly correlated with US, are all psychometric measures and are commonly used variables in the WIS context. Therefore, to understand these attributes in sufficient depth, and in an attempt to avoid bias in choosing one model or theory over another, it was important to review the literature comprehensively by covering multiple domains in the literature such as IS, Marketing and e-commerce, e-government, Management and Business administration, and Psychology. During this in-depth literature review, the hypotheses were proposed for this study.

### ***3.3 Developing the instrument - the operational approach***

Validating the model requires conducting two main steps. The first step is related to choosing, developing and testing the measurement instrument. The second step is related to collecting the data and validating the model empirically after choosing a suitable statistical approach. This section explains the operational approach for developing the measurement instrument which is going to be used for the validation process.

In order to develop the measurement instrument and collect data, the following process was chosen with regard to choosing the population of investigation, constructing the research instruments and the data collection protocol.

#### **3.3.1 The chosen method**

To validate the proposed conceptual model, there is a need to get data about a fixed number of well-defined constructs from a large sample of appropriate people who represent the target population. The most, if not the only, feasible way to do so is by using a survey conducted with the questionnaire method.

A questionnaire was also chosen, as the type of data needed to validate the model is not available in any published sources; therefore it needed to be gathered specifically for this study. In addition, interviews and focus groups may have been considered as methods; however, these options were difficult to apply because:

a) they would take too long to administer.

- b) they are not well suited to gathering the same data from a large group of people.
- c) there was no need to drill down because the constructs were all well understood.

### **3.3.2 The context and targeted population**

To validate the model empirically, the case of developing countries was considered. As per the United Nation report in 2010, most countries have published a large amount of information online, many going beyond basic websites to provide national portals for citizens that serve as a ‘single gate’ to the government services in different ministries. However, “the concerns of developing countries in respect to e-government lie less in any natural barriers to the diffusion of e-government and more on the side of human resources and their disposition, i.e. their ‘capabilities’ in policy-making, technology and consumption,(UN 2010, p.39)”. According to the United Nation 2005 report, there is a big difference in the uptake of citizens between developed and developing countries.

Although many developing countries placed huge resources on facilitating information technology tools, and networks (UN 2005), there is still a need to dedicate more attention to increase and enhance the transactional services as well as the electronic means of engaging citizens in public consultation and decision-making (UN 2010). “Most developing country Governments around the world are promoting citizen awareness about policies and programmes, approaches and strategies on their websites. They are making an effort to engage multi-stakeholders in participatory decision-making, in some cases through the use of innovative initiatives aimed at greater access and inclusion (UN 2005)

In addition, it is generally known that in developing countries most government services are tedious, problematic, and have many shortcomings including corruption, nepotism, unmotivated employees who are reluctant to work professionally and efficiently, and long routine processes which also require a lot of administrative work. As a result, citizens of developing countries are dissatisfied from the services they receive from their government. It could be assumed that implementing a good and effective EGS with high-quality performance, (e.g., allows tasks to be completed, always accessible, easy to use, has good technical quality, and provides sufficient information and e-services to meet the diverse needs of citizens), would have a positive

impact on all societies. Therefore, if implementing an EGS has the potential for a positive impact; it will be most obvious within this group of society.

The state of Kuwait has been chosen as an example for validating the conceptual model in this study particularly due to the ease of access to data. . Kuwait, typically, has these government performance<sup>47</sup> issues with the public that were addressed earlier. Also, the Kuwaiti government has put a lot of effort and resources into implementing the e-government initiative<sup>iii</sup>. Given that the adoption and development of EGS has been steady in both developed and developing countries, and by now, it is expected that the benefits are well recognizable (UN 2010).

Table 12 summarizes who is in the nominated sample; and why the chosen sample has to be composed of Internet users, particularly e-government users, instead of the whole population of Kuwait.

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<sup>47</sup> Such facts about the shortcomings of the government performance were published in Kuwaiti in newspapers and discussed in the parliament.

Table 12: Justification for choosing a sample of EGS users		
Main focus	Targeted population	The reason
1- Assessing citizens' perception of the overall EGS performance when using and after using	Internet users	<ul style="list-style-type: none"> <li>- Internet users, (regardless of their proficiency level), are capable of and have the choice of using the EGS. Thus, if this person is reluctant to use this service channel and prefers to use the traditional one, then, there must have been a reason for his/her reluctance which may be related to one or more aspects of the EGS performance or characteristic, e.g., lack of e-services, concerns with security or privacy issues, outdated information.</li> </ul>
2- Studying the obtained benefits from using the EGS.	actual EGS users	<ul style="list-style-type: none"> <li>- The sample has to be composed of actual EGS users particularly those with previous experience<sup>48</sup>, in order to be able to assess the obtained benefits.</li> <li>- Non-users cannot provide an insight of the EGS performance, nor can they assess the EGS functionality and advantages if they haven't actually attempted to use it. (Akman <i>et al.</i> 2005)</li> <li>- Including non-users in the sample would give invalid results because not all the respondents used the EGS which make them not eligible to give feedback on the actual system and their obtained benefits.</li> </ul>

In summary, citizens who use EGS are targeted as they are the appropriate population that can provide the required information to validate the conceptual CEM.

<sup>48</sup> This would be particularly true if the evaluated services involve government employees who complete online requests (e.g., passport, ID, and driving license issue or renewal). That's because citizens would need to assess how they perceive the quality of completing the task by the corresponding employees within the assigned time-frame.

### **3.3.3 Constructing the measurement instrument**

This section presents two sub-sections related to the development of the measurement instrument. Section (3.3.3.1) describes the protocol of the questionnaire and how it was designed. Section (3.3.3.2) describes how the pilot study was conducted, what weaknesses were identified, and how the questionnaire was modified.

#### **3.3.3.1 Survey design and protocol**

The designed survey employed a closed-ended questionnaire with seven-point Likert scale, ranging from strongly-disagree to strongly-agree. A Likert scale is a psychometric measuring tool that is commonly used in questionnaires, and is the most widely used scale in survey research. The Likert scale was used for the survey questions because “satisfaction”, which is a psychometric measure, was included as a dependent variable and because other constructs in the model are based on perceptual measures. When responding to a Likert questionnaire item, respondents specify their level of agreement to a statement. It is used to measure attitudes, preferences, and subjective reactions. Likert scales and other attitudinal scales help understanding the emotional and preferential responses people have which aid in the system design.

The questionnaire used the measurement items for each construct (questions for each variable in the model shown in Table 14) based on the definitions identified in Table 11. Some measures were adopted from previous empirical studies in the literature and others, which reflected important measures but were not found explicitly in the previous similar studies in the IS or e-government, were added. Based on the review of the literature there were three types of measurement items that were added to the questionnaire:

- an exact copy of questions found in previous studies, or,
- similar to questions found in previous studies but the wording was slightly modified to fit the EGS context, or,
- new measures that were added based on the concepts found in the literature review.

All of the questions in the questionnaire were obligatory. This was done to ensure that all questions were answered and to minimize missing answers.

The respondents were initially asked to answer questions related to their demographic and background which were not directly related to the constructs evaluation questions. For example, gender, citizenship, age, participants' frequency of use to the Internet and the EGS, education, occupation, and the name of the government agency that was used most by the respondent. Asking the respondents about the number of times they used the EGS and the type of services they used (including indicating whether they have performed any task requiring the assistance of the government employees offline) is worthwhile if further investigation is required for some responses. For example, there are citizens who used a government website to select a particular service and complete it online, e.g., performing a transaction online payment, or checking their status. This group of citizens can assess these e-services, without necessarily having previous or multiple experience of using the system. In these cases a single use by a user is sufficient for the user eligible to be able to evaluate his/her experience of the website. Conversely, there are citizens who lodged an online request which a government employee needs to complete. If any of those citizens have not yet got their task finalized by the government employees at the time of answering the survey, they will not be able to adequately and reliably assess the government employees' performance. Such information for these exceptional cases may be of value if deeper analysis of the results is needed.

The respondents were also asked to select an option among a number of frequently-used government agencies/ ministries all of which offered various types of services via their EGS; e.g., the Ministry of Interior (MOI), the Public Authority for Civil Information (PACI).

Due to the range of diverse purposes and tasks for which citizens might use an EGS, the questionnaire included a question about type of the tasks that user performed. For example, there are tasks that are related to finding general information such as searching for policies/ procedures/ legislations. Such tasks can be assessed based on the general information quality assessment criteria discussed in the literature. Other tasks involve completing a whole task independently without the assistance of government employees, such as downloading forms, online payment of taxes, bills, or fines. Independently performed tasks also include a follow-up process for a request that has already been lodged or checking the citizens' personal status, like liabilities, fines,

traffic violations, residency permits (eligibility status), sponsorship status, car insurance, renewed or expiry dates for any sort of document or license. While “status inquiry” is a service that can be executed at the same time independently by the citizens, it is still dependent on the government employee to update the system with any new information promptly and correctly. The last type of services is related to conducting a partial task which involves the citizen performing his/her part of the job and waiting for a government employees to finalize it; e.g., lodging an application, renewing a passport.

Therefore, the classification used in this study was:

- a- Find information about processes, procedures, policies, regulations, required documents for completing a specific task, etc.
- b- Complete tasks independently, such as online payment, downloading forms, etc.
- c- Lodge a task request for government employees to complete (e.g., renew ID, etc.)
- d- Follow-up a process for a request that has already been lodged, or, check the personal status (status inquiry) (e.g., infringements, expiry date, sponsorship, residency, bills, etc.)

Given that each type of task involves special assessment criteria, the respondents had to indicate the types of tasks they performed for their chosen government agency or ministry. For example, option “a” in the previous classification is related to the assessment of IQ; option “b” and “c” is related to the SQ (i.e., electronic and employees), and “d” is related to the SQ (as existing e-services) as well as IQ (e.g., correct and up-to-date personal information) . Thus, when a respondent has not experienced a specific type of service or task, he/she will not be able to provide any relevant feedback. Therefore, along with the Likert scale, there was an additional option for the respondents that they can select which is “don’t know/ not applicable”. This also helps the evaluator to relate the respondents’ answers regarding their selected task which provide better analysis.

### 3.3.3.2 Pilot study

A pilot study was conducted to ensure correct wording of the questionnaire to make the questionnaire design as simple and friendly as possible for the citizen-respondents.

The questionnaire was translated into the Arabic language as most respondents will be of an Arabic background. Since almost all of the respondents will be of an Arabic background, the questionnaire was translated into Arabic by the researcher who is fluent in both Arabic and English. The Arabic and English versions were then compared by friends and colleagues who were also fluent in both Arabic and English. Thirteen participants conducted the pilot study including people who had and had not used an EGS. During the pilot study, the participants of the pilot study who were fluent in both Arabic and English and, expressed no concerns about the likelihood that an Arabic translation of the questionnaire would prone to misinterpretation. These participants were from both genders, different age groups, and different educational backgrounds (ranging from high-school to PhD degrees). The pilot study was important to ensure the accuracy of wording and validate the measurement instrument (Cuffe 2007) by:

- ensuring that the measurement items fit within the context of e-government and the objectives of the study;
- ensuring that the sentences and questions are appropriately structured and that they are clear, understandable, and the idea of each question is delivered to all respondents in same way and that there is no confusion or redundancy.
- understanding what words or ideas might be missing and to obtain further suggestions for any improvements.

It is also important to note that the pilot study was a dynamic process of modification. Each participant of the pilot study was given the questionnaire in a different time, which allowed for one-to-one interaction and discussion of the questionnaire and possible ways of improvement. Consequently, the corrections and suggestions were made and the questionnaire was given to next participant<sup>49</sup>.

Table 13, below, presents a summary of the queries, comments, and suggestions made by the participants in the pilot study, and the action taken to rectify the shortcomings of the draft questionnaire.

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<sup>49</sup> This process did not cause any significant modifications that contradict with the initial questions and ideas that were approved in English by the researchers and Human Research Ethics Committee.



Table 13: The respondents comments of the pilot study and the adjustments made	
1	<p><b>Question:</b> <i>“On which country are we supposed to answer?”</i></p> <p>The participants in the pilot’s study were accordingly answered indicating that “Kuwait” and the “Kuwait government agencies” are the area of reach. This information has been explicitly added to the introduction of the online survey to specifically indicate the country of research.</p>
2	<p><b>Suggestion:</b> <i>“Some sentences need to be rephrased to be clearer as it could be understood differently from different respondents”</i></p> <p>The indicated questions were simplified<sup>50</sup>, rephrased in a clearer way while focusing on delivering the intended idea of the questions and considering the wording, phrases, structure and grammar of the sentence or question.</p>
3	<p><b>Comment:</b> <i>“Many questions are confusing as they seem to be similar in meaning repeated.”</i></p> <p>The questions were represented to appear more consistent so that to reduce respondent efforts to pay more attention understanding the difference in the questions.</p>
4	<p><b>Comment:</b> <i>“Questionnaire is too long; which may significantly reduce the response rate.”</i></p> <ol style="list-style-type: none"> <li>1- Some questions that were added to the draft questionnaire acquired the same answers but were stated in different phrases. The purpose for that was to allow checking for consistency of answers. These redundant questions were removed.</li> <li>2- Some questions that did not add significant value for validating our model were excluded. We tried to leverage between obtaining sufficient information to serve the objective of adequately validating the proposed conceptual model while attempting to minimize the rate of abandoned questionnaires.</li> <li>3- The questions that appeared confusing to the participants of the pilot study, because they shared similar wording, were merged together into a single question. This way the question is much clear and the respondent would get a better idea of what is meant by the question.</li> <li>4- In the online version of the survey, the questionnaire was designed to appear more appealing and interesting (e.g., add images, such as that used on the e-government portal webpage, the agencies’ logos, colorful interface, animated “smileys”). This was also done to make it easier for the respondents to focus on and remember their agency of choice before they start answering the questionnaire.</li> </ol>

<sup>50</sup> Simplified means that the question was made easy to read and understand by making as short as possible while using clear, common, understandable words.

(Continued)

Table 13: The respondents comments of the pilot study and the adjustments made	
5	<p><b>Question:</b> <i>“On which government agency are we supposed to provide our perception on? It is very confusing as we have a significantly different experience.”</i></p> <p>It was noted that the participants sometimes have inconsistent answers where their mind swings and switches between different experiences of different government agencies. Thus, in the pilot study, the participants were asked to focus only on a single agency website which they used most and answer all questions accordingly. It was still noted that some participants did not have consistent answers, which implied that they could not focus on their experience with a single agency’s website.</p> <p>Given that the questions were generic and only the classification of the task-types of were used and not the explicit name of the task, participants’ responses were influenced by their overall experience on tasks that share similar characteristics. Thus, their answers for some questions were linked with one particular experience, and in other questions, their answers were linked with their experience with another agency. This was particularly true when the participant performed a certain type task related to services provided by a particular agency and performed another task type of task that was related to the services provided by another agency (e.g., finding information from one agency vs. checking status in another agency).</p> <p>So, we did the following in the online version of the survey:</p> <ol style="list-style-type: none"> <li>1- In the introduction of the questionnaire, a sentence was added in a different color instructing the respondents to choose only one particular agency which they have used most and answer ALL the survey questions based on this choice.</li> <li>2- Once a respondent had indicated their agency of choice the name of the chosen agency was shown in the questions in a different color.</li> <li>3- A statement was added in a different color on each page to remind the respondent to answer the questions based on their chosen agency.</li> </ol>
6	<p><b>Question:</b> <i>“When asked ‘did you use the e-government to perform any task’, it is not clear what is meant by e-government?”</i></p> <p>The easiest fastest notion that all ordinary people (citizens) understood was “finding information or using the electronic services provided by a government agency online (whether through its official website or through the official portal). Common examples were given, such as using the Ministry of Interior (MOI) or Public Authority for Civil Information (PACI) (e.g., checking sponsorship or residency information, infringements, performing online payments, or renewing ID, etc.)</p>

(Continued)

Table 13: The respondents comments of the pilot study and the adjustments made	
7	<p><b>Suggestion:</b> <i>“Overall, it feels confusing and some aspects might not be comprehended clearly. Thus it is better to provide simple definitions that summarize the idea each attribute and help the respondent to see what the questions are aimed to ask.”</i></p> <p>A summary explaining the subject and research concept was presented in the introduction of the questionnaire. However, some participants of the pilot study still did not understand the aim of the study and were a bit confused as some questions seemed redundant to them. This was probably true for two main reasons:</p> <ul style="list-style-type: none"> <li>a- they did not notice the grammatical tense of the sentences which distinguished the questions related to their current perception compared to questions related to their future intentions.</li> <li>b- Some questions may have seemed repeated to the respondent while they were in fact addressing a different construct.</li> </ul> <p>Accordingly, in an attempt to resolve the effect of this issue, we did the following:</p> <ul style="list-style-type: none"> <li>1- The questions about each construct were presented in separate groups, each on a single page, to help the respondent focus on each construct at a time. When the group of questions for each construct was all answered, the respondents had to click next to go to the next group of question for another construct. Each page consisted of questions between 2 and 6.</li> <li>2- Putting a title naming each construct at the beginning of each page followed by a simplified definition of that construct.</li> <li>3- Made the look and wording consistent to make it easier for the respondent to notice the difference in the questions.</li> </ul>
8	<p><b>It was noticed that:</b> <i>the wording for the translated Likert scale in the Arabic survey seems to be confusing</i></p> <p>The translation of the Likert scale categories in Arabic seemed to be confusing. Although literally the categories had different meaning, it was difficult for the participants to distinguish between them because in Arabic the categories seemed very close. Therefore, they were slightly modified where the items of the scale can be more easily distinguished.</p>

Table 14, below, lists the final questions for each construct that were included in the survey after excluding some questions based on the pilot study. Copies of the draft and the final questionnaires are provided in the appendices D and E, respectively.

Table 14: Measurement items for each construct		
Attributes	Question	
<b>Information Quality (IQ)</b>	1. The information provided is well laid out, clearly presented, and understandable.	
	2. The information provided is comprehensive and provides me with all the information I need.	
	3. Generally, the information available is up-to-date.	
	4. The information provided could be described as accurate.	
<b>System Technical Quality (STQ)</b>	Website friendliness/ ease of use	1. The government agency's website for the online service is easy to use.
	Services ease of use	2. It is easy to use the e-services provided in the government agency's website.
	Ease of learn	3. I found it easy to learn using the government agency's website.
	Reliability and loading	4. The website operates reliably, quickly, and without errors. (e.g., Availability of titled links, loading time, moving between different pages, etc.)
	Security and Privacy	5. The security and privacy standards of the website are clearly published
	24/7 accessibility	6. I can access and use the government agency's website whenever I need and at any time (24hours/7days).
<b>Service Quality (SQ)</b>	1. I believe that the available e-services option are various and meet my need(s).	
	2. The system is accurately and promptly updated with my status, or the progress of my request.	
	3. For the services that need to be completed by government employees, (e.g., requesting renewal of ID); the completion of my online order/request gets finalized in the assigned time frame.	
<b>Overall EGS Perf. Quality (POSQ)</b>	Overall, I believe the performance of the e-government/ e-service online system for that government agency is very good and efficient.	
<b>Trust (T)</b>	<i>An Information trust</i>	1. I trust the information provided on the website of the e-government / e-service system.
	<i>B Technical trust</i>	2. I trust that the transactions and information transferred will be handled securely.
		3. I believe that my personal information and privacy are protected.
	<i>C Service and operational competency</i>	4. I trust that the information I provided is stored, integrated, and allocated appropriately.
		5. I believe that my inquiry/task required will be appropriately completed by the government personnel.
<b>Perceived Usefulness (PU)</b>	1. I believe that the e-government / e-service online system will enable me to accomplish the task I want more quickly.	
	2. I believe that the e-government / e-service online system would make my task easier to do.	
	3. I believe that using the e-government / e-service online system to complete a	

(Continued)

Table 14: Measurement items for each construct	
Attributes	Question
<b>Cont. Perceived Usefulness (PU)</b>	task, better suits my circumstances when I have difficulties. (e.g., the need to complete a task urgently or in a certain time, being overseas, transportation issues, having commitments or time, extreme weather, cultural issues (i.e., re females), health issues etc.)
	4. I believe that the e-government / e-service online system would meet my needs.
	5. Overall, I believe that the e-government / e-service online system which the government agency provides is effective and useful for me.
<b>System Use (U)</b>	1. I use the e-government / e-service online system on a regular basis.
	2. When I can, I depend on the e-government / e-service online system to get my task done.
	3. I use the e-government / e-service online system to do transactions. (e.g., pay fees, fines, bills, etc.)
	4. I use the e-government / e-service online system a lot to find information and/or download the forms that I need.
	5. I use the e-government / e-service online system to check my personal status/information or to follow-up a request.
<b>Psychological Benefit -User Satisfaction (US)</b>	1. The e-government / e-service online system for the government agency met my needs adequately.
	2. I prefer using the e-government / e-service online system rather than visiting the government agency in person, unless I have no choice.
	3. Overall, I am very satisfied with my experience in using the e-government / e-service online system for this government agency.
<b>Tangible Benefits (TB)</b>	1. I found that using the e-government / e-service online system made it easier for me to do my task.
	2. I found that the e-government / e-service online system saved me a lot of time.
	3. I found that the e-government / e-service online system saved me a lot of effort.
	4. I found that the e-government / e-service online system saved me a lot of cost.
	5. By using this e-service online system, I didn't need to depend on others to perform a task on my behalf when I couldn't do it on my own. (e.g., Disability/ health issues, females, work or other commitments, out of the country (overseas), etc.)
<b>Intention to Use/Reuse (IU)</b>	1. I intend to use the e-government / e-service online system, when I need, to find the information and/or download forms.
	2. I intend to use the e-government / e-service online system, when I need to, to complete a task and/or perform financial transactions. (e.g., pay fees, fines, bills, etc.)
	3. I intend to use the e-government / e-service online system, when I need, to lodge a request for a particular service.
	4. I intend to use the e-government / e-service online system to check my personal status, or follow-up a process for a request that I applied for. (e.g., passport, ID, license, etc.)
Note: All the questions above were derived from the literature, see for example, (Moon and Kim 2001; Gefen <i>et al.</i> 2003; Carter and Belanger 2005; Garrity <i>et al.</i> 2005; Wixom and Todd 2005; AGIMO 2006; Kulkarni <i>et al.</i> 2006; Wang and Liao 2008)	

### 3.3.4 Data collection

Logically, choosing a large, representative random sample provides an opportunity to gather data and understand the different views of e-government website users. Therefore, in an attempt to obtain a sufficient number of responses, the following was conducted:

- Recruited participants through different channels<sup>51</sup> (i.e., different kinds of forums, email campaign, personal invitations). The personal invitations included recruiting university students who were encouraged to participate in the study and were given the online link to participate voluntarily whenever possible. Another approach was through requests to various friends and colleagues, etc. and all were requested to further publicize the survey. The targeted individuals were from both genders and with different educational background and occupations; and,
- Provided both English and Arabic versions of the online questionnaire, using Survey Gizmo<sup>52</sup>.
- Provided the 7 most frequently used government agencies as options of government agencies for the respondents to choose from.
  - a. Ministry of Interior (MOI)
  - b. The Public Authority of Civil Information (PACI)
  - c. The Public Authority for Housing Welfare (PAHW)
  - d. Ministry of Electricity and Water (MEW)
  - e. Ministry of Higher Education (MHE)
  - f. Public Authority of Applied Education and Training (PAAET).
  - g. Kuwait University (KU)<sup>53</sup>

In addition, the respondents were given the option to mention a particular government agency that they used most in the case where they have not used a website of any of the government agencies in the list.

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<sup>51</sup> This approach has also aided in have a diversity in the respondents background, such as personal, educational, occupational, and demographic characteristics, which in turn provide a higher randomized sample that more accurately reflects the population that use the Internet, in particular the EGS, in Kuwait.

<sup>52</sup> An Online Survey Software & Questionnaire Tool ([www.surveygizmo.com](http://www.surveygizmo.com))

<sup>53</sup> We choose to include the two educational institutions mainly because they are considered as governmental not private while can also be accessed through the e-government portal.

### ***3.4 Validating the model - the statistical approaches and the analytical processes***

#### **3.4.1 Potential statistical approaches**

For any researcher to choose a statistical tool for testing something, he /she should consider the context of the study and the nature of the model or approach to be tested. In other words, it is important to choose the methodology which suits this objective. Since a numerical scale is being used in the questionnaire, and since we are interested in determining the strength of the association and statistical significant relationships that exist between the variables, Chi<sup>2</sup> test and Pearson coefficient test<sup>54</sup> could be used to test the hypotheses (Cuffe 2007).

Rather than just investigating a direct correlation between two constructs, we need to understand all the relations and the accumulative effects of the model constructs. Hence, the model that is being developed here is based on the concept of the accumulated effects of the factors that impact one's intentions to use the system, to obtain an understanding of the psychological and Tangible Benefits. This means that the conceptual model has different direct and indirect paths leading to the attainment of benefits, and the significance of each path needs to be measured. Path analysis is used to describe the directed dependencies among a set of variables. For that reason, the most appropriate statistical technique to be used is the structural equation modeling (SEM) technique.

##### **3.4.1.1 Structural Equation Modeling (SEM)**

SEM is a statistical technique used for testing and estimating causal relationships (Ringle *et al.* 2010) using a combination of statistical data and qualitative causal assumptions (Pearl 2012). It is used to test 'complex' relationships between observed (measures) and unobserved (latent) variables, and also relationships between two or more latent variables. It is a powerful multivariate method allowing the evaluation of a series of simultaneous hypotheses about the impact of latent and manifest variables on other variables, and can incorporate multiple dependent variable while taking measurement errors into account (Karim and Weisz 2010). The multivariate statistical

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<sup>54</sup> This test can only be used in parametric/ normally distributed populations

tools include path analysis, multiple regression, factor analysis, principle component analysis (Rouse and Corbitt 2008). SEM is used to measure the path significance for confirmatory and explanatory modeling, but is said to work best in a confirmatory mode (Chin 1998a; Ringle *et al.* 2010).

### **Type of Analysis: Confirmatory vs. exploratory**

Confirmatory analysis is based on the concept where a set of a priori hypothesized path model has been developed, based on knowledge of some substantive theories which thereafter gets tested or validated against empirical data (Chin 1998a; Guan and Ma 2009; Sosik *et al.* 2009). Therefore, a ‘confirmatory test’ usually starts out by specifying a set of hypotheses for the paths in a causal model and then empirically determining the extent to which the observed data confirms the theoretically proposed conceptual model. This means it requires a strong theoretical background (Henseler *et al.* 2009; Sosik *et al.* 2009); and is concerned with confirming the results of a previous model that have been empirically investigated.

The concept of confirmatory analysis includes Confirmatory Factor Analysis (CFA) which is generally performed to validate the measurement model by validating the relationships between the constructs (Latent Variables (LV)) and their assigned measurement items (assuming they are not correlated; or taking into account the covariance and error correlation among the measurement items) (Goo *et al.* 2009; Guan and Ma 2009).

Exploratory analysis, on the other hand, which is a preliminary analysis, is generally performed in the absence of a strong theoretical background (Guan and Ma 2009). It can be used in early stages of theory development where the research is prediction-oriented (Henseler *et al.* 2009). The exploratory models get tested and validated to help explain predicted (endogenous) construct(s) (Henseler *et al.* 2009), such as success factors. Exploratory analysis commonly uses Exploratory ‘Factor’ Analysis (EFA) which relies on filtering out the initially proposed set of indicators (measurement items) for each LV that turn out to be unacceptable, assuming that the measurement items’ errors are uncorrelated (Chin 1998a; Goo *et al.* 2009).



### **SEM Approaches: CB vs. PLS**

For performing confirmatory or exploratory analysis, SEM includes two statistical approaches: covariance-based (CB-SEM), and variance-based partial least squares (PLS) regression (which is variance-based) ([Urbach and Ahlemann 2010](#)).

**CB-SEM** works with latent variables (LV) where a model's parameters are determined to reproduce an empirically observed covariance matrix. **PLS**, on the other hand, works with a block of variables estimating the latent variables as “an exact linear combination of its indicators” ([Chin et al. 2003, p.199](#)) reflecting a sequence of linear regressions ([Henseler et al. 2009](#)) using a single regression for reflective LV and multiple regression for formative LV. PLS estimates model parameters to maximize the explained variance (or equivalently minimize the error ([Hulland 1999](#))) for all the predicted (endogenous) constructs through a series of ordinary least square (OLS) regressions ([Reinartz et al. 2009; Hair et al. 2012](#)). PLS-Path Modeling is used for “estimating the coefficients of a structural equation system with the partial least squares method” ([Mateos-Aparicio 2011, p.2310](#)).

Despite the distinction of the methodological and statistical point of view between PLS and CB-SEM, PLS can still be considered as a good proxy for CB-SEM ([Henseler et al. 2009; Hair et al. 2011a](#)). Essentially, CB-SEM and PLS can be used alternatively and would produce relatively close results given that good measures and data are used and that the CB-SEM assumptions (which are related to the minimum required sample size, normality and distribution, maximum model complexity, and constructs' measurement items' properties such as their number and being reflective) are controlled for and are all met ([Hair et al. 2011a](#)). Then the “differences in results are primarily a matter of measurement model quality” ([Hair et al. 2011a, p.140](#)).

Unlike CB-SEM, PLS-path modeling does not provide a specific, formal process or technique in calculating “a global” or overall Goodness-of-fit (GoF) criterion ([Hulland 1999; Tenenhaus et al. 2005; Henseler et al. 2009](#)) to determine whether a model has the capacity to provide adequate and accurate predictive results simulating reality. Therefore, researchers have employed other validation approaches while using the PLS (which is considered as “component-based” approach to test the “overall” or a “global

index” for the goodness of a model (Chin 1998a; Karim and Weisz 2010). Fit measures do not relate to how well the latent variables or measurement items are predicted, but relate only to how well the parameter estimates are able to match the sample covariances (Chin 1998a).

PLS has been suggested by some researchers to be suitable for both confirmatory and exploratory analysis (e.g., Chin 1998a; Cyr 2008; Urbach and Ahlemann 2010). However, understanding the purpose and characteristics of each method have lead researchers to have certain preferences as to whether PLS is more suited to exploratory or confirmatory analysis.

Generally, researchers have differentiated between PLS and CB-SEM, based on the purpose for why the study was conducted (Henseler *et al.* 2009; Hair *et al.* 2011a). If the research is prediction-oriented<sup>55</sup> and is for theory building (i.e., exploratory), where propositions are developed and there is a need to explore the relationships between variables (Urbach and Ahlemann 2010) then PLS is the more suitable than CB-SEM (Barclay *et al.* 1995; Komiak and Benbasat 2006; Lee *et al.* 2006; Rai *et al.* 2006; Henseler *et al.* 2009; Sosik *et al.* 2009; Ringle *et al.* 2010; Urbach and Ahlemann 2010; Hair *et al.* 2011a). When research is in its early stages and a new model needs to be explored and validated, then the more suitable test is PLS-path modeling (Mahmood *et al.* 2004; Lee *et al.* 2006).

However, if the research objective is theory testing and confirmation (i.e., “confirming theoretically assumed relationships” (Reinartz *et al.* 2009)) , then CB-SEM is a more suitable method than PLS (Komiak and Benbasat 2006; Rai *et al.* 2006; Henseler *et al.* 2009; Ringle *et al.* 2010; Urbach and Ahlemann 2010; Hair *et al.* 2011a), unless, the CB-SEM assumptions are violated or cannot be met (Reinartz *et al.* 2009; Hair *et al.* 2011a). That is because, in the case where the CB-SEM assumptions are violated, methodological matters (such as “inflated parameters estimates” and large standard errors) become an issue and PLS becomes more robust in producing the results of the

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<sup>55</sup> “The goal of prediction-oriented PLS path modelling method is to minimize the residual variance of the endogenous latent variables in the inner model which accordingly maximize their explained variance ( $R^2$ ) values (Ringle *et al.* 2010).

structural model and thus a preferable alternative (Henseler *et al.* 2009; Reinartz *et al.* 2009; Hair *et al.* 2011a).

According to Joreskog (1974) “Many investigations are to some extent both exploratory and confirmatory, since they involve some variables of known and other variables of unknown composition” (cited in (Anderson and Gerbing 1988, p.411)). In situations of model uncertainty, Asparouhov and Muthén, (2009) refer to Browne’s (2001) article where he advocates exploratory rather than confirmatory approaches, stating:

*“Confirmatory factor analysis procedures are often used for exploratory purposes. Frequently a confirmatory factor analysis, with pre-specified loadings, is rejected and a sequence of modifications of the model is carried out in an attempt to improve fit. The procedure then becomes exploratory rather than confirmatory – In this situation the use of exploratory factor analysis, with rotation of the factor matrix, appears preferable.” (Browne 2001, p.113)*

Asparouhov and Muthén, (2009) suggest that “it is important to extend structural equation modeling to allow less restrictive measurement models to be used in tandem with the traditional CFA models. This offers a richer set of a priori model alternatives that can be subjected to a testing sequence”. (p.398)

#### **3.4.1.2 The chosen approach**

The aim of this research is to confirm the validity of an a priori conceptual model. As mentioned earlier, PLS is generally recommended for exploratory research (i.e., research which gives rise to a model or theory), and CB-SEM is generally recommended for confirmatory research (i.e., research which confirms an a priori model or theory). So, at first glance, CB-SEM may seem to be the better choice for this research.

However, our proposed model is influenced by two well-known models in the IS literature (i.e., Technology Acceptance Model (TAM) (Davis *et al.* 1989) and DeLone and McLean IS success model (DeLone and McLean 2003)). The proposed model also includes the constructs Users’ Tangible Benefits and Perceived Trust, which are first

order constructs, as well as Perceived Overall System Quality, which is conceptualized as a second-order construct. This means that we need to confirm the validity of the two original models combined in the e-government context while also exploring the validity of the two added constructs. Accordingly, the current research seems to be a combination of confirmatory and exploratory research.

In addition, compared to PLS, CB-SEM is more demanding in its underlying assumptions (including the minimum required sample size, maximum model complexity, the number of constructs and constructs being reflective).

Based on the characteristics of PLS and how it is calculated, researchers have suggested several advantages of this approach<sup>56</sup>:

- It supports both exploratory and confirmatory research (Cyr 2008; Urbach and Ahlemann 2010).
- It does not require strong theory. It can be used for theory building, exploration and prediction. It is used in an early stage of theoretical development to test and validate exploratory models and assists researchers explain endogenous construct(s) (e.g., success factors) (Henseler *et al.* 2009; Sosik *et al.* 2009; Urbach and Ahlemann 2010; Hair *et al.* 2011a).
- It is a rigorous tool that provides sufficient results even if the sample size is relatively small (Johansson and Yip 1994; Chin *et al.* 2003; Julien and Ramangalahy 2003; Venaik *et al.* 2005; Henseler *et al.* 2009; Karim and Weisz 2010; Ringle *et al.* 2010; Hair *et al.* 2012).
- It is robust enough to handle measurement error and produce reliable and consistent results even in the existence of outliers and missing values (Chin *et al.* 2003).
- It can be performed with reliable results without the need for the data to be standardized; i.e., it is not seriously affected by the distribution of the data and whether it is normal or not (Johansson and Yip 1994; Chin *et al.* 2003; Julien and Ramangalahy 2003; Venaik *et al.* 2005; Henseler *et al.* 2009; Karim and Weisz 2010; Ringle *et al.* 2010).

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<sup>56</sup> Urbach and Ahlemann (2010) and Reinartz (2009), for example, provide a collective view for a number of reference (PLS-related articles) for the different reason for which PLS was used.

- It can deal more reliably with more complex<sup>57</sup> models where it may be more difficult or unreliable to do with CB-SEM (Venaik *et al.* 2005; Ahuja *et al.* 2007; Pavlou *et al.* 2007; Goo *et al.* 2009; Henseler *et al.* 2009; Ringle *et al.* 2010; Urbach and Ahlemann 2010; Hair *et al.* 2011a).
- It can be used to estimate hierarchical construct models (i.e., models that have one or more global construct- a global construct involving more than one dimension) (Williamson and Bow 2002; Venaik *et al.* 2005; Henseler *et al.* 2009; Wetzels *et al.* 2009; Hair *et al.* 2012).
- It delivers an LV score whether there was one or several indicators (manifest variables). (Henseler *et al.* 2009; Hair *et al.* 2011a).
- It is Robust even in the case of the existence of multicollinearity<sup>58</sup> of explanatory variables, whether in the measurement or structural model (Mateos-Aparicio 2011).<sup>59</sup>

For the reasons stated above and given the complexity, type, and characteristics of the proposed conceptual model including the use of reflective constructs and the possible use of small sample sizes, PLS-path modeling was chosen as it appears to be the more flexible, suitable and better alternative (Henseler *et al.* 2009; Reinartz *et al.* 2009; Hair *et al.* 2011a).

### 3.4.2 The common steps and the related concepts of PLS validation in reflective models

To understand the results presented, it is necessary to understand the concepts and terminology used in PLS-path modeling, therefore, this section provides a brief explanation of PLS-path modeling. Figure 3-2 presents the proposed conceptual model as displayed in Smart-PLS<sup>60</sup>, it can be used as a reference to aid in the understanding of the concepts presented in this section.

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<sup>57</sup> E.g., a complex model with a large number of LV, indicators, and relationships (paths) which contains several layers of constructs and direct and non-direct affects to some constructs. It may also contain both formative and reflective constructs (Henseler *et al.* 2009; Urbach and Ahlemann 2010).

<sup>58</sup> Multicollinearity refers to a situation in which two or more explanatory variables (predictors) in a multiple regression model are highly linearly related/ correlated.

<sup>59</sup> The difference will be explained in the next chapter

<sup>60</sup> Ringle, C. M./Wende, S./Will A. (2005): SmartPLS 2.0 (beta), [www.smartpls.de](http://www.smartpls.de).

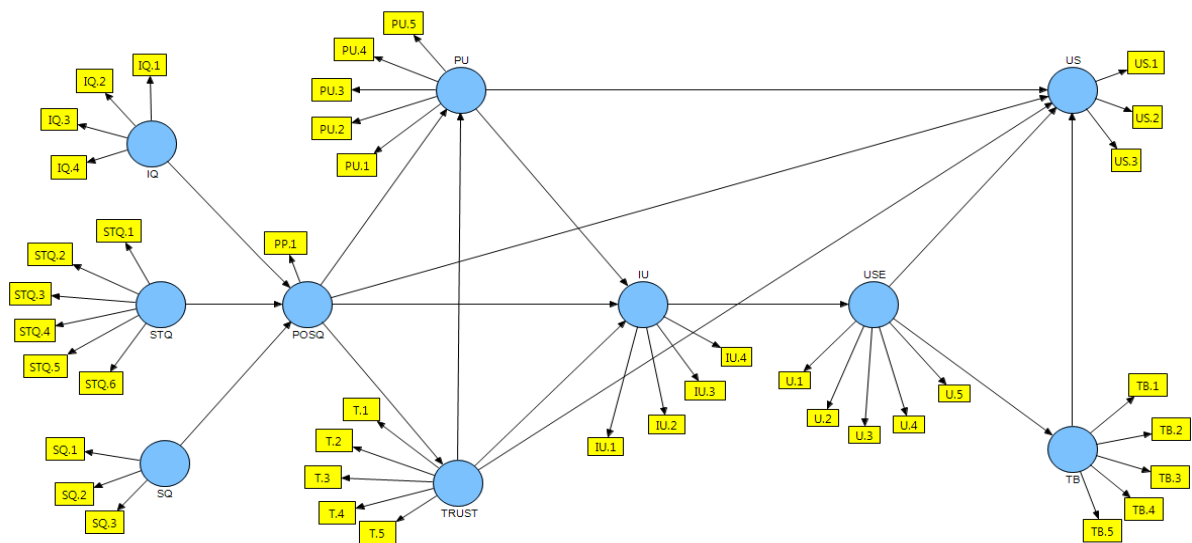


Figure 3-2: The Structural Model and Measurements

In PLS-path modeling statistical analysis, one must distinguish between an **outer** and an **inner** model which are referred to as the **measurement model** and the **structural model**, respectively.

An **outer or a measurement model** reflects the relationship between each ‘unobserved’ construct or latent variable (LV) (blue circles), that needs to be predicted, and the independent ‘predictors’ which are the ‘indicators’ or ‘observed measurement items’ (yellow squares) that are also referred to as ‘manifest variables’ (MVs) (Henseler *et al.* 2009; Ringle *et al.* 2010). The factorial analysis is applied in the analysis of the measurement (outer) model (Mateos-Aparicio 2011).

The measurement model could be one of two kinds: a **formative** or a **reflective model** (Hulland 1999), or even a combination of both. In a **reflective model**, the LV causes the MV to happen, i.e., the MVs reflect the ‘**effect**’ of the LV; and the values that appear on the paths leading from an LV to each of its corresponding MVs are called ‘**factor loadings**’ (Henseler *et al.* 2009; Ringle *et al.* 2010).

Conversely, in a **formative model** the MVs predict or cause the LV to happen, i.e., the relation between the MVs and the corresponding LV is **causal** and the LV is considered to be “a combination of its indicators”. In a formative measurement model, the values that appear on the paths that are coming from each of the MVs to their corresponding

LV, reflect the ‘**weight**’ of effect for each MV in relation to its LV and hence are called the ‘**weight coefficients**’ (Henseler *et al.* 2009; Ringle *et al.* 2010).

Deciding whether the indicators should be formative or reflective is very much dependent “on the nature of the casual relationship between the indicator and the LV” (Bollen 1989; Hulland 1999; Henseler *et al.* 2009; Ringle *et al.* 2010). In the proposed conceptual model, this relationship has been deemed to be a reflective model, so the paths in the measurement (outer) model in Figure 3-2 are shown pointing from the LV to the MVs.

**An inner or a structural model**, is a set of directed paths reflecting a “causal chain” between constructs or LVs, (Henseler *et al.* 2009); where the relationship originates from one construct or LV and ‘points’ to another LV. A structural model is usually a hypothesized theoretical model (Ringle *et al.* 2010). Given the “predictive” nature of the paths, the relationship between the LVs in a structural model is considered “formative”. Any LV that is independent and predicts another LV is referred to as an “**exogenous**” LV, and any LV that is predicted or dependent on or explained by another LV is referred to as “**endogenous**” LV (Chin *et al.* 2003; Henseler *et al.* 2009; Hair *et al.* 2011a).

In the structural (inner) model, a ‘**path analysis**’ approach is applied to analyze the parameters (Mateos-Aparicio 2011), so the values that appear on the paths between each of the LVs in the structural model are called ‘**path coefficients**’. A path coefficient is the direct effect of one exogenous LV on another endogenous LV, i.e. it is the amount of change (increase/decrease) in the endogenous LV when the exogenous LV increases by 1 standard deviation (assuming standardized data). For example, if a particular path coefficient was X, this means that an increase of 1 SD in the exogenous LV would result in an increase of X in the SD of the dependent variable.

The validation process for a particular model has been suggested to take place in two stages separating measurement and structural model assessments (Chin *et al.* 2003; Henseler *et al.* 2009; Karim and Weisz 2010; Ringle *et al.* 2010; Hair *et al.* 2011a). This is conducted to ensure initially that the measurement items of each construct are reliable

and that they are valid before attempting to draw conclusions about the nature of the constructs' relationships (Hulland 1999). Before validating the goodness of the structural (inner) model, we need to first assess the goodness of the measurement (outer) model. In doing so, we need to test, both, the outer model's **validity** and **reliability**. It is important to note that though the assessment criteria in the statistical analysis differs based on whether the measurement model is reflective or formative (Henseler *et al.* 2009; Ringle *et al.* 2010; Urbach and Ahlemann 2010). Given that our proposed measurement model is completely reflective, the assessment criteria we discuss in this chapter, with regards to the measurement model, are for reflective models.

### 3.4.2.1 Assessment of the measurement model

1. **Validity**<sup>61</sup> refers to the extent of the accuracy of the assessment in which the nominated assessment measurement items corresponds to a particular construct or LV as predicted by a theory. If an assessment measurement is valid then the full content of a concept's definition is included in the measure such that the measuring instrument is actually measuring the properties that it is supposed to measure, so that we can ensure there is no bias or distortion.

To assess the validity of the outer model the **convergent** and **discriminant validity** are tested. **Convergent validity** is concerned with testing the degree of correlation between those items that are supposed to be 'theoretically' related with each other. It "signifies that a set of indicators represents one and the same underlying construct, which can be demonstrated through their uniattributeality" (Henseler *et al.* 2009, p.299).

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<sup>61</sup> In conducting the factor analysis, content and construct validity are tested. Content validity involves assessment of the indicators and their related LV such that there is a common agreement among researchers that an instrument has content validity when it contains all the measurement items that cover all the aspects that should be measured for a particular variable (construct) (Das *et al.* 2008; Prous *et al.* 2009; Mishra and Bhaskar 2010). In other words, the content validity of an instrument refers to the extent to which it provides sufficient coverage of the measures used in the investigation or study where all the variables that share the same concept are included under the study (Cooper and Schindler 2003; Mishra and Bhaskar 2010). The construct validity, on the other hand, reflects the aptitude of the measurement items in adequately measuring a proposed theoretical construct (Prous *et al.* 2009; Mishra and Bhaskar 2010).



**Convergent validity** is measured by the **Average Variance Extracted (AVE)**, which reflects the proportion of the explained variance that is captured for a particular LV in relation to the amount of variance due to measurement error. AVE ranges between 0 and 1, and is considered acceptable at a minimum threshold of .5 (Fornell and Larcker 1981; Henseler *et al.* 2009). An AVE above .5 means that, on average, a LV is able to explain more than half of the variance of its indicators (Henseler *et al.* 2009). If the AVE is less than .5, then the variance due to measurement error is greater than the variance due to the construct. The convergent validity of the construct, in this case, is questionable.

**Discriminant validity**, on the other hand, refers to the level of correlation between measurement items of one construct with measurement items of other unrelated construct(s), which theoretically should not be correlated with one another. This test shows how much the variance is attributed to a block of constructs where two “conceptually different” constructs should be sufficiently different to one another (Henseler *et al.* 2009). Discriminant validity determines whether the factor loadings are well established. There are two ways for testing the discriminant validity, the **Fornell-Larcker-Criterion** and **cross-loadings** where the former is performed on the construct level while the latter is performed on the indicator (measurement item) level (Henseler *et al.* 2009).

The **Fornell-Larcker-Criterion** is based on the concept that the measurement items are able to explain more variance of their assigned LV than other measurement items would. So when there is discriminant validity, the AVE of each LV exceeds the squared correlations with all other LVs, or, if the square root of the variance is higher than extracted the correlation between the other LVs. This means that each LV shares more variance with its own block of measurement items than with any other LV (Henseler *et al.* 2009).

The second measurement for discriminant validity is concerned with the assessment of the loading of indicators, namely, the **cross-loading** and **factor loading**. The **cross-loadings** are concerned with determining whether the loadings of the measurement items on their assigned LV are the highest compared to the loadings of the other

measurement items on this particular LV. In other words, the loading of an indicator that is attributed to an LV should be higher than its loading on all other LV (Fornell and Larcker 1981; Henseler *et al.* 2009). As with the assessment of the factor loadings, each indicator on its assigned LV should be higher than .7 which indicates that each indicator contributes in explaining at least 50% of the variance in the corresponding LV (Chin 1998a; Hair *et al.* 1998; Chin *et al.* 2003; Au *et al.* 2008).

2. **Reliability** refers to the level of confidence that can be placed in the proposed instrument in providing the same numeric values of the results throughout repeated or replicated measurements. It shows the extent to which a measurement gives consistent results. This is referred to as the **internal consistency reliability**. The reliability also reflects the proportion of indicator variance that is explained by the LV and reflects the indicator reliability. To assess the reliability of the measurement model, which is particularly done in reflective models, we test the **internal consistency reliability** and **indicator reliability**.

The **internal consistency reliability** is measured using **Composite Reliability** (for Dillon Goldstein's Rho) and **Cronbach's alpha**. The composite reliability assesses whether all of the indicators measure the same LV. The values range from 0 to 1, and the minimum acceptable threshold value should be .7 to indicate internal consistency (Nunnally 1978). Cronbach's alpha is generally believed to indirectly indicate the degree to which a set of indicators measures a single uni-attributed LV. Cronbach's alpha also ranges from 0 to 1 and the minimum acceptable threshold should be .7 to indicate internal consistency. However, a higher alpha is desirable and .8 is considered to be good and .9 which is considered to be excellent.

To assess the individual **indicator reliability**, the factor loadings of the indicators or measurement items on their respective LV are examined to ensure that the variance explained by each measurement item associated with a particular LV is greater than the variance explained by any other measurement items associated with another LV. In general, researchers assume that an LV should be able to explain a considerable amount of variance for each indicator, which they assume to be at least 50%, and should eliminate a "reflective" indicator from the measurement model if its loading was less than .4 (Henseler *et al.* 2009). To consider an item loading to be reliable, it has to

exceed the threshold of .7 and the squared loading (i.e., the variance explained for the indicator) has to be higher than .5.

Table 15 presents a general summary of the assessment criteria used to determine the validity and reliability of a reflective, measurement (outer) model (Henseler *et al.* 2009; Urbach and Ahlemann 2010).

Table 15: The assessment criteria to determine the validity and reliability of a reflective outer model	
➤ <u>Measurement <i>reliability</i> of indicator</u>	
○ <b>Internal consistency</b>	
<b>Criterion</b>	<b>Description</b>
▪ <b>Cronbach <math>\alpha</math></b>	The minimum acceptable threshold is .7, preferably is more than .8.
▪ <b>Composite reliability</b>	The composite reliability must not be lower than .7.
○ <b>Indicator reliability</b>	
<b>Criterion</b>	<b>Description</b>
▪ <b>Factor loading</b>	Absolute standardized outer (component) loadings should be significant at the .05 level and higher than .7. In exploratory research, lower threshold are acceptable.
➤ <u>Measures of <i>validity</i> of the factors of the LV</u>	
○ <b>Convergent validity</b>	
<b>Criterion</b>	<b>Description</b>
▪ <b>AVE</b>	The average variance extracted should be higher than .5.
○ <b>Discriminant validity</b>	
<b>Criterion</b>	<b>Description</b>
▪ <b>Fornell–Larcker criterion</b>	In order to ensure discriminant validity, the AVE of each LV should be higher than the squared correlations with all other LV, which means that each LV shares more variance with its own block of indicators than with any other LV.
▪ <b>Cross-loadings</b>	If an indicator has a higher correlation with a LV than with its respective LV, the appropriateness of the model should be reconsidered.
➤ <u>Measures of <i>unidimensionality</i> of the LV</u>	
<b>Criterion</b>	<b>Description</b>
▪ <b>Exploratory factor analysis (EFA)</b>	Measurement items should relate to their associated LV and have the highest loading on only one LV which is the one that it is theoretically supposed to measure. An item loading is usually considered high if the loading coefficient is above .6 and considered low if the coefficient is below .4.

### 3.4.2.2 Assessment of the structural model

The assessment of the structural model includes estimating the **path significance** between the LVs, and estimating the **explained variance ( $R^2$ )** for the endogenous LVs (Henseler *et al.* 2009; Karim and Weisz 2010).

#### **The path significance**

The path significance of the structural model is estimated by using the **Bootstrapping** procedure, which is a resampling technique that provides information about the confidence intervals for all parameter estimates which includes an estimate of the shape, spread, and bias of the sampling distribution of a specific statistic (Henseler *et al.* 2009). The bootstrap procedure produces t-values for each path in that model. During the bootstrap procedure, it creates a large number of samples, treating each ‘recreated’ sample as if it represents the population. This is done by randomly drawing cases from the original sample (Henseler *et al.* 2009). Therefore, ideally, the pre-specified number of samples for the bootstrap should be equivalent to the number of cases (observations) of the original sample (Henseler *et al.* 2009). Generally, the larger the number of resampling, the better and more reliable the t-statistics are.

#### **The explained variance ( $R^2$ )**

The explained variance ( $R^2$ ) is the proportion of the variance in each predicted (endogenous) variable that can be explained. Henseler *et al.*, (2009) suggest that low  $R^2$  values mean that the model is unable to explain the endogenous LV which in turn sheds some doubts on the theory proposed in the tested model. According to Chin (1998),  $R^2$  values of 0.67 are substantial, 0.33 are moderate, and 0.19 are weak in PLS path models. The most important  $R^2$  values that need to be assessed are the one for those key target LVs that need to be predicted (e.g., User Satisfaction (US), Intention to Use (IU), or Loyalty). The  $R^2$  values for the other LVs in the model are not as important because they serve more as mediators rather than being key constructs which are intended be predicted.

#### **The effect size ( $f^2$ )**

In addition to the previous two traditional tests, researchers and practitioners, who use PLS-path modeling, can also evaluate their hypothesized path model of direct effects. They can perform additional analyses regarding mediating and moderating effects to

understand more about possible unreal effects or suppressor effects (Henseler *et al.* 2009). This test is generally conducted manually and is referred to as the **Cohen (1988) F-test**<sup>62</sup>. The F-test is used to determine the “strength of the moderating” effect size ( $f^2$ ) by adding or removing a construct to a previously tested model and calculating the change in the explained variance  $R^2$  of the ‘ultimate’ endogenous latent dependent variable (DV) (Henseler *et al.* 2009; Henseler and Fassott 2010). For example, a researcher might test a ‘full model’ (which included a particular moderating LV) and calculate the  $R^2$ . Then exclude the moderating LV and recalculate the  $R^2$  in the reduced model to see the change of percentage in the explained variance of the ultimate DV (Au *et al.* 2008).

Generally,  $f^2$  effect sizes of 0.02, 0.15, and 0.35 are regarded as small, medium, and large, respectively (Cohen 1988) cited in (Chin *et al.* 2003; Henseler *et al.* 2009; Henseler and Chin 2010). However, a low  $f^2$  should not always be ignored as it doesn’t necessarily mean that the corresponding moderating effect is trivial; rather, a small interaction effect can still be regarded as meaningful to some extent (Chin *et al.* 2003).

### **The Prediction Relevance ( $Q^2$ )**

The Prediction Relevance ( $Q^2$ ) or the Stone-Geisser’s  $Q^2$  test (Geisser 1974; Stone 1974) reflects the model’s ability to predict the measurement items of any endogenous LV in the model (Henseler *et al.* 2009). The predictive relevance can be measured using the blindfolding procedure (Tenenhaus *et al.* 2005), specifically applied for endogenous LV of *reflective* measurement models (Henseler *et al.* 2009).

The blindfolding algorithm can sometimes be called “boot-cross” because it is a “cross-validation” (CV) technique used with standardized data. It is somewhat a combination between PLS algorithms and bootstrapping. This technique gives a  $Q^2$  statistic which is a criterion that tells how good the model is in predicting missing values in the data set or how well the omitted data are estimated by the model. It blind-folds some of the data set (say for instance every seventh one) and makes it blank then attempts to predict the model which is then compared to the actual model (without the missing values)

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<sup>62</sup> The Cohen (1988) formula of the effect size  $f^2$  is :  $f^2 = (R^2_{\text{full model}} - R^2_{\text{reduced model}}) / (1 - R^2_{\text{full model}})$

(Tenenhaus *et al.* 2005). The predictive relevance<sup>63</sup> of  $Q^2$  is measured by comparing the sum of the squares of prediction errors (SSE) to the sum of the squares original “omitted” values (SSO).  $Q^2$  values of 0.02, 0.15, and 0.35 reflect small, medium, and large predictive relevance of a certain LVs, and, of course, the higher  $Q^2$  is the better its predictive relevance (Henseler *et al.* 2009; Urbach and Ahlemann 2010). So when  $Q^2 > 0$ , that means that the model has predictive relevance with respect to a particular explanatory LV and it would be considered good when the predicted measurement items are very close to the original data. Likewise, when  $Q^2 \leq 0$ , this means that the model lacks predictive relevance; i.e., the blind-folded measurement items compared to the actual ones reveal poor prediction relevance and the difference between the actual and predicted would be no better than what would have been guessed (Henseler *et al.* 2009; Urbach and Ahlemann 2010). Practically, the values for  $Q^2$  are almost the same as the values of  $R^2$ .

Table 16 summarizes the assessment criteria for the structural (inner) model validity (Henseler *et al.* 2009; Urbach and Ahlemann 2010).

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<sup>63</sup> The  $Q^2$  can be measured to be used for two things; the CV redundancy and CV communality where the former measures the predictive relevance of each separate regression model within the structure model and the latter measures how good is the block of indicators (the LV) to predict (by itself) the missing values (Tenenhaus *et al.* 2005; Henseler *et al.* 2009).

**Table 16: The assessment criteria for the structural model validity**

➤ Measuring the *path significance*

Criterion	Description
▪ <b>Path coefficient</b>	Path coefficients between the LVs should be analyzed in terms of their significance (using t-values produced by bootstrap), algebraic sign (to know if the relation between the LVs are positive or negative), and magnitude.

➤ Measuring the *explained variance ( $R^2$ )*

Criterion	Description
▪ <b><math>R^2</math></b>	Measures the explained variance of an endogenous LV relative to its total variance. Values of approximately <b>.67</b> , <b>.33</b> , and <b>.19</b> are considered substantial, moderate, and weak, respectively.

➤ Measuring the *effect size of moderating effects ( $f^2$ )*

Criterion	Description
▪ <b><math>f^2</math></b>	Measures whether an independent LV has a significant impact on a dependent LV. The predictor variable's values of <b>.02</b> , <b>.15</b> , and <b>.35</b> reflect a low, medium, & large effect, respectively, in the structural model.

➤ Measuring the *predictive relevance ( $Q^2$ )*

Criterion	Description
▪ <b><math>Q^2</math></b>	Measures the predictive relevance of a block of indicators (using the blindfolding technique). The proposed threshold value for a tested model is $Q^2 > 0$ , where higher $Q^2$ reflects a higher predictive relevance. Predictive relevance values of <b>.02</b> , <b>.15</b> , and <b>.35</b> are considered small, medium, or large, respectively. Any modifications to a model may be evaluated by comparing the $Q^2$ values.

When assessing the validity of a structural model using PLS, IS research papers do not commonly use the predictive relevance, although it is used in marketing research. In fact, most IS research articles that use PLS to assess a structural model use only the path significance (using t-value) and the explained variance ( $R^2$ ). See, for example, (Chin *et al.* 2003; Miranda and Saunders 2003; Karimi *et al.* 2004; Burton-Jones and Straub 2006; Au *et al.* 2008; Wetzels *et al.* 2009; Karim and Weisz 2010). So, given the nature of our model and the context of our research, we have used only the path significance and the explained variance ( $R^2$ ) to assess the structural model in our proposed model (CEM).

### 3.4.2.3 Assessment of higher-order constructs

The assessment of second-order constructs generally follow the same steps conducted in assessing the formative/reflective first-order constructs. The second-order construct is considered as an ordinary LV and the first-order constructs serve as manifest variables (indicators) to that dimension (which is the second-order constructs) (Chin 1998a; Hair *et al.* 2011a). Accordingly, if the first-order constructs were caused by the second-order construct, then the assessment process of the second-order construct should be carried out in a similar method to that of reflective LV. Similarly, if first-order latent variables cause or form the second-order variable, then the assessment procedure that should be performed to the relation between the first and then second-order constructs should be the same as that used in assessing formative latent variables (Chin 1998a; Hair *et al.* 2011a). Since IQ, STQ, and SQ, in our model, are all aspects of or form the perceived overall system quality (POSQ), then the second-order (POSQ<sub>2</sub>) construct should be assessed in the same process as was employed for formative latent variables (or a measurement model). In such cases, the typical issues of assessments that are looked at are related to:

- 1- The Nomological<sup>64</sup> validity<sup>65</sup> such that the formative index is supposed to behave within a net of hypotheses as expected (Henseler *et al.* 2009).
- 2- The weights of each indicator that result from the PLS algorithm which reflect the importance of each indicator to the latent variable (Henseler *et al.* 2009; Hair *et al.* 2011a).
- 3- The indicator validity by testing the significance of the correlation between a latent variable and its indicators which is tested by using the bootstrap procedure, as explained earlier. Significant weights mean that there is empirical support to keep all indicators (Henseler *et al.* 2009; Hair *et al.* 2011a).
- 4- Multicollinearity between the indicators, which means that there is a higher correlation between indicators than of that between indicators and their corresponding latent variable (Henseler *et al.* 2009; Hair *et al.* 2011a). A common test used for such issues is the **Variance Inflation Factor** (VIF) which provides

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<sup>64</sup> “Nomological” network is a representation of the concepts (constructs) of interest in a study, their observable manifestations, and the interrelationships among and between these.”. In other words, the interrelations between specific constructs within a logical network (model).

<sup>65</sup> “Nomological validity” is a form of construct validity which is related to “the degree to which a construct behaves as it should within a system of related constructs called a nomological net”.



an index that measures how much the variance (the square of the estimate's standard deviation) of an estimated regression coefficient is increased because of collinearity, or “how much of an indicator's variance is explained by the other indicators of the same construct” (Urbach and Ahlemann 2010), p20). Some researchers suggest a threshold of 10 for VIF (Urbach and Ahlemann 2010) while others are more conservative and suggest that the VIF should not exceed the threshold of 5 (Henseler *et al.* 2009; Hair *et al.* 2011a), otherwise, the measurement model should be questioned or reconsidered. A VIF that is higher than 5 can cause indicators to be insignificant (Hair *et al.* 2011a). Nevertheless, it is worth noting that insignificant indicators should not be discarded based on the statistical results as this may lead to a change of meaning (Urbach and Ahlemann 2010); rather, they may be considered if they are theoretically and conceptually justified (Henseler *et al.* 2009).

### **3.4.3 The analytical approach and steps for validating the model**

As mentioned earlier in Section (3.3.3.1), we considered controlling for the government agency. As it was believed that this would help to better understand the interrelations between the constructs and the context in which the model can be used. EGS generally differ in the amount and type of services or information they provide in each government agency. So different subsets of data may have different responses because of the information/service mix they have experienced. Therefore, testing the model with each of these subsets may identify parts of the model that are influenced by the mix of information and services.

The recruitment process initially seemed very effective with over 800 hits on the survey site in 12 months period. However, due to the voluntary nature for the online survey, there were many incomplete or partial surveys that needed to be discarded. Nonetheless, 401 surveys were completed and the rest were either partially completed or accounted for as responses, though the respondents did not go beyond the introduction or demographic pages. All respondents who answered “no” for using an EGS were automatically eliminated. Table 17 shows the number of responses for the government agencies in more detail.

Table 17: The number and name of the government agencies that were used by the respondents		
	The agency	Number of responses
1	MOI- Ministry of Interior	196
2	EDU- Education Institution	74
3	PACI- The Public Authority for Civil Information	38
4	OTHER	35
5	CSC- Civil Service Commission	27
6	MHE- Ministry of Higher Education	16
7	MEW- Ministry of Electricity and Water	15

Respondents who selected “Other” in response to government agency, in most cases specified the agency’s website they used. These included the Ministry of Finance (MOF), Ministry of Communication (MOC), Ministry of Education (MOE), Ministry of Justice (MOJ), Ministry of Public Work (MPW), and the Kuwait Oil Company (KOC).

However, before we can decide what small or reasonable refers to or how to create subset groups of the available data, we need some sort of a guideline to determine a benchmark for the lowest acceptable sample size to carry out the statistical analyses.

There are some researchers who recommended the “ten times” rule of thumb to estimate the minimum required sample size in order to produce robust PLS-path modeling estimations (Barclay *et al.* 1995). The rule suggests that the calculated sample size be should be at least equal or the larger to the following numbers:

- (1) ten times the number of indicators of the scale with the largest number of formative indicators, or
- (2) ten times the largest number of structural paths directed at a particular construct in the inner path model.

Though other researchers debate the efficacy of this rule (Goodhue *et al.* 2006; Henseler *et al.* 2009), it is still being used and applied successfully by a number of researchers (Hair *et al.* 2011b). Therefore, we choose to follow the ‘ten times’ rule. Since we don’t have formative indicators in our proposed model, we need to use the second approach to

estimate roughly the minimum acceptable sample size. So, for our study and based on our proposed model, the minimum accepted sample size should not be less than 60 records because the largest number of paths directed to a particular construct in our model equals 6 (POSQ → Trust → PU → IU → Use → TB → US).

Our minimum sample size of 60 respondents means that it is not possible to use all the sub-groups shown in Table 17 in statistical analysis, because several have less than 60 respondents. However, some of these sub-groups could usefully be grouped together as shown in Table 18. Consequently, the set of sub-groups were distinguished based on considering two things, 1- the type of institution, 2- the sample or group size. Table 18 shows the differentiated sub-groups and the sample size for each group.

Table 18: The groups classification as sub-samples of data		
	Group	Sample size
1	All data this is including different types of government agencies plus the “2 governmental educational institutions”	401
2	All data minus the ministry of interior (MOI)	205
3	Ministry of interior (MOI)	196
4	Only the government agencies but minus the MOI	131

In view of the created groups, to test the proposed conceptual CEM we conduct a number of steps in order to reach the final conclusion of the ‘appropriate’ revised model. Table 19 shows the major steps and the reasons for which each step is conducted.

Table 19: The main steps for refining the CEM based on the results to produce the final revised model			
Step	What will be done	Objective	Decision based on the results
1	Compare the initial proposed model (CEM), using all collected data, conceptualizing EGS system performance as being a higher-order construct (i.e., overall construct), once measured as a second-order construct with the repeated indicators approach <sup>66</sup> (i.e., aggregate IQ, STQ, and SQ indicators which are 13 indicators and reassign them to OSPQ), and next as a first-order construct with one general indicator <sup>67</sup> reflecting the overall perception of the EGS.	To see which is better in terms of significance, path correlation, and explained variance, application, etc.	Select the model that is deemed to be better and list the justification for this choice
2	Compare the results of the three sub-groups of data, which are group 2, 3, and 4 as identified in Table 18.	To see how the model behaves with more than one group and confirm the significance of the relationships in the model	If needed, perform deeper analysis to understand more of the relation between constructs
3	Discussing the revised model CEM based on the validation results	To confirm the final version of the model based on the results and detailed analyses.	Introduce CEM after excluding the paths that were insignificant.

<sup>66</sup> It is a commonly used technique for measuring higher-order constructs in hierarchical component models (Wetzels *et al.* 2009; Akter *et al.* 2010; Turel *et al.* 2010; Ringle *et al.* 2012). In order to use this approach, the manifest variables (indicators) of the first-order and second-order constructs must be reflective (Westerlund 2009), which means that it is applicable in our model. There is another approach that can equally be applied is based on using the first-order construct scores as indicators to the second-order construct instead of the using the first order constructs in the model. <http://warppls.blogspot.com/2010/06/using-second-order-latent-variables-in.html>

<sup>67</sup> There were many studies that used single-item construct while using PLS-SEM and they were widely accepted and published in highly-rated journals (Ringle *et al.* 2012).

Having explained the details of analyses undertaken to validate the proposed conceptual CEM, it is noteworthy that there is a small segment of proposed model that will not be included as part of the validation process. As mentioned earlier and shown in Figure 2-14, the proposed conceptual CEM contains both forward paths and feedback loops. In addition, there are hypotheses associated with both the forward paths and the feedback loops, as shown in Table 10. While we believe these feedback loops and their associated hypotheses are valid, it is beyond the scope of the current research to test them as explained below.

The forward paths could be tested using a single snapshot of data and statistical techniques such as PLS as discussed in the above section. However, the feedback loops can only be tested using the same sample of users repeatedly in a longitudinal study. Nonetheless this poses some serious problems.

First, to validly test the model we cannot force users to interact with the system more frequently than they would normally do because the model assumes that the use of the system is voluntary.

Second, the testing of the model requires that the same users engage in more complex tasks to ensure that the service quality constructs are adequately measured. The model assumes that some tasks will involve back-end operations carried out by government employees, for example, a person applying for a passport renewal would enter the request online but the request needs to be completed by a government employee. Hence, to adequately measure the service quality we need to have sufficient users engaged in such tasks. However, these tasks may be conducted very infrequently. In the case of a passport renewal this might take place once every five or ten years. Consequently, effective testing of the feedback loops requires monitoring the same users carrying out tasks over perhaps a five-year cycle. Also, it is extremely difficult to get a sample of users who would engage in a repeated longitudinal study over a long period of time.

Therefore the results presented in the following chapter will only cover the forward paths and their associated hypotheses. The longitudinal study to test the feedback loops will need to be conducted at some future time.

### **3.4.4 Addressing the issue of potential threats to validity**

For any research, there exist some potential threats to its validity. To ensure the rigor, credibility, and validity of a particular research, these issues need to be addressed adequately. The way of how the research was designed, and how the data was collected and handled is very important to the validity of the research. The potential threat to validity also includes the existence of missing data and outliers in the research. The ways chosen in each research to handle and treat these issues also affect its validity. This section addresses the issues of the potential threats of validity and discuss each of them its own right.

#### **3.4.4.1 Missing values**

Researchers usually conduct survey-based research due to time and other constraints and attempt to collect data that is random and representative of the characteristics of the population under investigation. However, researchers have little, if no, control over the occurrence of missing data, which was found to occur quite commonly in survey-based research studies ([Karanja \*et al.\* 2013](#)). Missing data refers to those values that have not been collected or reported by the respondent for one reason or another in a particular study.

Besides mistakenly missing some questions, there are several other reasons for the occurrence of missing values in the survey-based research. These reasons include ([Karanja \*et al.\* 2013](#)):

- 1- the respondents' unwillingness to answer some questions (e.g., level of income, or ethnic background),
- 2- inability to respond to certain questions because of its un-applicability (e.g., years of marriage for unmarried respondents),
- 3- failure to finish some sections due to time limitations,
- 4- lack of knowledge or interest on the subject,
- 5- starting and failing to finish the questionnaire,
- 6- faulty or malfunctioning data collection equipment,
- 7- incorrect data entry procedures

The existence of missing values in study is regarded as a threat to its validity because it caused bias to the collected data ([MacKenzie and Podsakoff 2012](#)). The data will inevitably lack to some extent the ability and credibility in representing the actual

characteristics of the population under investigation. Of course this is very much dependent on the type and importance of information and most importantly the amount of missing data and how it is handled later on.

Despite the importance of the issue of missing value and how it affects a research, it has been suggested that it has been overlooked in the Management Information Systems (MIS) literature (Karanja *et al.* 2013). There is a need to encourage researchers to address the issue of missing data through reporting the missing values, the treatment techniques and the way in which the missing values were handled, and the justification for adopting the specific technique (Karanja *et al.* 2013). The appropriateness of choosing a particular technique affects the rigor and quality of MIS survey-based research.

To minimize the chances of having missing values, in this study, due to unintentionally or mistakenly unanswered questions, the respondents were not able to proceed to the following question before they answered the previous question. The online questionnaire was created to prompt the respondent to complete any question that was left unanswered. For those respondents who were not able to give an opinion due to their lack of experience on a particular task or type of service, the “I don’t know/Not applicable” (NA) option was added to the Likert scale. However, despite the inclusion of NA answers, these could be considered to reflect values in their own right; researches could still argue and regard them as missing values.

Although it has been suggested in the literature that PLS is robust on missing values, we checked all the collected records of the percentage of questions answered with NA for each measurement item and for each construct. We identified that there was the highest percentage of “missing values” equal to 25.7% for the SQ3 indicator - which asks the respondents about their rating on the completion of their online request for being finalized by the employees in the assigned time frame. We infer the high NA responses are either due to lack of experience or to the limited options of such services where they were finalized by employees. This is because the launching of EGSs in the different government agencies in Kuwait is relatively recent and still needs to go through higher maturity stages. Most of the NA answers (or missing values) for SQ3 were found in the

MOI responses which form approximately half the responses collected. The rest of the “missing values” did not resemble a big issue as most indicators had a very low percentage of “missing values” as shown in the Table 20 below.

Table 20: Table of missing values						
Construct	Item	missing values for each item out of 401 responses	% of missing values/item	missing values / construct	Total data points / construct	% of missing values / construct
Inf. Q	IQ1	5	1.25%	16	1604	1%
	IQ2	1	0.25%			
	IQ3	5	1.25%			
	IQ4	5	1.25%			
Tech. Q	STQ1	0	0.00%	88	2406	3.7%
	STQ2	2	0.50%			
	STQ3	6	1.50%			
	STQ4	3	0.75%			
	STQ5	62	15.46%			
	STQ6	15	3.74%			
Serv. Q	SQ1	1	0.25%	130	1203	10.8%
	SQ2	26	6.48%			
	SQ3	103	25.69%			
Overall	OPSQ	4	1.00%	4	401	1 %
Trust	T1	5	1.25%	206	2005	17.1%
	T2	46	11.47%			
	T3	49	12.22%			
	T4	62	15.46%			
	T5	44	10.97%			
Perceived Usefulness	PU1	3	0.75%	19	2005	0.9%
	PU2	2	0.50%			
	PU3	6	1.50%			
	PU4	6	1.50%			
	PU5	2	0.50%			
USE	U1	5	1.25%	75	2005	3.7%
	U2	5	1.25%			
	U3	38	9.48%			
	U4	9	2.24%			
	U5	18	4.49%			
User Sat.	US1	8	2.00%	14	1203	1.2%
	US2	4	1.00%			
	US3	2	0.50%			
Tan. Ben.	TB1	5	1.25%	63	2005	3.1%
	TB2	4	1.00%			
	TB3	7	1.75%			
	TB4	35	8.73%			
	TB5	12	2.99%			
Intent.	IU1	7	1.75%	42	1604	2.6%
	IU2	15	3.74%			
	IU3	12	2.99%			
	IU4	8	2.00%			
total missing data points=				657		
total data points=				16441		
percentage of missing data points of the total=				4%		



The table shows that, besides SQ3, the rest of indicators appear to have small numbers of NA or “missing values”.

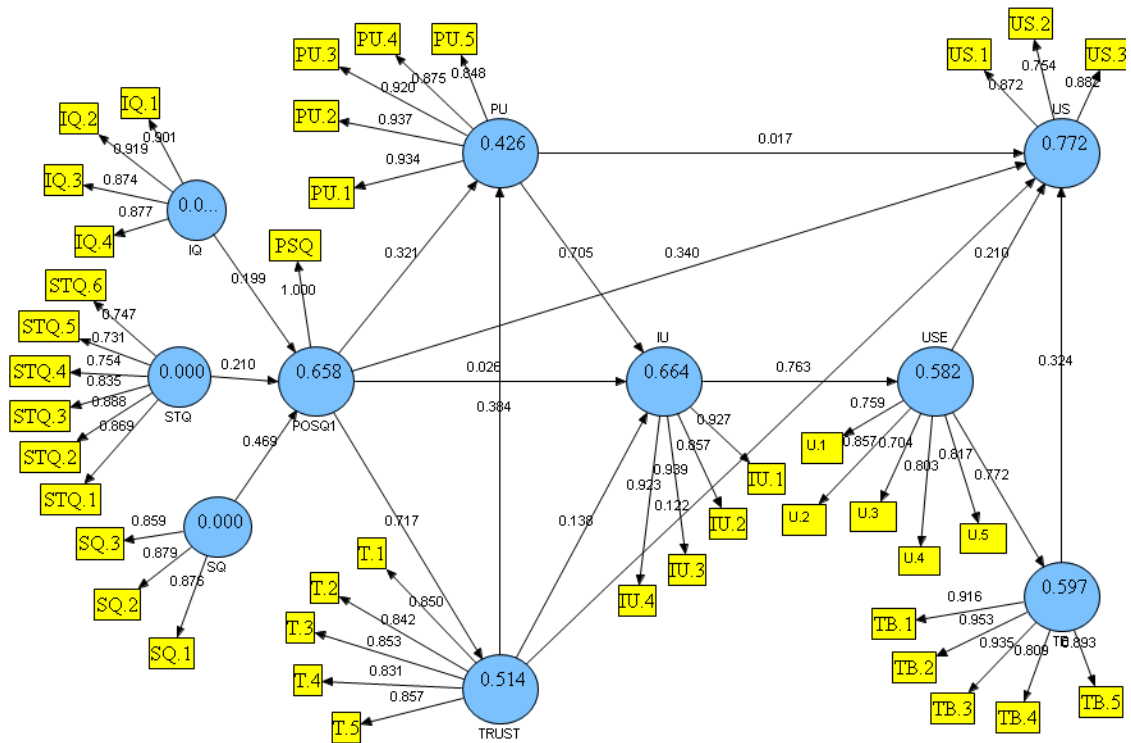
In an attempt to reduce the risk of having any potential threat to validity related to the “missing values”, which could cause bias or inappropriate interpretations, we considered dealing with any “missing values”. Croninger and Douglas (2005) suggested that one must consider why the data are missing and that our understanding of why the data are missing influences the methods we chose to deal with this issue. This also means that before choosing any particular method for handling the missing values, we need to leverage the advantages and disadvantages of the alternative options.

For example, we must consider that decreasing the sample size results in increased variability and decreased confidence (O'Rourke 2003). Given that the incidents in which NA were answered are considered small, we choose to deal with the missing values by replacing them with the mean values for each indicator (O'Rourke 2003). We believe that this approach is reasonable because:

- 1- the missing values are relatively small and replacing them with the mean values will unlikely cause bias to the results
- 2- there are various claims suggesting that PLS is robust against missing values.

However, considering that SQ3 had 25% missing values, for the sake of completeness, we tested the model using the Listwise deletion approach by deleting those whole cases in which SQ3 was answered with “NA”. This is to see the differences between case 1 where the missing values of SQ3 were replaced with the mean values (total responses = 401) versus cases 2 when the whole record that contained missing values were removed (sample size becomes 298 responses – (see Appendices F). Doing so assists in checking whether there would be any bias that might result from enforcing “a perfect fit” for this indicator when using the mean value replacement approach. Note that, we chose not to drop the SQ3 indicator as a means of handling the NA responses because of its importance to the operationalization and concept service quality (SQ) construct and the theory behind it.

By default, the process of eliminating the cases where SQ3 was answered with NA means that there are more eliminated incidents of missing values (in other indicators), resulting in less missing values in total.



**Figure 3-3: PLS path model for case 2 ( 298 responses) showing the path coefficients and explained variance ( $R^2$ )**

The results show that in both cases 1 and 2, the measurement-items load more on their corresponding constructs, and that the significant vs. non-significant paths are also the same in both cases – (see Table 24 in Section (4.2.1) and Table 47 in Section F for case 2 in the appendices). The only prominent change that occurred in case 2 is that the explained variance ( $R^2$ ) for a number of constructs has increased while the dependent variable TB remained approximately the same – (see Table 50).

After this analysis has been conducted, in order not to reduce the sample size and reduce the statistical power by simply deleting any case which has missing values (NA answers) for all variables (O'Rourke 2003), and because the test of the two cases confirmed the same results except of the increased variance in POSQ, Trust, and USE, we find no issues in completing the rest of tests using the mean replacement algorithm method for all the collected cases where NA was answered by the respondents for a question.

### 3.4.4.2 Outliers

Outliers resemble those values that are usually represented by extremely large or extremely small values compared to the other data in the set. Generally, the existence of outliers could negatively affect the analysis; however, in other cases, the outliers could may provide useful information about data (Seo 2006).

To test the existing outliers for each indicator, we considered performing commonly used tests, including the z-score method, standard deviation (SD) method, and Tukey's method (or boxplot). However, the standard deviation or z-score methods tests are more suitable for normally distributed data while the Tukey's method does not follow any distribution assumption and thus could be is applicable to skewed or non-mound-shaped data (Seo 2006). The descriptive statistics (in Table 51) for the 401 records for each indicator showed that there is a variation of the degrees of skewness<sup>68</sup>. In such cases, it would be more appropriate to check the outliers using the Tukey's method.

The outliers were checked using the  $Q1-3IQR$ ,  $Q3+3IQR$  boundary, where  $Q1$ = inner quartile,  $Q3$ , outer quartile, and  $IQR$ = inner quartile range; and any point beyond this boundary may be considered as a "probable" outlier (Seo 2006). Two tests were performed, the first one was to check for any probable outliers in all the records where each indicator is checked in its own right, while the second test was performed taking in consideration the entire sample rather a single indicator at a time. The results of the first test are shown in Table 21 below. The second test revealed no outliers. Also, all the detected outliers were for respondents who were generally not in favor of the EGS that they responded about and reported "totally disagree". Table 21 shows those incidents of outliers in 6 indicators out of 41.

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<sup>68</sup> To test whether the accepted degree of skewness is close to normal distribution or statistically /significantly different from a normal one, we used (  $| \text{skewness} | > 2 * \sqrt{\frac{6}{n}}$  ) where  $n = 401$  (according to (Tabachnick and Fidell 1996) cited in (Brown 1996)

Table 21: Number and percentage of outliers found when checking all the records for the 41 indicators		
	number of outliers	%
<b>STQ.2</b>	15	3.74%
<b>STQ.3</b>	8	2.00%
<b>U.2</b>	17	4.24%
<b>U.4</b>	18	4.49%
<b>U.5</b>	11	2.74%
<b>IU.4</b>	17	4.24%

It is also important to note that the Tuckey method uses the boxplot to display information about continuous univariate data (Seo 2006). There is a dispute as to whether a Likert scale data can be analyzed as a categorical, rank-ordered (ordinal), and/or continuous scale (Brown 2000). Also, there is no universal agreement on whether choosing the quartile values for discrete distributions is appropriate (Hyndman and Fan 1996). Therefore, from a conservative perspective, we chose to leave the collected data as it is. We chose not to delete any record which appeared to have some incidents of probable outliers, for this reason and for the following reasons:

- 1- Our sample is relatively a small sample containing only few hundreds, and if the sample size was considerably large, the outliers may not appear.
- 2- The Tuckey method may not be appropriate for small sample sizes (Seo 2006), and our sample is relatively small with respect to conducting such tests.
- 3- Outliers are recommended to be deleted if they would potentially cause distortion to the results and interpretation of those results. Otherwise, one must be cautious before deleting outliers as in some cases they are regarded as information rich and reflect part of / provide explanation to the phenomenon.
- 4- The incidents of outliers were relatively little and only in very few indicators from a total of 41 indicators for each record. Thus, it would not be appropriate to delete the whole record and reduce the sample size simply because few indicators of few respondents are suspected outliers
- 5- No outliers were found when all the data was taken in consideration.
- 6- PLS has been reported by several researchers, as stated earlier, to be robust against outliers.

#### 3.4.4.3 Method Bias

There are several research articles addressing the issue of common method variance bias (CMB) in social science and behavioral studies emphasizing that this is usually caused by the measurement method rather than the constructs the measures represent (Podsakoff *et al.* 2003).

Fiske (1982, p. 82) defined the “method” to include “the content of the items, the response format, the general instructions and other features of the test-task as a whole, the characteristics of the examiner, other features of the total setting, and the reason why the subject is taking the test.” (cited in (MacKenzie and Podsakoff 2012)).

According to Campbell and Fiske (1959) (cited in (MacKenzie and Podsakoff 2012)), any measuring instrument inevitably has:

- a) systematic construct variance due to features that are intended to represent the construct of interest;
- b) systematic error variance due to characteristics of the specific method being employed which may be common to measures of other traits/constructs; and
- c) random error variance.

Common method variance (CMV) is a form of bias (Gorrell *et al.* 2010). Conway and Lance (2010) distinguished between method variance and common methods bias in that **method variance** is systematic error variance due to the method of measurement while **common method bias** is inflation of relationships by shared method variance.

Method bias is seen as one important factor that can result in artificially influencing figures, such as artificially inflating/deflating the relationships between constructs (Bagozzi *et al.* 1991; Podsakoff *et al.* 2003; Gorrell *et al.* 2010), or artificially inflating the reliability estimates (Gorrell *et al.* 2010; MacKenzie and Podsakoff 2012). Thus, the existence of such cases of method bias may be problematic, cause measurement error, and the results may be interpreted wrongly (Podsakoff *et al.* 2003).

Some researchers who address the issues of method bias argue that using questionnaires, Likert scales, or a single method for assessing the dependent and independent variables are potential causes of method bias (e.g., Podsakoff *et al.* 2003;

MacKenzie and Podsakoff 2012). However, another group of researchers argue otherwise (e.g., Norman 2010; Waples *et al.* 2010).

Waples *et al.* (2010) argue against discarding the use of Likert scales in surveys and ignoring its benefits versus choosing other methods, such as the Thurstone scaling technique. In addition to the advantage of the Likert scale method being simple and practical, it has been supported over decades to have greater reliability per item especially with respect to psychometric and attitude measures and it “translates to real pragmatic value” (Waples *et al.* 2010). Moreover, Norman (2010) asserts that Likert scales can be used confidently with small sample sizes, with unequal variances, and unequal distribution without fearing to the conclusions are flawed.

In general, researchers have been urged to note for CMB and attempt to avoid it or minimize their effect as much as possible. Nevertheless, with such emphasis on CMB, researchers, such as (Conway and Lance 2010), analyze and debate the common conceptions of method bias and urge reviewers, editors, or theses examiners to have reasonable expectations regarding CMB in the presented studies. The authors suggested three widespread misconceptions about CMB and they are:

- 1- The covariance/ relationship between the self-reported variables are always “upwardly” biased.
- 2- Other-reports (or other methods) are superior to self-report.
- 3- Rating sources (e.g., self, other) resembles only a simple alternative measurement method.

While providing logical arguments and analysis based on the previous studies, Conway and Lance (2010) recommended reasonable guidelines or expectations in which studies provide:

- 1- An argument for why self-reports are appropriate.
- 2- Lack of overlap in items for different constructs.
- 3- Evidence of construct validity.
- 4- Evidence that researchers have proactive measures to consider threats CMB.

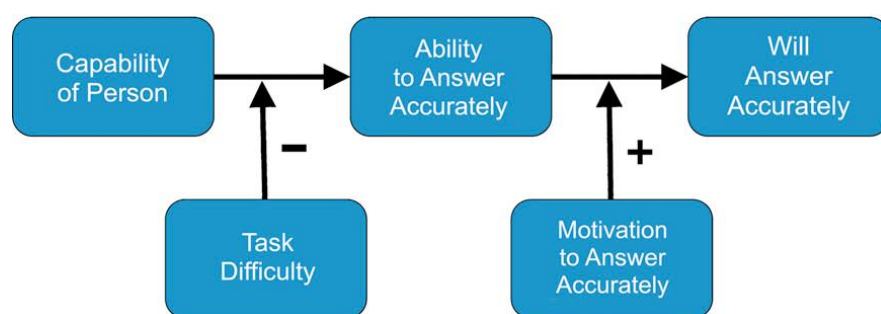
Given that the context of this study involves studying citizen-users perceptions of a used EGS qualities, usefulness, trustworthiness, and benefits obtained, it is inevitable but to

refer to the users' own reports as there is no alternative source for such personal information about perceptions and beliefs.

In addition, this study also takes into account that no overlapping occurs between the different variables. Though some might argue that the type of instrument itself is likely to cause confusion to the respondents as their answers may become bias for different reasons, this issue was considered in the pilot study. All the comments and suggestions that the participants of the pilot study gave were taken in consideration to reduce confusion and modifications to the questionnaire were made accordingly and that include:

- How the questionnaire was presented; e.g., each variable in a separate page with a title on top about the variable in which the questions are related.
- For each variable, in each webpage, a summarized clarification (definition) of the concept of that particular variable is given before the set of questions.
- How the questions were stated; e.g., making the questions more concise, shorter, consistent, and with clarification such as providing an explanation on what is meant or examples whenever applicable.

A recently published paper by Mackenzie and Podsakoff discussed in detail CMB, its causes, mechanism, and procedural remedies. The authors summarize these in Figure 3-4, the factors influencing a respondent's answer in terms of his/her willingness and ability to provide an accurate answer, which in turn reduces the effect of some bias.



**Figure 3-4: When is method bias likely to be a problem?**  
(Adopted from (MacKenzie and Podsakoff 2012))

The next two tables were adopted from the MacKenzie and Podsakoff (2012) paper. Table 22 and Table 23 present the factors that have the potential to increase method bias due to lack of ability and motivation to respond accurately, respectively. In both tables,

where relevant, we have marked whether the relevant remedy was taken into account in our study and how it was handled.

Table 22: Factors that increase method bias by decreasing the <u>ability</u> to respond accurately (adapted from (MacKenzie and Podsakoff 2012))			
Factors that cause method bias	Mechanism	Potential remedies	Considered/handled in our study
Lack of verbal ability, education, or Cognitive sophistication	May increase the difficulty of the task of comprehending the meaning of the questions, retrieving information, and making judgments	Align the difficulty of the task with the capabilities of the respondents by: <b>(a) pretesting questions to ensure they are written at a level the respondents can comprehend</b> ; and/or (b) presenting the questions in audio form to augment the written form	(Yes) based on the feedback from the pilot study
Lack of experience thinking about the topic	May impair a respondent's ability to answer because it: (a) hinders comprehension by reducing the respondent's ability to link key terms to relevant concepts, (b) makes information retrieval more difficult (less to retrieve, less practice retrieving), and (c) makes it harder to draw inferences needed to fill in gaps and to integrate material that is retrieved.	<b>Select respondents who have the necessary experience thinking about the issues of interest. Exercise caution when asking respondents about the motives for their behavior, the effects of situational factors on their behavior, or other things pertaining to cognitive processes that are unlikely to have been attended to or stored in short-term memory.</b>	(Yes) everything was explained in the information sheet, forums and clarified within the questions where appropriate
Complex or abstract questions	May increase the difficulty of comprehending the meaning of the questions, retrieving relevant information, and making judgments.	<b>Avoid referring to vague concepts without providing clear examples; simplify complex or compound questions; and use language, vocabulary, and syntax that match the reading capabilities of the respondents.</b>	(Yes) questions simplified based on feedback from the pilot study and examples were given
Item ambiguity	May increase the difficulty of comprehending the questions, retrieving relevant information, and making judgments. Can also increase the sensitivity of answers to context effects.	<b>Use clear and concise language; avoid complicated syntax; define ambiguous or unfamiliar terms; and label all response options rather than just the end points.</b>	(Yes) construct title was provided for each dimension and its definition



(Continued)

Table 22: Factors that increase method bias by decreasing the ability to respond accurately (adapted from (MacKenzie and Podsakoff 2012))			
Factors that cause method bias	Mechanism	Potential remedies	Considered/handled in our study
Questions that rely on retrospective recall	May increase the difficulty of the retrieval process and the likelihood of satisfying because questions that require retrospective recall are more difficult to answer due to the relative remoteness of the relevant information in memory.	<b>Refocus the questions to ask about current states because this reduces the effort required for retrieval. Take steps to increase the respondent's motivation to expend the effort required to retrieve the information necessary to answer the question accurately by explaining why the questions are important and how accurate responses will have useful consequences for the respondent and/or the organization. Make it easier for respondents to recall the information necessary to answer the question accurately.</b>	(Yes) reminders and examples were given. Motivating sentences were introduced to respondents, when recruiting them, on their role to be effective members to help improve the provided EGS and assist in making this study succeed.
Double-barreled questions	Make the retrieval task more demanding and introduce ambiguities into the response selection task by making it unclear whether respondents should: (a) answer only one part of the question, or (b) average their responses to both parts of the question.	Avoid double-barreled questions.	Not used
Auditory only presentation of item (telephone) versus written presentation of item (print or web).	Increases the memory load because respondents must keep the meaning of the question and all response options in short-term memory before responding.	Simplify questions and/or response options. Present long, complex, questions with many response options in written form or with visual aids.	Not applicable – web-based questionnaire was used
<p>Note: for detailed references, see (MacKenzie and Podsakoff 2012)</p> <p>- The relevant remedies were bolded.</p> <p>- For detailed remedies, see Table 13 on performed modifications after the pilot study and the information sheet in the appendices.</p>			

Table 23: Factors that increase method bias by decreasing the <u>motivation</u> to respond accurately (adapted from (MacKenzie and Podsakoff 2012))			
Factors that cause method bias	Mechanism	Potential remedies	Considered/handled in our study
Low personal relevance of the issue	May decrease a respondent's motivation to exert cognitive effort and result in: poorer comprehension; less thorough retrieval; and less careful judgment and mapping of judgments onto response categories.	<b>Explain to respondents why the questions are important and how their accurate responses will have useful consequences for them and/or their organization;</b> and/or promise feedback to respondents to motivate them to respond more accurately so that they can gain greater self-understanding, enhance self-efficacy, and improve performance.	(Yes) was introduced in the information sheet and in the recruitment process
Low self-efficacy to provide a correct answer	May decrease motivation to exert cognitive effort which decreases a person's willingness to: assess the completeness and accuracy of information retrieved, fill in gaps in what is recalled, and trust his/her own inferences based on partial retrieval.	<b>Emphasizing to respondents that it is their personal opinions that are important, and only their personal experience or knowledge is required to answer the questions.</b>	(Yes) was introduced in the information sheet and in the recruitment process
Low need for cognition	May decrease motivation to exert cognitive effort and thereby diminish: (a) the thoroughness of information retrieval and integration processes, and (b) the filling in of gaps in what is recalled.	<b>Enhance motivation to exert cognitive effort by emphasizing the importance of the issues; reminding respondents of how research can benefit them or help the organization; or increasing personal relevance of the task.</b>	(Yes) Motivating sentences were introduced to respondents in the invitation to participate when recruiting them thought the emails, forums, research introductory information sheet emphasizing their role as effective members to help improve the provided EGS to them and to others.
Low need for self-expression, self-disclosure, or emotional catharsis	May decrease motivation to exert cognitive effort and thereby decrease (a) the thoroughness of information retrieval and (b) the filling in of gaps in what is recalled. As a result, these factors may cause people to respond to items carelessly, randomly, or nonpurposefully.	<b>Enhance the motivation for self-expression by explaining in the cover story or instructions that "we value your opinion," "we need your feedback," or that we want respondents to "tell us what you think," and so forth. Similarly, enhance willingness to self-disclose by emphasizing the personal benefits of the research to them (e.g., improved performance and increased self-awareness) in the instructions.</b>	(Yes) Was done in the invitation to participate when recruiting them thought the emails, forums, research introductory information sheet.

(Continued)

Table 23: Factors that increase method bias by decreasing the <u>motivation</u> to respond accurately (adapted from (MacKenzie and Podsakoff 2012))			
Factors that cause method bias	Mechanism	Potential remedies	Considered/handled in our study
Low feelings of altruism	May decrease intentions to exert cognitive effort on behalf of the researcher which can decrease the thoroughness of information retrieval and the filling in of gaps in what is recalled.	<b>Explain how much the respondent's help is needed, indicating that others are depending upon the accuracy of the responses; suggest that no one else can provide the needed information (or you are one of the few that can); and/or remind them how research can improve the quality of life for others or help the organization.</b>	(Yes) reminders and examples were given. Motivating sentences were introduced to the respondents in the forums on their role to be an effective member that can help improve what's provided and help make this study succeed.
Agreeableness	Increases the tendency to uncritically endorse or acquiesce to statements, search for cues suggesting how to respond, and edit responses for acceptability. According to the dual process theory, acquiescence results from a premature truncation of the reconsideration stage of comprehension.	<b>Through instructions, stress the fact that the best way to help the researcher is to answer the questions as accurately as possible. Enhance motivation by emphasizing the importance of the issues; reminding respondents of how research can benefit them or help the organization; or increasing personal relevance of the task. In addition, measure acquiescence response style and control for it.</b>	(Yes) Motivating sentences were introduced to the respondents in the forums on their role to be an effective member that can help improve what's provided and help make this study succeed.
Impulsiveness	May: (a) impair comprehension by decreasing attention to questions and instructions; (b) diminish the tendency to assess the completeness and accuracy of information retrieved, fill in gaps in what is recalled, and integrate the information retrieved; and (c) result in carelessness in mapping judgments onto response categories.	<b>Stress the importance of conscientiousness and accuracy, and encourage respondents to carefully weigh the alternatives before responding.</b>	(Yes) Reminders and examples were given whenever possible, in addition to motivating sentences.
Implicit theories	May motivate respondents to edit their responses in a manner that is consistent with their theory.	<b>Introduce a temporal, proximal, or spatial separation; and/or obtain the information about the predictor and criterion variables from separate sources.</b>	(Yes) Was done in the design of the survey

(Continued)

Table 23: Factors that increase method bias by decreasing the <u>motivation</u> to respond accurately (adapted from (MacKenzie and Podsakoff 2012))			
Factors that cause method bias	Mechanism	Potential remedies	Considered/handled in our study
Dogmatism, rigidity, or intolerance of ambiguity	Dogmatism (or rigidity) may heighten feelings of certainty and thus increase willingness to: make an estimate based on partial retrieval; and/or draw inferences based on accessibility or to fill in gaps in what is recalled. Dogmatism (or intolerance for ambiguity) can cause people to view things as either black or white, thus increasing the likelihood that they will map judgments onto extreme response categories.	Stress the importance of conscientiousness and accuracy, and encourage respondents to carefully weigh the alternatives before responding. <b>Measure extreme response style and control for it.</b>	(Yes) The cases in which the answers seemed inappropriate or contradicting each other were eliminated from the sample. The importance of having complete answers was mentioned in the email, forums, and information sheet.
Repetitiveness of the items	May decrease motivation to maintain the cognitive effort required to provide optimal answers and increase the tendency to respond in a non-differentiated manner or stylistically.	Increase motivation by minimizing the repetitiveness of the items, making the questions seem less repetitive by reversing some items (i.e., polar opposites not negations), or changing the format.	(Yes) Was done in the design of the survey. Reminders, definition of concepts, examples were introduced whenever possible
Lengthy scales	May decrease motivation to maintain the cognitive effort required to provide optimal answers, and result in poorer comprehension, less thorough retrieval, less careful judgment and mapping of judgments onto response categories, and/or stylistic responding.	Increase motivation by <b>minimizing the length of the survey, simplifying the questions, making the questions seem less repetitive by reversing some items</b> (i.e., polar opposites not negations), or changing the format.	(Yes) Based on the feedback from the pilot study, the survey was shortened as much as possible
Forced participation	May increase psychological reactance and consequently decrease the motivation to exert cognitive effort to generate accurate answers or to faithfully report those answers.	Solicit participation by promising rewards rather than by threatening punishment. Treat participants in a respectful manner, show that you value their time, and express appreciation for their participation.	Not Applicable (anonymous, voluntary participation)
Measurement conditions that make the consequences of a response salient	May increase desire to edit answers in order to provide a socially acceptable response or to avoid undesirable consequences.	<b>Can be diminished by guaranteeing anonymity</b> , telling respondents there are no right or wrong answers, and assuring them that people have different opinions about the issues addressed in the questionnaire.	(Yes) Was mentioned in the information sheet, information sheet, and email

(Continued)

Table 23: Factors that increase method bias by decreasing the <u>motivation</u> to respond accurately (adapted from (MacKenzie and Podsakoff 2012))			
Factors that cause method bias	Mechanism	Potential remedies	Considered/handled in our study
presence of an interviewer	May motivate respondents to edit their answers to make them more socially desirable to avoid any social consequences of expressing their true judgments.	If appropriate, utilize a self-administered method of data collection (e.g., traditional paper and pencil or <b>computer-assisted questionnaire</b> ). If this is inappropriate, <b>assure respondents in the cover story or instructions</b> that there are no right or wrong answers, that people have many different opinions about the issues addressed in the questionnaire, <b>that their responses will only be used for research purposes, and that their individual responses will not be revealed to anyone else.</b>	A computer-based questionnaire was used
Source of the survey is disliked	May decrease: the desire to cooperate; willingness to exert the cognitive effort required to generate optimal answers; or motivation to faithfully report those answers.	Treat participants in a respectful manner, <b>show that you value their time, and express appreciation for their participation.</b> If the dislike relates to an impersonal source of the survey, you can attempt to disguise the source.	(Yes) Expressions of high appreciation and gratitude were given frequently in forums, introduced in the emails and information sheets. Also animated smiley faces were presented thanking the participation of the survey
Contexts that arouse suspicions	May motivate respondents to conceal their true opinion by editing their responses. They might do this by using the middle scale category regardless of their true feelings, or by responding to items carelessly, randomly, or nonpurposefully.	Suspicious may be mitigated by <b>explaining how the information will be used, why the information is being requested</b> , who will see the responses, and how the information will be kept secure. In addition, one could <b>assure participants that their responses will be used only for research purposes, will be aggregated with the responses of others</b> , and that no one in their organization will see their individual responses. Measure midpoint response style and control for it.	(Yes) Was mentioned in the information sheet, information sheet, and email
<p>Note: for detailed references, see (MacKenzie and Podsakoff 2012)</p> <p>- The relevant remedies were bolded.</p> <p>- For detailed remedies, see Table 13 on performed modifications after the pilot study and the information sheet in the appendices.</p>			

### ***3.5 Conclusion***

This chapter presented the research methodology in two main stages, 1- the development of the proposed conceptual CEM and 2- the validation approach. The first part presented CEM and a discussion on how and why the proposed model was developed. The second part presented the validation approach in two steps, the first is concerned with development of the measurement instrument and the second is concerned with the validation process in terms of the statistical and analytical approaches. The presentation of the development of the instrument mainly included a description of the chosen evaluation method, targeted population, the survey's design and pilot study. The details of the process of the validation process for the model, on the other hand included a discussion on the possible statistical approaches that could be used in analyzing the data, which approach is used, why and what the common steps are for the validation process for the chosen statistical approach, and finally presented the analytical approach (what and how data what used for the validation process using PLS-path modeling of SEM).

In the next chapter, we will present the results of the PLS-path modeling validation as described in this chapter, interpretation and discussion of the results and the most interesting findings, and lastly conclude the revised model.

## 4 RESULTS AND DISCUSSIONS

### 4.1 Introduction

The previous chapter presented the methodology and research approach for developing and validating our conceptual CEM. This chapter presents the actual process of the proposed-model's validation, where the collected data have been used in the statistical analysis and the results have been obtained, presented, and discussed. This chapter is composed of three parts. Section (4.2) presents a comparison of the initial proposed model where the attribute of EGS performance quality is conceptualized to reflect the overall quality as a higher-order concept where it is measured in two ways. In the first, it is measured as an ordinary first-order construct with a single indicator, and in second, it is considered as being a second-order construct measured with a repeated indicator approach of the first-order constructs. We differentiate that by referring to the first-order construct as the 'Perceived Overall System Quality' (POSQ<sub>1</sub>) and the second-order construct as the (POSQ<sub>2</sub>). Section (4.3) presents and compares the results of analyses for 3 sub-groups to see how the model behaves with more than one group and to confirm the significance of the relationships in the model. Section (4.4) discusses the most important and interesting findings presented in this study, including the significance and contribution of the findings and their implications for both academic studies in general and the practice of e-government in particular. Lastly, section (4.5) presents the final (revised) model based on a dynamic process of refining the model which was derived from the results.

Also, for analyzing the data, SmartPLS<sup>69</sup> was used to run the PLS algorithm and validated the model. All reported data is standardized, such that all loadings and coefficients represent ratios that may assume a value in the range from 0 to 1 (or from 0 to -1). Furthermore, the answers that were chosen by the respondents in the questionnaire to be 'Not Available/Not Applicable' due to their lack of experience with some EGS services of functionality were treated in the statistical analysis as missing values<sup>70</sup>. All the tested cases used in the bootstrap algorithm were set to 'No sign change, 1000 resamples, and number of cases equal to the records number in each tested

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<sup>69</sup> Ringle, C. M./Wende, S./Will A. (2005): SmartPLS 2.0 (beta), [www.smartpls.de](http://www.smartpls.de).

<sup>70</sup> A detailed discussion on how the missing values were managed is presented in Section (3.4.4.1).



group'. To ensure that results are correct and that there is no mono-operation bias<sup>71</sup>, the data was tested using also WarpPLS<sup>72</sup>, which confirmed the same results. Also, an initial analysis of the distribution of respondents by the method of their recruitment e.g. university students, friends, colleagues etc. did not suggest that any systemic bias existed in the sample.

Furthermore, all but one of the paths in the model seem to have a clear directionality (i.e., positive direct relationship) so they were tested at the minimum of  $P < .001$  one tailed which seem to be more appropriate. The relationship between System Use and User Satisfaction, on the other hand seem to be less clear and non-directional. It is expected that Use will alter US; however, increased use of an EGS could result in either higher or lower levels of US. This is especially true because in the context of e-government, the Use of an EGS is not entirely optional. In some circumstances citizens feel somewhat obliged to use it even if they didn't like its quality. This could occur when a user is unable to physically visit an agency and they had to use the EGS to accomplish the task they need. Therefore, without a clear sense of directionality, it is more appropriate to use a two-tailed test. In addition, the two-tailed test is the more stringent, so using the two-tailed test reduces the likelihood of incorrectly reporting that a relationship is significant when in fact it is only marginally significant on a one-tailed test.

Since the chosen statistical approach was PLS to validate the proposed conceptual CEM and determine the significant relationships between the model constructs, the data used at this stage were merely the data collected for the constructs measurement items. An initial analysis of the distribution of respondents across the various demographic characteristics e.g. gender did not suggest that any systemic bias existed in the sample. Therefore, the demographic data was not utilized in this research. However, it was deemed appropriate and important to include them in the proposed questionnaire as a template which can be used as part of the assessment by government official. Such information could be very useful in where a higher number of responses may be collected.

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<sup>71</sup> Mono Operation bias could be due to using a single version of a program at a single place at a single point in time. Trochim, W. M. (2000). The Research Methods Knowledge Base. 2nd Edition. Internet WWW page: <http://trochim.human.cornell.edu/kb/index.htm>

<sup>72</sup> Kock, N (2012), WarpPLS 3.0. Laredo, Texas: ScriptWarp Systems: [www.scriptwarp.com/warppls](http://www.scriptwarp.com/warppls)



Moreover, several participants responded to the open-ended question pointing out, for example,

- their perception of the website they used in comparison with other EGS;
- their positive impressions about the available EGS emphasizing their beliefs on the importance of the EGS in increasing efficiency and saving time and effort;
- their favor in using an EGS versus the traditional face-to-face channel;
- their negative impressions about the available EGS, or describing disadvantages of some features in the used EGS, etc., such as, the user friendliness, currency and availability of information;
- suggestions on other features to be added;
- criticisms of the easiness of people accessing other people's personal information if they had access to their civil ID number;
- remarks on the survey, e.g., length of the survey or that they liked and though it was useful.

However, these responses were not used in this study because the type of data collected via the open ended question require qualitative analysis and that does not serve the objective of validating the conceptual model quantitatively, especially using the PLS. Therefore, no formal transcript method was applied to the answers of the open-ended question.

#### ***4.2 A comparison of CEM where the EGS performance is measured as a second-order and as a first-order construct***

In this step, the validation, in both versions of the models, is carried out using all the sample of data which contains all valid, completed questionnaires for all the agencies, as shown in Table 18. This '*all data*' group consists of a total of 401 responses.

Since we are using the same data for both of the models that we are testing, and since both models are identical except that the concept of perceived overall system quality, it is expected that, the changes that result from POSQ being evaluated differently will not have an impact in the constructs that precede it in the model. Also, it is expected these preceding construct results will have no significant changes, especially those in the measurement (outer) model. The expected change will most likely affect:

- (1) the inner model in terms of the path significance and probably the explained variance ( $R^2$ ), and affect
- (2) the relationship between the POSQ<sub>1</sub> and its antecedents compared to the POSQ<sub>2</sub> and its antecedents.

After confirming the validity of the model in general, we will focus on the differences between the two models and whether one is better than the other or if they can be used alternatively.

#### 4.2.1 Testing CEM when POSQ is measured as a first-order construct

Table 24 shows the results of testing the convergent validity for all exogenous reflective measurement items in the '*all data*' group. The factor loadings and cross loadings reveal that all items loaded:

- (1) on their respective reflective latent construct from a lower bound of 0.65 to an upper bound of 0.95;
- (2) more highly on their own respective latent construct than they loaded on any other latent construct; and
- (3) each item's factor loading on its respective construct is statistically significant at  $p < 0.001$ .

The latent constructs' item loadings and cross loadings, and their levels of statistical significance, serve to affirm the convergent validity of these reflective indicators as representing distinct latent constructs in the research model.

Table 25 presents the results of testing the discriminant validity of the reflective measurement scales. The square roots of the Average Variance Extracted (AVEs) that are represented diagonally in bold, are greater in virtually almost all cases than the off-diagonal elements in their corresponding row and column, providing evidence of the discriminant validity of the scales (Fornell and Larcker 1981). Nevertheless, the correlation between STQ and IQ appears to be very close to the square root of AVE for STQ, which should not be the case because each variable is supposed to reflect a different attribute. However, it is not as close to the square root of AVE for IQ. Also, although higher, the square root of AVE for the Use construct seems to be close to the

correlation between Use and TB. This high correlation could be inferred to the high path coefficient between the variables Use and TB, as shown in Figure 4-2.

Table 24: Factor Loadings and Cross Loadings for Reflective Constructs where POSQ is a First-order										
	IQ	STQ	SQ	POSQ1	TRUST	PU	IU	Use	TB	US
<b>IQ.1</b>	<b>0.90</b>	0.73	0.63	0.63	0.61	0.60	0.52	0.56	0.55	0.62
<b>IQ.2</b>	<b>0.91</b>	0.73	0.65	0.62	0.59	0.52	0.47	0.53	0.55	0.65
<b>IQ.3</b>	<b>0.87</b>	0.61	0.62	0.59	0.57	0.44	0.38	0.47	0.45	0.59
<b>IQ.4</b>	<b>0.86</b>	0.66	0.63	0.52	0.56	0.47	0.45	0.49	0.50	0.58
<b>STQ.1</b>	0.68	<b>0.87</b>	0.65	0.64	0.60	0.52	0.45	0.54	0.50	0.58
<b>STQ.2</b>	0.72	<b>0.89</b>	0.68	0.66	0.64	0.58	0.52	0.61	0.58	0.65
<b>STQ.3</b>	0.66	<b>0.84</b>	0.60	0.59	0.61	0.56	0.46	0.58	0.53	0.55
<b>STQ.4</b>	0.51	<b>0.71</b>	0.55	0.47	0.49	0.40	0.39	0.39	0.36	0.45
<b>STQ.5</b>	0.50	<b>0.65</b>	0.50	0.45	0.59	0.36	0.32	0.37	0.39	0.42
<b>STQ.6</b>	0.49	<b>0.70</b>	0.51	0.48	0.46	0.42	0.43	0.46	0.44	0.50
<b>SQ.1</b>	0.67	0.73	<b>0.85</b>	0.66	0.66	0.51	0.46	0.59	0.54	0.68
<b>SQ.2</b>	0.64	0.62	<b>0.86</b>	0.60	0.65	0.44	0.46	0.53	0.45	0.55
<b>SQ.3</b>	0.49	0.53	<b>0.82</b>	0.55	0.58	0.37	0.38	0.41	0.37	0.49
<b>POSQ.1</b>	0.67	0.71	0.72	<b>1.00</b>	0.68	0.59	0.54	0.61	0.60	0.72
<b>T.1</b>	0.68	0.69	0.72	0.64	<b>0.84</b>	0.57	0.56	0.59	0.58	0.64
<b>T.2</b>	0.49	0.56	0.53	0.49	<b>0.83</b>	0.50	0.53	0.53	0.46	0.54
<b>T.3</b>	0.48	0.55	0.55	0.51	<b>0.85</b>	0.49	0.48	0.49	0.48	0.55
<b>T.4</b>	0.52	0.59	0.68	0.59	<b>0.82</b>	0.45	0.44	0.49	0.46	0.57
<b>T.5</b>	0.55	0.63	0.64	0.59	<b>0.86</b>	0.47	0.44	0.52	0.48	0.59
<b>PU.1</b>	0.51	0.56	0.46	0.52	0.54	<b>0.93</b>	0.75	0.66	0.73	0.64
<b>PU.2</b>	0.50	0.54	0.44	0.52	0.54	<b>0.93</b>	0.76	0.65	0.73	0.62
<b>PU.3</b>	0.47	0.51	0.40	0.46	0.49	<b>0.91</b>	0.72	0.60	0.70	0.57
<b>PU.4</b>	0.47	0.49	0.44	0.49	0.47	<b>0.88</b>	0.68	0.63	0.67	0.61
<b>PU.5</b>	0.63	0.65	0.61	0.67	0.61	<b>0.85</b>	0.66	0.67	0.71	0.70
<b>IU.1</b>	0.51	0.54	0.51	0.54	0.53	0.72	<b>0.91</b>	0.70	0.73	0.65
<b>IU.2</b>	0.35	0.39	0.36	0.36	0.47	0.63	<b>0.85</b>	0.60	0.62	0.52
<b>IU.3</b>	0.49	0.52	0.50	0.54	0.55	0.76	<b>0.93</b>	0.67	0.70	0.64
<b>IU.4</b>	0.50	0.52	0.46	0.49	0.55	0.75	<b>0.92</b>	0.66	0.73	0.60
<b>U.1</b>	0.47	0.51	0.48	0.47	0.46	0.52	0.45	<b>0.77</b>	0.55	0.58
<b>U.2</b>	0.52	0.55	0.50	0.52	0.55	0.70	0.63	<b>0.85</b>	0.72	0.67
<b>U.3</b>	0.33	0.36	0.28	0.33	0.37	0.49	0.55	<b>0.68</b>	0.57	0.51
<b>U.4</b>	0.46	0.55	0.56	0.55	0.53	0.51	0.55	<b>0.78</b>	0.54	0.56
<b>U.5</b>	0.48	0.52	0.55	0.50	0.53	0.57	0.65	<b>0.80</b>	0.62	0.56
<b>TB.1</b>	0.58	0.61	0.53	0.60	0.59	0.76	0.71	0.72	<b>0.91</b>	0.75
<b>TB.2</b>	0.57	0.58	0.53	0.57	0.57	0.74	0.74	0.74	<b>0.95</b>	0.75
<b>TB.3</b>	0.55	0.58	0.51	0.54	0.55	0.74	0.71	0.70	<b>0.93</b>	0.73
<b>TB.4</b>	0.39	0.43	0.38	0.45	0.42	0.60	0.58	0.62	<b>0.80</b>	0.58
<b>TB.5</b>	0.48	0.49	0.46	0.52	0.49	0.68	0.71	0.67	<b>0.87</b>	0.65
<b>US.1</b>	0.63	0.66	0.69	0.70	0.67	0.53	0.49	0.61	0.61	<b>0.87</b>
<b>US.2</b>	0.48	0.44	0.39	0.39	0.43	0.68	0.66	0.61	0.69	<b>0.74</b>
<b>US.3</b>	0.62	0.59	0.61	0.69	0.61	0.56	0.55	0.64	0.66	<b>0.89</b>

Table 25: Discriminant Validity (Inter-correlations) of the Reflective Latent Variable Constructs where POSQ is a First-order										
	IQ	STQ	SQ	POSQ <sub>1</sub>	T	PU	IU	Use	TB	US
IQ	<b>0.884</b>									
STQ	0.769	<b>0.782</b>								
SQ	0.716	0.749	<b>0.845</b>							
POSQ <sub>1</sub>	0.672	0.709	0.719	<b>1.000</b>						
T	0.656	0.726	0.747	0.676	<b>0.840</b>					
PU	0.578	0.614	0.525	0.594	0.595	<b>0.900</b>				
IU	0.518	0.551	0.511	0.543	0.583	0.794	<b>0.901</b>			
Use	0.581	0.638	0.610	0.608	0.627	0.717	0.730	<b>0.780</b>		
TB	0.578	0.607	0.540	0.603	0.591	0.790	0.772	0.774	<b>0.895</b>	
US	0.692	0.679	0.683	0.721	0.690	0.702	0.672	0.742	0.778	<b>0.836</b>

Note: All correlations are significant at the level of  $P < .001$

Table 26 shows the reliability results from testing the reflective measurement model. Consistent with the guidelines of Fornell and Larcker (1981), the average variance extracted (AVE) for each reflective measure exceeds the minimum recommended threshold of 0.5.

Table 26: The Reliability Assessment of the Reflective Measurement Model where POSQ is a First-order			
Latent Constructs	Average Variance Extracted/Explained	Composite Reliability (Dillon Goldstein's Rho)	Cronbach's Alpha
IQ	0.78	0.93	0.91
STQ	0.61	0.90	0.87
SQ	0.71	0.88	0.80
POSQ <sub>1</sub>	1.00	1.00	1.00
T	0.70	0.92	0.90
PU	0.81	0.96	0.94
IU	0.81	0.95	0.92
Use	0.61	0.89	0.84
TB	0.80	0.95	0.94
US	0.70	0.87	0.78

In addition, the data indicates that the reflective measures are robust in terms of their internal consistency reliability as indexed by the composite reliability. The results show that the composite reliabilities of the different measures in the model (Dillon Goldstein's Rho) range from 0.87 to 0.96 (excluding POSQ<sub>1</sub> which equals 1 because it has only 1 indicator), and all exceed the minimum recommended threshold value of 0.7 (Nunnally 1978).

Table 27: Total effect where POSQ is a first-order							
	POSQ <sub>1</sub>	T	PU	IU	Use	TB	US
IQ	0.18	0.12	0.11	0.10	0.07	0.06	0.11
STQ	0.29	0.20	0.17	0.16	0.12	0.09	0.17
SQ	0.37	0.25	0.22	0.20	0.15	0.11	0.22
POSQ <sub>1</sub>		0.68	0.59	0.54	0.40	0.31	0.58
T			0.36	0.40	0.29	0.22	0.31
PU				0.68	0.50	0.39	0.26
IU					0.73	0.57	0.32
Use						0.77	0.44
TB							0.35

Table 27 displays the standardized total effects on the seven predicted (dependent) endogenous latent variables. Each total effect from a predicting, independent variable (i.e., the ‘left hand’ column) onto a predicted dependent variable (i.e., the top row) is the sum of any direct and the product of the indirect paths that lead from the independent variable to the dependent variable. Of the three ‘ultimate’ predicted variables (i.e., TB, US and Use), the strongest total effects are from Use to TB (0.77) and from IU to Use (0.73). In addition, the total effect of POSQ<sub>1</sub> to trust and PU to IU are also relatively high but still less than total effect from IU to Use.

A t-test using the bootstrap technique using SmartPLS (see Figure 4-1), showed that each of the inner-model structural path coefficients are also significant<sup>73</sup> except for the two non-significant paths from POSQ<sub>1</sub> to IU, and from PU to US, as displayed in Figure 4-2. Also, the explained variances (R<sup>2</sup> values) for the predicted (dependent) endogenous latent variables are displayed in the figure. It is evident that the amount of variance explained in the predicted latent variables ranges from a low of approximately 42% (e.g. PU) to a high of 74% (e.g. US). According to W. Chin (1998b), these relative proportions of variance explained fall into the moderate (anything higher than 33%) to the high range (higher than 67%).

<sup>73</sup> The paths’ significance between all the constructs, except for the ones between Use and the dependent variables (US & TB), were at the minimum of P<.001 one tailed. The reason for that is that the relation between Use and US or TB is non-directional. This means that using an EGS is not necessarily positive as US might go up or down with more use. This is especially true because in the context of e-government, the Use of an EGS is not strictly optional as in some circumstances citizens feel somewhat obliged to use it because there are things that hinder their physical visit to the agency while there is no other option from which they can choose even if they didn’t like its quality(s).

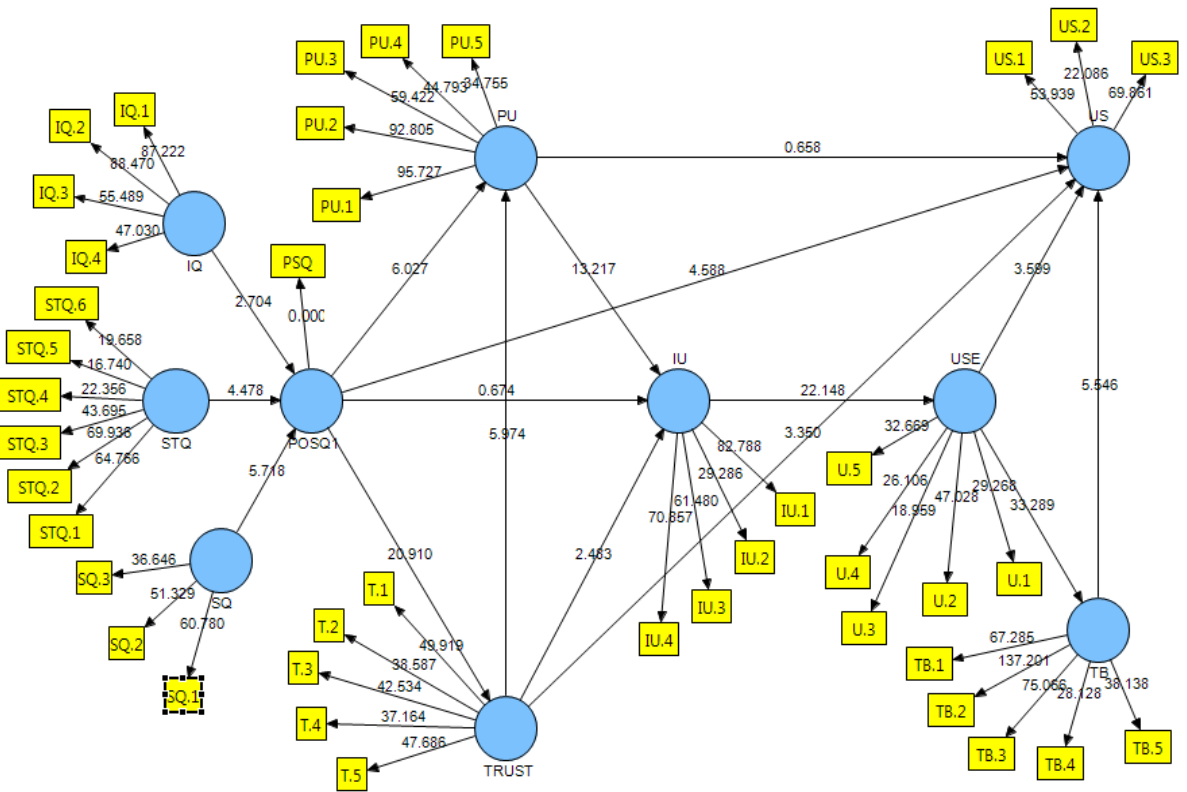


Figure 4-1: Bootstrap Results for the Structural Model and Measurements for 'all data' where POSQ is a First-order

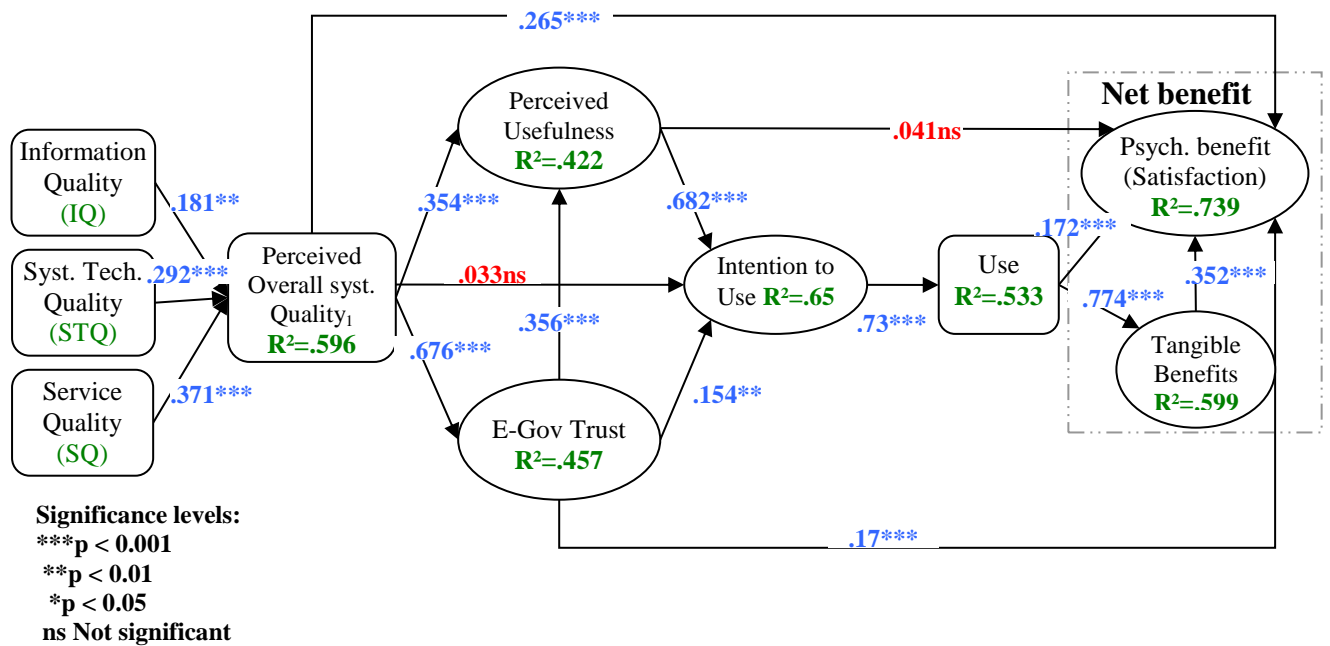


Figure 4-2: CEM showing R² and the path coefficients for the model which has POSQ<sub>1</sub> as a first-order

#### **4.2.2 Testing CEM when POSQ is measured as a second-order construct**

As with the previous model, the convergent validity for all exogenous reflective measurement items for the same group shows that the factor loadings and cross loadings (shown in Table 28) of all items also loaded:

- (1) on their respective reflective latent construct from a lower bound of 0.65 to an upper bound of 0.95; and
- (2) more highly on their own respective latent construct than they loaded on any other latent construct;
- (3) each item's factor loading on its respective construct is statistically significant at  $p < 0.001$ . This confirms the convergent validity for all reflective measurement items in each first-order construct which represent distinct latent constructs.

Table 29 presents the results of testing the discriminant validity of the reflective measurement scales. The bolded elements in the matrix diagonals, representing the square roots of the AVEs, are greater in virtually all cases than the off-diagonal elements in their corresponding rows and columns, providing evidence of the discriminant validity of the scales (Fornell and Larcker 1981). As with the previous model, we find the same correlations between IQ and STQ and between Use and TB because the model is technically the same except for the relation between the EGS overall performance being a first-order and a second-order construct.

Reliability results from testing the reflective measurement model are reported in Table 30. Consistent with the guidelines of Fornell and Larcker (1981), the average variance extracted (AVE) for each reflective measure well exceeds the minimum recommended threshold of 0.5. In addition, the data indicates that the reflective measures are robust in terms of their internal consistency reliability as indexed by the composite reliability. The results show that the composite reliabilities of the different measures in the model (Dillon Goldstein's Rho) range from 0.88 to 0.96, and all exceed the minimum recommended threshold value of 0.7 (Nunnally 1978). Moreover, although the POSQ<sub>2</sub> is a composite of the first-order indicators, we find the composite reliability is still less than 1.

Table 28: Factor Loadings (Bolded) and Cross Loadings among the low-order constructs									
	IQ	STQ	SQ	TRUST	PU	IU	Use	TB	US
<b>IQ.1</b>	<b>0.90</b>	0.72	0.63	0.61	0.60	0.52	0.56	0.55	0.62
<b>IQ.2</b>	<b>0.91</b>	0.73	0.65	0.59	0.52	0.47	0.53	0.55	0.65
<b>IQ.3</b>	<b>0.86</b>	0.61	0.63	0.57	0.44	0.38	0.47	0.45	0.59
<b>IQ.4</b>	<b>0.87</b>	0.66	0.63	0.56	0.47	0.45	0.49	0.50	0.58
<b>STQ.1</b>	0.68	<b>0.87</b>	0.65	0.60	0.52	0.45	0.54	0.50	0.58
<b>STQ.2</b>	0.72	<b>0.89</b>	0.68	0.64	0.58	0.52	0.61	0.58	0.65
<b>STQ.3</b>	0.66	<b>0.83</b>	0.60	0.61	0.56	0.46	0.58	0.53	0.55
<b>STQ.4</b>	0.52	<b>0.72</b>	0.55	0.49	0.40	0.39	0.39	0.36	0.45
<b>STQ.5</b>	0.50	<b>0.65</b>	0.50	0.59	0.36	0.32	0.37	0.39	0.42
<b>STQ.6</b>	0.49	<b>0.70</b>	0.51	0.46	0.42	0.43	0.46	0.44	0.50
<b>SQ.1</b>	0.67	0.73	<b>0.85</b>	0.66	0.51	0.46	0.59	0.54	0.68
<b>SQ.2</b>	0.64	0.62	<b>0.87</b>	0.65	0.44	0.46	0.53	0.45	0.55
<b>SQ.3</b>	0.49	0.53	<b>0.81</b>	0.58	0.37	0.38	0.41	0.37	0.49
<b>T.1</b>	0.68	0.69	0.72	<b>0.85</b>	0.57	0.56	0.59	0.58	0.64
<b>T.2</b>	0.49	0.56	0.53	<b>0.83</b>	0.50	0.53	0.53	0.46	0.54
<b>T.3</b>	0.48	0.56	0.55	<b>0.85</b>	0.49	0.48	0.49	0.48	0.55
<b>T.4</b>	0.52	0.59	0.68	<b>0.82</b>	0.45	0.44	0.49	0.46	0.57
<b>T.5</b>	0.55	0.63	0.64	<b>0.86</b>	0.47	0.44	0.52	0.48	0.59
<b>PU.1</b>	0.51	0.56	0.47	0.54	<b>0.93</b>	0.75	0.66	0.73	0.64
<b>PU.2</b>	0.50	0.54	0.44	0.55	<b>0.93</b>	0.76	0.65	0.73	0.62
<b>PU.3</b>	0.47	0.51	0.40	0.49	<b>0.91</b>	0.72	0.60	0.70	0.58
<b>PU.4</b>	0.47	0.48	0.44	0.47	<b>0.88</b>	0.68	0.63	0.67	0.61
<b>PU.5</b>	0.63	0.65	0.61	0.61	<b>0.85</b>	0.66	0.67	0.71	0.70
<b>IU.1</b>	0.51	0.54	0.51	0.53	0.72	<b>0.91</b>	0.70	0.73	0.65
<b>IU.2</b>	0.35	0.39	0.36	0.48	0.63	<b>0.85</b>	0.60	0.62	0.52
<b>IU.3</b>	0.49	0.52	0.50	0.55	0.76	<b>0.92</b>	0.67	0.70	0.64
<b>IU.4</b>	0.50	0.52	0.46	0.55	0.75	<b>0.92</b>	0.66	0.73	0.60
<b>U.1</b>	0.47	0.51	0.48	0.46	0.52	0.45	<b>0.77</b>	0.55	0.58
<b>U.2</b>	0.52	0.55	0.50	0.55	0.70	0.63	<b>0.85</b>	0.72	0.67
<b>U.3</b>	0.33	0.36	0.28	0.37	0.48	0.55	<b>0.68</b>	0.57	0.51
<b>U.4</b>	0.46	0.54	0.57	0.53	0.51	0.55	<b>0.78</b>	0.54	0.56
<b>U.5</b>	0.48	0.51	0.55	0.53	0.57	0.65	<b>0.80</b>	0.62	0.56
<b>TB.1</b>	0.58	0.61	0.53	0.59	0.76	0.71	0.72	<b>0.91</b>	0.75
<b>TB.2</b>	0.57	0.58	0.53	0.57	0.74	0.74	0.74	<b>0.95</b>	0.75
<b>TB.3</b>	0.55	0.58	0.51	0.55	0.74	0.71	0.70	<b>0.93</b>	0.73
<b>TB.4</b>	0.39	0.43	0.38	0.42	0.60	0.58	0.62	<b>0.80</b>	0.58
<b>TB.5</b>	0.49	0.49	0.46	0.49	0.68	0.71	0.67	<b>0.87</b>	0.65
<b>US.1</b>	0.63	0.66	0.69	0.67	0.53	0.49	0.61	0.61	<b>0.87</b>
<b>US.2</b>	0.48	0.44	0.40	0.43	0.68	0.66	0.61	0.69	<b>0.75</b>
<b>US.3</b>	0.62	0.59	0.61	0.61	0.56	0.55	0.64	0.66	<b>0.89</b>



Table 29: Discriminant Validity (Inter-correlations) of all constructs									
	IQ	STQ	SQ	TRUST	PU	IU	Use	TB	US
IQ	<b>0.885</b>								
STQ	0.769	<b>0.782</b>							
SQ	0.718	0.751	<b>0.845</b>						
POSQ <sub>2</sub>	0.914	0.941	0.872	<b>0.758</b>					
TRUST	0.656	0.727	0.748	0.773	<b>0.839</b>				
PU	0.577	0.613	0.527	0.634	0.595	<b>0.900</b>			
IU	0.518	0.551	0.512	0.580	0.583	0.794	<b>0.901</b>		
Use	0.581	0.637	0.612	0.668	0.628	0.717	0.730	<b>0.780</b>	
TB	0.579	0.606	0.542	0.635	0.592	0.790	0.772	0.774	<b>0.895</b>
US	0.692	0.678	0.684	0.747	0.689	0.703	0.674	0.742	0.779

Notes: all correlations are significant at  $p < .001$

Table 30: The Reliability Assessment of the Reflective Measurement Model			
Latent Constructs	Average Variance Extracted/Explained	Composite Reliability (Dillon Goldstein's Rho)	Cronbach's Alpha
IQ	0.78	0.94	0.91
STQ	0.61	0.90	0.87
SQ	0.71	0.88	0.80
POSQ <sub>2</sub>	0.58	0.95	0.94
TRUST	0.70	0.92	0.90
PU	0.81	0.96	0.94
IU	0.81	0.95	0.92
Use	0.61	0.89	0.84
TB	0.80	0.95	0.94
US	0.70	0.87	0.78

Table 31 displays the standardized total effects on the seven predicted (dependent) endogenous latent variables. Each total effect from a predicting, independent variable (i.e., the 'left hand' column) onto a predicted, dependent variable (i.e., the top row) is the sum of any direct path and the product of the indirect paths that lead from the independent variable to the dependent variable. Of the three 'ultimate' predicted variables (i.e., TB, US and Use), the strongest total effects are from Use to TB (0.77) and from IU to Use (0.73). However, the total effect from POSQ<sub>2</sub> seems to have increased compared to the previous model, where it became as high as the total effect from Use to TB. This increment can be inferred to the accumulated effect of the first order constructs IQ, STQ, and SQ represented in POSQ<sub>2</sub>.

Table 31: Total effect						
	TRUST	PU	IU	Use	TB	US
POSQ <sub>2</sub>	0.77	0.63	0.58	0.42	0.33	0.60
TRUST		0.26	0.34	0.25	0.19	0.25
PU			0.69	0.50	0.39	0.27
IU				0.73	0.57	0.32
Use					0.77	0.44
TB						0.37

The t-test using bootstrap technique also reveals that each of the inner-model structural path coefficients are significant (at a minimum of  $p < 0.05$ , one tailed) except for the two non-significant paths from POSQ<sub>2</sub> to IU, and from PU to US, as displayed in Figure 4-4. Similarly, the amount of variance explained in the predicted latent variables ( $R^2$  values), as in the previous model, ranges from a low of approximately 42% (i.e., PU) to a high of 74% (i.e., US).

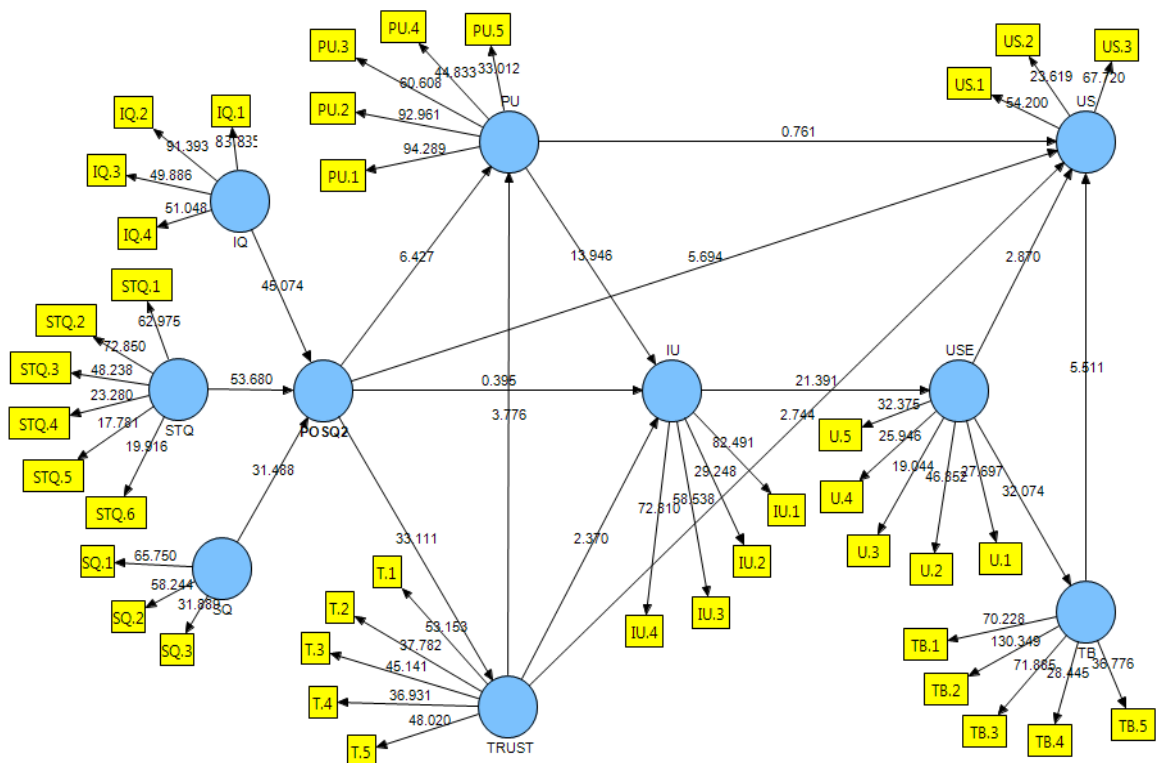


Figure 4-3: Bootstrap Results for the Structural Model and Measurements for 'all data'

Moreover, we have to check the validity of the relationship between the first and second-order constructs, as explained earlier in Section (3.4.2.3), considering the

suitable assessment criteria used for *formative* latent variables. By that we mean we need to:

- 1- consider that the validation is carried out for a second-order construct; and
- 2- ensure that the appropriate steps of validation are used in terms of whether the relationship between the second-order construct and its first order constructs is formative or reflective, because each case require its own validation process or criteria.

### ***1- Nomological validity (construct validity)***

Based on the literature and empirical validation, the first order-constructs IQ, STQ, SQ and the second-order construct POSQ<sub>2</sub> fit within the context of the model and behave as expected and within the net of hypotheses.

***2- Indicator weight and validity:*** As previously mentioned, the formative relation between the first and second-order constructs is similar to that of a formative variable and its indicators and the first-order constructs should, thus, be treated as indicators to the second-order construct. It is evident that the weight for each first-order construct differs. The difference in weights is associated with the number of indicators for each of the first-order constructs, i.e., the highest weight was for STQ which had 6 indicators, second came IQ which had 4 indicators, and finally came SQ which only had 3 indicators. In addition, associated with the effect of the number of indicators on the weights is the importance of each variable, compared to the others, in determining the second-order construct. In addition, as shown in Figure 4-3 and Figure 4-4, the t-test from the bootstrap shows that IQ, STQ, and SQ have a significant relation with the POSQ<sub>2</sub>.

***3- Multicollinearity:*** Since PLS does not provide the “Variance Inflation Factor” (VIF) to test for multicollinearity among IQ, STQ, and SQ, we obtained the VIF for the three first-order constructs using WarpPLS. We used the standardized scores for IQ, STQ, and SQ so that they are assigned as indicators to the second-order construct and the obtained weights were 0.366, 0.371, and 0.362 respectively, and all significant at  $p < .001$ . The obtained VIF were 2.723, 2.998, 2.49 respectively, which means that there was no multicollinearity among the formative variables indicating no overlapping due to

similar indicators among the three variables. In fact, a VIF that is less than 3.3 is considered an excellent value (Thongrattana 2010).

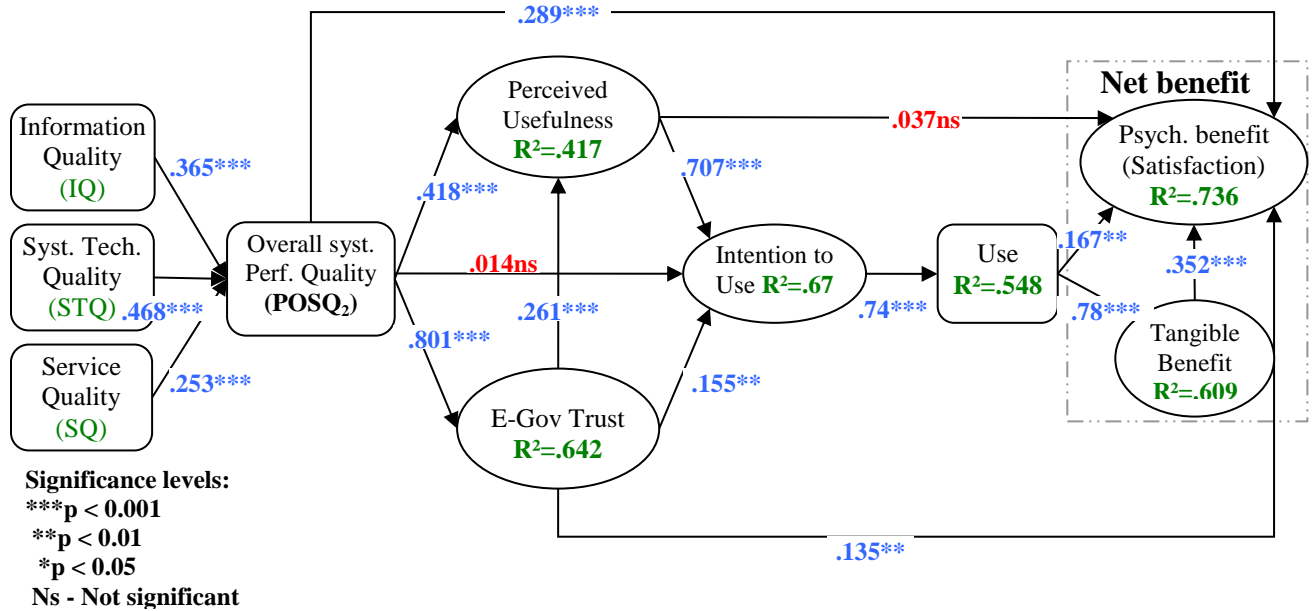


Figure 4-4: CEM showing  $R^2$  and path coefficients for the model which has OSPQ as a second-order construct

#### 4.2.3 Summary findings and analysis: comparison of CEM when POSQ is measured as a first-order and a second-order construct

As we mentioned earlier, the similarity of both models and the use of same data sample to test the models lead to nearly identical results. As demonstrated, the results have confirmed the validity and reliability of the measurement model. All the assessment criteria for the reflective measurements, as shown in the previous sub-section, were fulfilled.

As with the second part of the assessment which is concerned with testing the validity of the structural (inner) model, in general, our proposed conceptual CEM is supported, regardless of how EGS overall quality was measured. 14 out of 16 hypotheses were supported matching with the previous studies as discussed in Chapter 2. The two unsupported hypotheses were H6 from POSQ<sub>1</sub>/POSQ<sub>2</sub> to IU, and H12 from PU to US, which were found to be insignificant. The level of significance for the paths in both models is the same – (see Table 32).

Table 32: The level of significance of paths for the two models				
	POSQ <sub>1</sub> as a First-order construct		POSQ <sub>2</sub> as second-order construct	
	Hypothesis	significance	Hypothesis	significance
1	H1 IQ → POSQ <sub>1</sub>	++	H1 IQ → POSQ <sub>2</sub>	Formative first-order variable +++
2	H4 SQ → POSQ <sub>1</sub>	+++	H4 SQ → POSQ <sub>2</sub>	Formative first-order variable +++
3	H3 STQ → POSQ <sub>1</sub>	+++	H3 STQ → POSQ <sub>2</sub>	Formative first-order variable +++
4	H4 POSQ <sub>1</sub> → US	+++	H5 POSQ <sub>2</sub> → US	+++
5	H5 POSQ <sub>1</sub> → PU	+++	H7 POSQ <sub>2</sub> → PU	+++
6	H6 POSQ <sub>1</sub> → IU	-	H6 POSQ <sub>2</sub> → IU	-
7	H7 POSQ <sub>1</sub> → T	+++	H7 POSQ <sub>2</sub> → T	+++
8	H8 T → IU	++	H8 T → IU	++
9	H9 T → PU	+++	H9 T → PU	+++
10	H10 T → US	+++	H10 T → US	++
11	H11 PU → IU	+++	H11 PU → IU	+++
12	H12 PU → US	-	H12 PU → US	-
13	H13 IU → U	+++	H13 IU → U	+++
14	H14a U → US	+++	H14a U → US	++
15	H14b U → TB	+++	H14b U → TB	+++
16	H15 TB → US	+++	H15 TB → US	+++

For a one-tailed test the critical t-values are:

- + CI 95% significance, t-value ( $p < .05$ ) = 1.65
- ++ CI 99% significance, t-value ( $p < .01$ ) = 2.33
- +++ CI 99.9% significance, t-value ( $p < .001$ ) = 3.12

For a two-tailed test the critical t-values are:

- CI 95% significance, t-value ( $p < .05$ ) = 1.96
- CI 99% significance, t-value ( $p < .01$ ) = 2.58
- CI 99.9% significance, t-value ( $p < .001$ ) = 3.33

As shown in Table 32, the results empirical validation for H6, which was not supported, reveals a contrary position to that postulated in the literature. That is, despite the agreement found in the literature confirming the significant correlation between users' perception of a system's quality or effectiveness and their intention to use it, this proposition was not supported in our research. The results suggest that the concept of this relationship does not apply in the e-government context. In other words, perceiving an EGS to be effective and of good overall quality does not necessarily impact users' intention to use it, especially when users don't have any other alternatives to perform the

task they need. Citizens' use of an EGS is very much connected with their needs such as the need to perform a specific task while there is no other provider for the required service, and their need to use an electronic means due to certain circumstances that prevent them from travelling in person.

The insignificance of H6 suggests three possible interpretations:

- 1- Citizens' perception of the quality of an EGS will not impact their intention to use it unless they actually believe that it would be useful and would provide them with potential benefits; i.e., the relation between POSQ and IU needs to be mediated by PU.
- 2- Similarly, citizens' perception of the quality of an EGS on its own will not impact their intention to use it unless they actually trust the system and that they will successfully obtain what they need when they use it; i.e., this relation must be mediated by TRUST. For example, trusting that the information will be adequate to their needs; trusting that whatever service they require will be followed-up and completed within a reasonable time frame; trusting that the system is reliable enough, secure enough and would work properly whenever they decide to use it, etc.
- 3- It is difficult for citizens to predict whether they will need to perform a particular task or when they might need to do so. So, whether an EGS is perceived to be of good-quality or not is not significantly correlated with the IU of the system because citizens' need for an EGS is un-predictable, the circumstances in which a user might need to use an EGS are un-known, and many services are not usually done on a frequent basis, rather, it may take a long time before a specific service is needed again.

Likewise with H12, the previous theoretical and empirical research confirmed the significant relation from PU to US in the technology use and acceptance literature, including e-government. However, interestingly and contrary to our expectations, H12 was not supported in our study even though the measurement items for PU and US were adopted from previous empirical studies.

Although the result is not consistent with the literature, it does support our claim that the e-government context is different to other contexts for example e-commerce. One of these differences, as we postulated earlier, is related to citizens' objectives for using an EGS. Citizens are mostly interested in obtaining Tangible Benefits, such as saving time and effort. They do not use an EGS to obtain satisfaction per se, even if they perceive it as useful. Thus, it makes more sense that 'US' is influenced by PU after actual use of the system when users' experience with the system matches their expectation of its Usefulness and potential benefits. Accordingly, their Satisfaction would be significantly influenced by the actual attainment of TB rather than their expectations or beliefs of the system's usefulness itself or the potential benefits that might be obtained. Conversely, if users' consider that PU involves an expectation of fun or pleasure, US would logically be significantly correlated with users' PU, however for EGS this was not the case as these systems are not considered to be fun or pleasurable.

Another possibility for the insignificant path from PU to US could be due to the missing feedback loop that was supposed to be added to the model but was excluded in the validation process. The effect resulting from US and feeding back into the model may be lacking, and this may mean that for the strength of the relation from PU to US has been undermined. Table 32 presents a comparison of the path significance for the two models based on the bootstrap t-value results using 1000 samples as the number of iterations.

Moreover, when comparing both models, we find that they both reveal similar values for the explained variance ( $R^2$ ) and path coefficients, with only some minor differences. It seems that the 'general' question used in measuring POSQ<sub>1</sub> acted as if it reflects a higher-order concept (which is generally measured by the measurement items of the first-order constructs).

One possible challenge to CEM might be that POSQ<sub>1</sub> has only one measurement item. However, Ringle *et al.* explain:

*“Single-item constructs have practical advantages ... and there are circumstances in which researchers may have no other choice than to use single item constructs .... Since PLS-SEM allows for the unrestricted use of single item constructs, it is not surprising that many models (31 models, 47.69%) deploy them. In terms of psychometric properties, recent research shows that only under very specific conditions do single items perform as well as multi-item scales ....”* (Ringle *et al.* 2012)

The only observable difference is the relation of the first-order constructs IQ, STQ, and SQ, which serve as indicators to the second-order construct POSQ<sub>2</sub> compared to the relation between the LVs, IQ, STQ, and SQ with POSQ<sub>1</sub>. The explained variance of POSQ<sub>1</sub> with a single indicator reflecting the overall perception of the EGS quality reached about 60% which was explained by its antecedents IQ, STQ, and SQ. This is considered to be very close to the border of the high-range of explained variance classified by W. Chin (1998b). This also means that there are other aspects of the system that exist and would impact the overall perception and may need to be taken into consideration. It also may be worthwhile to add a general question, in future studies, on the overall perception for each system attribute which may increase the explained variance of the POSQ<sub>1</sub>;

Furthermore, although all paths to the POSQ<sub>1</sub> were confirmed to be significant, unlike the paths of H2 and H3 which were significant at  $P < .001$ , the path from IQ to POSQ<sub>1</sub> for H1 was significant at the level of  $P < .01$ , which is also highly associated with the strength of the path coefficient. As shown in Figure 4-2, the path coefficient between IQ and POSQ<sub>1</sub> was the least compared to the other system attributes (STQ and SQ). This indicates that, compared to the other system attributes, IQ has less influence, on the perception of overall EGS effectiveness or goodness of the quality which probably reflects the level of its importance. The significance of the relation between IQ and POSQ<sub>2</sub> was not detectable in the second model because it was measured as a global construct. This leads us to conclude that this model may be better in reflecting reality.



Accordingly, we chose to use the first model with the POSQ<sub>1</sub> which is measured with one indicator for the following reasons:

- 1- When assessing the reliability of the second-order construct, it was found that the reliability is less than one although the second-order is technically composed of the same indicators for those of the first-order. In addition, the Average Variance Extracted (AVE) for the second-order construct turns out to be smaller than the weighted average AVE of the first-order constructs. This generally indicates a loss of some information due to lack of clarity or accuracy of some details that may appear when directly testing the correlations of first-order constructs.
- 2- When comparing the results for both models, we found that there is no considerable difference between the two models as both act very much the same while producing nearly the same results and significant paths.
- 3- Using first-order model will help to understand the explicit correlations between the EGS attributes and trust when we test the sub-hypotheses of trust directly with the first-order constructs IQ, STQ, and SQ.

Consequently, we believe that POSQ, as conceptualized in the context of this study, can be measured with a single measurement-item to reflect the overall perception of EGS quality. The next section will show a comparison for the three sub-groups in order to understand more about the model (CEM) and see its consistency and how it behaves with different groups.

### ***4.3 A comparison for three sub-groups***

This section reports and analyses the results of CEM tested for three groups using the perceived overall EGS quality (POSQ<sub>1</sub>), measured as an ordinary construct with a single ‘general’ measurement item resembling a higher-order conceptualization of the overall perception of the EGS quality.

As explained in the previous chapter, Section (3.4.3), the validation is carried out for testing three sub-groups from the original sample, as was shown in Table 18. The groups are divided as the following:

- 1- the first group consists of all data minus the ministry of interior (*All-MOI*);
- 2- the second groups consists of the ministry of interior (*MOI*);
- 3- the third group consists of the government agencies but minus the MOI (*Gov-MOI*).

#### **4.3.1 Testing the first (*All – MOI*) group**

When we tested the convergent validity for all exogenous reflective measurement items, the factor loadings and cross loadings (shown in Table 33) reveal that all items loaded:

- (1) on their respective reflective latent construct from a lower bound of 0.65 to an upper bound of 0.96;
- (2) more highly on their own respective, latent construct than they loaded on any other latent construct; and
- (3) each item's factor loading on its respective construct is statistically significant at  $p < 0.001$ .

Based on those results, it is evident that these reflective indicators represent distinct latent constructs in the research model for this group, which confirms convergent validity.

The results of testing the discriminant validity for the reflective measurement scales are presented in Table 34. The square roots of the AVEs in bold seem to be greater in virtually all cases than the off-diagonal elements in their corresponding rows and columns. This provides evidence of the discriminant validity of the scales (Fornell and Larcker 1981). However, we still find similar results to those we saw in the '*all data*' group with regards to the inter-correlation in two occasions where the correlation between three constructs appear close to the square root of AVE for a one of these constructs. Namely:

- 1- the correlation between Use and TB with the square root of AVE for Use
- 2- the correlation between IQ and STQ with the square root of AVE for STQ
- 3- the correlation between SQ and STQ with the square root of AVE for STQ

Reliability results from testing the reflective measurement model are reported in Table 35. Consistent with the guidelines of Fornell and Larcker (1981), the average variance

extracted (AVE) for each reflective measure exceeds the minimum recommended threshold of 0.5.

In addition, the data indicates that the reflective measures are robust in terms of their internal consistency reliability as indexed by the composite reliability. The results show that the composite reliabilities of the different measures in the model (Dillon Goldstein's Rho) range from 0.88 to 0.96 (excluding POSQ which equals 1 because it has only 1 indicator), and all well exceed the minimum recommended threshold value of 0.7 (Nunnally 1978).

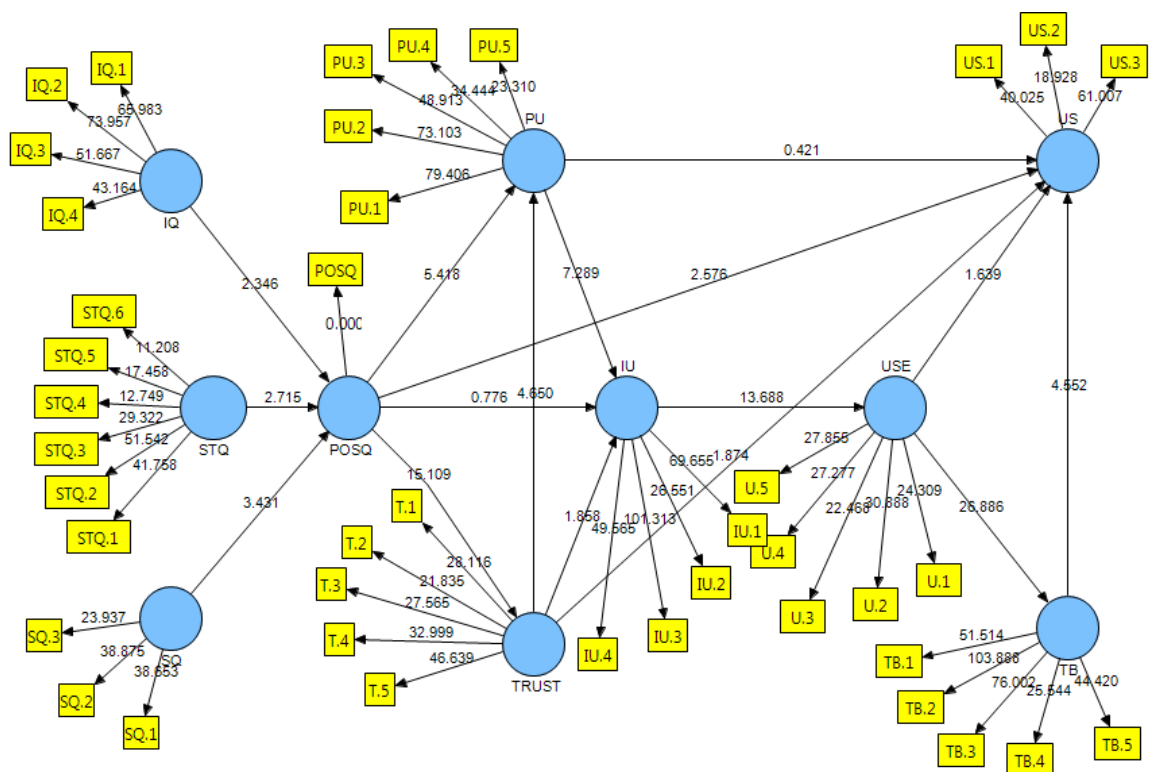
Table 36 displays the standardized total effects on the seven predicted endogenous latent variables. Of the three 'ultimate' predicted variables (e.g. TB, US and Use), the strongest total effects are from Use to TB (0.80) and from IU to Use (0.73).

Table 33: Factor Loadings (Bolded) and Cross Loadings for first ( <i>All – MOI</i> ) group										
	IQ	STQ	SQ	POSQ	TRUST	PU	IU	Use	TB	US
<b>IQ.1</b>	<b>0.92</b>	0.74	0.63	0.64	0.62	0.65	0.53	0.55	0.57	0.65
<b>IQ.2</b>	<b>0.92</b>	0.71	0.64	0.62	0.58	0.55	0.51	0.54	0.59	0.69
<b>IQ.3</b>	<b>0.89</b>	0.63	0.61	0.61	0.61	0.51	0.42	0.52	0.51	0.63
<b>IQ.4</b>	<b>0.89</b>	0.70	0.66	0.55	0.58	0.53	0.48	0.51	0.56	0.66
<b>STQ.1</b>	0.68	<b>0.86</b>	0.66	0.62	0.58	0.50	0.43	0.47	0.45	0.55
<b>STQ.2</b>	0.73	<b>0.89</b>	0.69	0.66	0.68	0.62	0.55	0.57	0.59	0.63
<b>STQ.3</b>	0.63	<b>0.82</b>	0.60	0.57	0.62	0.56	0.43	0.51	0.52	0.50
<b>STQ.4</b>	0.46	<b>0.65</b>	0.49	0.41	0.40	0.39	0.38	0.33	0.33	0.41
<b>STQ.5</b>	0.56	<b>0.73</b>	0.59	0.56	0.65	0.48	0.45	0.42	0.45	0.49
<b>STQ.6</b>	0.46	<b>0.67</b>	0.51	0.42	0.40	0.38	0.41	0.43	0.36	0.42
<b>SQ.1</b>	0.68	0.75	<b>0.84</b>	0.63	0.66	0.55	0.51	0.62	0.58	0.69
<b>SQ.2</b>	0.62	0.64	<b>0.87</b>	0.58	0.68	0.49	0.49	0.56	0.53	0.55
<b>SQ.3</b>	0.45	0.54	<b>0.82</b>	0.57	0.55	0.42	0.41	0.44	0.46	0.50
<b>PP.1</b>	0.67	0.71	0.70	<b>1.00</b>	0.69	0.67	0.61	0.60	0.64	0.71
<b>T.1</b>	0.65	0.66	0.69	0.61	<b>0.83</b>	0.60	0.57	0.51	0.57	0.57
<b>T.2</b>	0.48	0.55	0.50	0.47	<b>0.80</b>	0.46	0.51	0.48	0.41	0.48
<b>T.3</b>	0.43	0.55	0.53	0.54	<b>0.84</b>	0.55	0.54	0.50	0.51	0.53
<b>T.4</b>	0.56	0.62	0.69	0.60	<b>0.84</b>	0.52	0.49	0.51	0.51	0.59
<b>T.5</b>	0.61	0.67	0.70	0.66	<b>0.88</b>	0.58	0.53	0.54	0.55	0.62
<b>PU.1</b>	0.54	0.58	0.52	0.59	0.61	<b>0.94</b>	0.73	0.65	0.75	0.64
<b>PU.2</b>	0.52	0.56	0.50	0.58	0.61	<b>0.93</b>	0.73	0.62	0.74	0.61
<b>PU.3</b>	0.51	0.54	0.46	0.56	0.54	<b>0.91</b>	0.73	0.61	0.71	0.59
<b>PU.4</b>	0.52	0.50	0.47	0.56	0.53	<b>0.88</b>	0.70	0.63	0.72	0.65
<b>PU.5</b>	0.68	0.68	0.65	0.73	0.64	<b>0.85</b>	0.67	0.66	0.75	0.70
<b>IU.1</b>	0.55	0.55	0.55	0.60	0.57	0.72	<b>0.92</b>	0.71	0.77	0.68
<b>IU.2</b>	0.38	0.44	0.46	0.46	0.54	0.64	<b>0.86</b>	0.63	0.66	0.56
<b>IU.3</b>	0.52	0.55	0.54	0.60	0.62	0.77	<b>0.96</b>	0.69	0.76	0.65
<b>IU.4</b>	0.52	0.54	0.49	0.56	0.58	0.76	<b>0.92</b>	0.64	0.77	0.61
<b>U.1</b>	0.47	0.47	0.50	0.45	0.46	0.56	0.49	<b>0.79</b>	0.61	0.58
<b>U.2</b>	0.52	0.53	0.53	0.55	0.49	0.74	0.63	<b>0.85</b>	0.74	0.68
<b>U.3</b>	0.38	0.37	0.42	0.36	0.41	0.47	0.58	<b>0.77</b>	0.58	0.54
<b>U.4</b>	0.50	0.55	0.58	0.56	0.55	0.55	0.64	<b>0.84</b>	0.65	0.59
<b>U.5</b>	0.52	0.51	0.60	0.53	0.58	0.55	0.65	<b>0.84</b>	0.69	0.58
<b>TB.1</b>	0.61	0.59	0.58	0.61	0.57	0.80	0.73	0.72	<b>0.91</b>	0.75
<b>TB.2</b>	0.63	0.59	0.62	0.62	0.60	0.76	0.78	0.77	<b>0.95</b>	0.80
<b>TB.3</b>	0.58	0.59	0.61	0.58	0.59	0.77	0.75	0.72	<b>0.94</b>	0.78
<b>TB.4</b>	0.42	0.41	0.46	0.48	0.46	0.64	0.63	0.68	<b>0.83</b>	0.62
<b>TB.5</b>	0.55	0.51	0.56	0.61	0.57	0.74	0.79	0.76	<b>0.92</b>	0.73
<b>US.1</b>	0.69	0.65	0.71	0.68	0.63	0.58	0.54	0.61	0.65	<b>0.88</b>
<b>US.2</b>	0.51	0.43	0.45	0.45	0.47	0.65	0.62	0.60	0.72	<b>0.78</b>
<b>US.3</b>	0.66	0.59	0.61	0.68	0.61	0.60	0.61	0.66	0.71	<b>0.91</b>

Table 34: Discriminant Validity (Inter-correlations) of the first ( <i>All – MOI</i> ) group										
	IQ	STQ	SQ	POSQ	T	PU	IU	Use	TB	US
IQ	<b>0.905</b>									
STQ	0.769	<b>0.775</b>								
SQ	0.698	0.769	<b>0.844</b>							
POSQ	0.670	0.708	0.704	<b>1.000</b>						
T	0.658	0.732	0.749	0.691	<b>0.837</b>					
PU	0.619	0.638	0.579	0.672	0.652	<b>0.902</b>				
IU	0.537	0.570	0.558	0.608	0.632	0.789	<b>0.916</b>			
Use	0.586	0.596	0.644	0.602	0.610	0.706	0.731	<b>0.819</b>		
TB	0.617	0.592	0.624	0.638	0.615	0.816	0.810	0.801	<b>0.911</b>	
US	0.725	0.653	0.695	0.708	0.671	0.711	0.685	0.727	0.809	<b>0.858</b>

Table 35: Reliability Assessment of the Reflective Measurement Model for the first ( <i>All – MOI</i> ) group			
Latent Constructs	Average Variance Extracted/Explained	Composite Reliability (Dillon Goldstein's Rho)	Cronbach's Alpha
IQ	0.82	0.95	0.93
STQ	0.60	0.90	0.86
SQ	0.71	0.88	0.80
POSQ	1.00	1.00	1.00
Trust	0.70	0.92	0.89
PU	0.81	0.96	0.94
IU	0.84	0.95	0.94
Use	0.67	0.91	0.88
TB	0.83	0.96	0.95
US	0.74	0.89	0.82

Table 36: Total effect of the paths for the first ( <i>All – MOI</i> ) group							
	POSQ	TRUST	PU	IU	Use	TB	US
IQ	0.22	0.15	0.15	0.13	0.10	0.08	0.12
STQ	0.28	0.20	0.19	0.17	0.13	0.10	0.15
SQ	0.33	0.23	0.22	0.20	0.15	0.12	0.18
POSQ		0.69	0.67	0.61	0.44	0.36	0.55
TRUST			0.36	0.41	0.30	0.24	0.29
PU				0.63	0.46	0.37	0.20
IU					0.73	0.59	0.38
Use						0.80	0.52
TB							0.503



**Figure 4-5: Bootstrap Results for the Structural Model and Measurements for the first (*All- MOI*) group**

The t-value produced by the bootstrap in Figure 4-5 showed the same significant vs. non-significant paths as in the ‘*all data*’ group (i.e., POSQ → IU, PU → US, and Use → US) – (See also Figure 4-6). Also, it is evident that the amount of variance explained in the predicted latent variables ranges from a low of 48% (i.e., PU) to a high of 73% (i.e., US). Again, these relative proportions of variance explained fall into the moderate to high range (Chin 1998b).

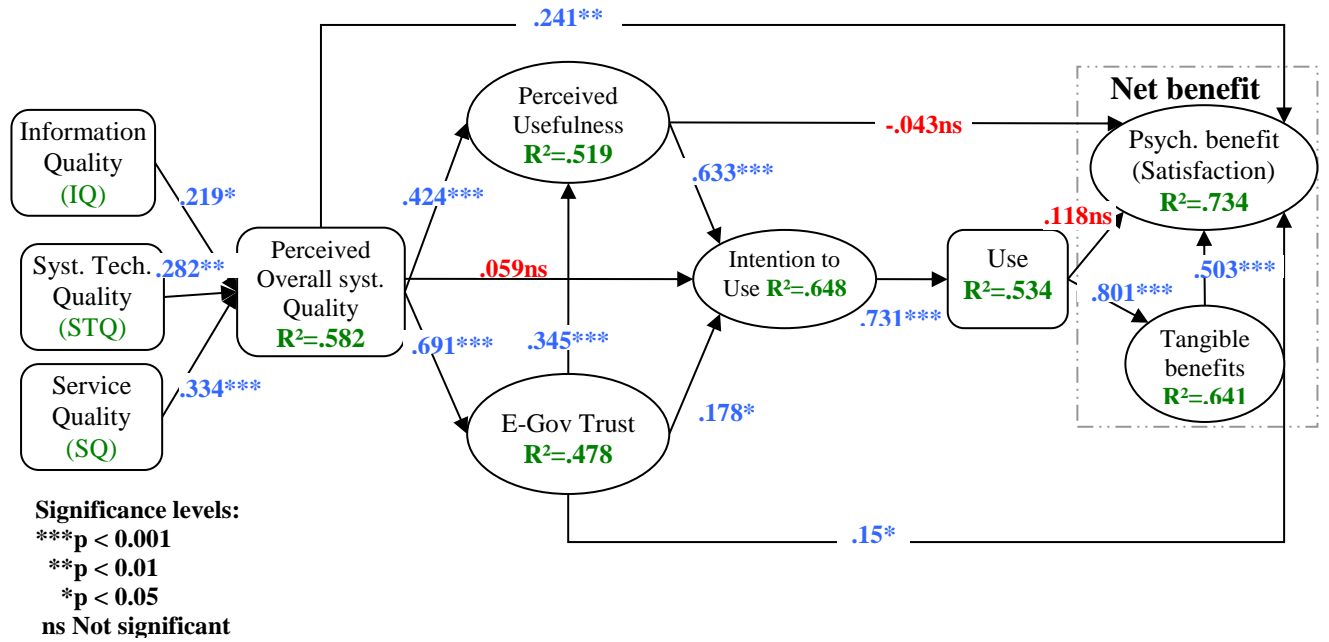


Figure 4-6: CEM showing  $R^2$  and the path coefficients for the first (*All – MOI*) group

### 4.3.2 Testing the second (*MOI*) group

The convergent validity test for all the reflective measurements was confirmed and is shown in Table 37. The results show that all items loaded:

- (1) on their respective reflective latent construct from a lower bound of 0.58 to an upper bound of 0.95;
- (2) more highly on their own respective latent construct than they loaded on any other latent construct; and
- (3) each item's factor loading is statistically significant at  $p < 0.001$ .

The latent constructs' item loadings and cross loadings, and their levels of statistical significance, serve to affirm the convergent validity of these reflective indicators as representing distinct latent constructs in the research model.

Table 37: Factor Loadings and Cross Loadings for the second (MOI) group										
	IQ	STQ	SQ	POSQ	TRUST	PU	IU	Use	TB	US
<b>IQ.1</b>	<b>0.88</b>	0.71	0.64	0.64	0.62	0.50	0.47	0.55	0.51	0.57
<b>IQ.2</b>	<b>0.89</b>	0.75	0.67	0.62	0.60	0.46	0.40	0.50	0.47	0.59
<b>IQ.3</b>	<b>0.84</b>	0.60	0.64	0.58	0.54	0.39	0.37	0.43	0.39	0.55
<b>IQ.4</b>	<b>0.83</b>	0.60	0.59	0.49	0.54	0.41	0.42	0.47	0.41	0.48
<b>STQ.1</b>	0.68	<b>0.88</b>	0.64	0.67	0.62	0.56	0.48	0.63	0.56	0.63
<b>STQ.2</b>	0.71	<b>0.89</b>	0.66	0.66	0.61	0.54	0.49	0.66	0.57	0.68
<b>STQ.3</b>	0.70	<b>0.86</b>	0.59	0.60	0.61	0.56	0.50	0.65	0.54	0.61
<b>STQ.4</b>	0.59	<b>0.77</b>	0.64	0.55	0.63	0.36	0.38	0.45	0.39	0.50
<b>STQ.5</b>	0.45	<b>0.59</b>	0.42	0.35	0.54	0.25	0.19	0.33	0.34	0.35
<b>STQ.6</b>	0.52	<b>0.72</b>	0.51	0.54	0.53	0.48	0.45	0.48	0.54	0.60
<b>SQ.1</b>	0.67	0.71	<b>0.86</b>	0.69	0.67	0.48	0.41	0.55	0.48	0.66
<b>SQ.2</b>	0.66	0.61	<b>0.86</b>	0.63	0.62	0.39	0.44	0.49	0.36	0.56
<b>SQ.3</b>	0.54	0.53	<b>0.82</b>	0.54	0.60	0.32	0.35	0.39	0.26	0.47
<b>PP.1</b>	0.68	0.72	0.74	<b>1.00</b>	0.67	0.52	0.48	0.62	0.57	0.74
<b>T.1</b>	0.73	0.75	0.74	0.67	<b>0.86</b>	0.57	0.57	0.68	0.61	0.74
<b>T.2</b>	0.50	0.58	0.56	0.50	<b>0.85</b>	0.55	0.57	0.60	0.52	0.61
<b>T.3</b>	0.55	0.57	0.57	0.49	<b>0.87</b>	0.44	0.44	0.50	0.47	0.58
<b>T.4</b>	0.48	0.58	0.68	0.58	<b>0.80</b>	0.41	0.41	0.48	0.41	0.56
<b>T.5</b>	0.51	0.62	0.58	0.54	<b>0.84</b>	0.41	0.39	0.53	0.44	0.57
<b>PU.1</b>	0.46	0.53	0.40	0.44	0.50	<b>0.91</b>	0.77	0.68	0.69	0.64
<b>PU.2</b>	0.47	0.53	0.38	0.45	0.51	<b>0.92</b>	0.79	0.69	0.72	0.66
<b>PU.3</b>	0.39	0.47	0.33	0.34	0.47	<b>0.90</b>	0.67	0.58	0.68	0.55
<b>PU.4</b>	0.38	0.46	0.41	0.42	0.45	<b>0.86</b>	0.63	0.62	0.59	0.55
<b>PU.5</b>	0.56	0.62	0.56	0.62	0.60	<b>0.85</b>	0.63	0.68	0.65	0.69
<b>IU.1</b>	0.45	0.54	0.48	0.48	0.51	0.69	<b>0.89</b>	0.67	0.66	0.61
<b>IU.2</b>	0.30	0.33	0.24	0.26	0.43	0.58	<b>0.80</b>	0.54	0.56	0.47
<b>IU.3</b>	0.44	0.47	0.46	0.48	0.49	0.74	<b>0.87</b>	0.64	0.61	0.64
<b>IU.4</b>	0.46	0.51	0.43	0.43	0.54	0.71	<b>0.91</b>	0.68	0.65	0.59
<b>U.1</b>	0.47	0.54	0.46	0.49	0.47	0.46	0.40	<b>0.74</b>	0.47	0.57
<b>U.2</b>	0.50	0.57	0.46	0.48	0.62	0.66	0.64	<b>0.86</b>	0.70	0.67
<b>U.3</b>	0.25	0.34	0.13	0.30	0.34	0.47	0.48	<b>0.58</b>	0.54	0.48
<b>U.4</b>	0.44	0.55	0.55	0.55	0.51	0.49	0.49	<b>0.74</b>	0.44	0.55
<b>U.5</b>	0.42	0.53	0.50	0.47	0.50	0.58	0.64	<b>0.75</b>	0.53	0.53
<b>TB.1</b>	0.53	0.64	0.49	0.59	0.63	0.70	0.67	0.73	<b>0.91</b>	0.75
<b>TB.2</b>	0.48	0.57	0.41	0.51	0.55	0.72	0.69	0.70	<b>0.94</b>	0.69
<b>TB.3</b>	0.50	0.58	0.39	0.50	0.53	0.70	0.64	0.66	<b>0.92</b>	0.66
<b>TB.4</b>	0.34	0.45	0.29	0.43	0.39	0.57	0.52	0.54	<b>0.77</b>	0.53
<b>TB.5</b>	0.38	0.47	0.33	0.42	0.42	0.56	0.56	0.53	<b>0.79</b>	0.55
<b>US.1</b>	0.57	0.67	0.67	0.73	0.72	0.47	0.44	0.61	0.56	<b>0.86</b>
<b>US.2</b>	0.41	0.47	0.33	0.34	0.42	0.71	0.71	0.62	0.64	<b>0.70</b>
<b>US.3</b>	0.57	0.60	0.61	0.70	0.62	0.53	0.49	0.62	0.59	<b>0.87</b>



Table 38 presents the results of testing the discriminant validity of the reflective measurement scales. The bolded elements in the matrix diagonals, representing the square roots of the AVEs, are greater in virtually all cases than the off-diagonal elements in their corresponding rows and columns, providing evidence of the discriminant validity of the scales (Fornell and Larcker 1981). Nevertheless, it appears that there are occasions where the correlation between two constructs appears somewhat close to the square root of AVE for a one of these constructs. For example, the correlation between Use and PU, between Use and IU, and between Use and TB appear close to square root of the AVE of Use. When this occurs, it suggests that there may be a correlation between the pairs of constructs where one was not theoretically expected. This may also be inferred to the high correlation demonstrated in the high path coefficient between each of those two constructs. In addition, in this group, there seems to be a high correlation between Use and US which exceeds the square root of the AVE of USE which could raise questions with regards to the discriminant validity between Use and US. However, this correlation did not seem to be an issue in the other two groups (see Table 34 and Table 42). This opens up a venue for future study to confirm the validity of this constructs using a different data set.

Table 38: Discriminant Validity (Inter-correlations) of the second (MOI) group										
	IQ	STQ	SQ	POSQ	T	PU	IU	Use	TB	US
IQ	<b>0.860</b>									
STQ	0.776	<b>0.792</b>								
SQ	0.740	0.736	<b>0.847</b>							
POSQ	0.681	0.723	0.736	<b>1.000</b>						
T	0.667	0.741	0.747	0.666	<b>0.844</b>					
PU	0.515	0.593	0.474	0.518	0.572	<b>0.891</b>				
IU	0.482	0.538	0.472	0.484	0.570	0.787	<b>0.871</b>			
Use	0.570	0.688	0.572	0.617	0.669	0.731	0.730	<b>0.739</b>		
TB	0.519	0.628	0.446	0.567	0.588	0.751	0.712	0.734	<b>0.872</b>	
US	0.644	0.721	0.672	0.739	0.731	0.688	0.655	0.759	0.736	<b>0.811</b>

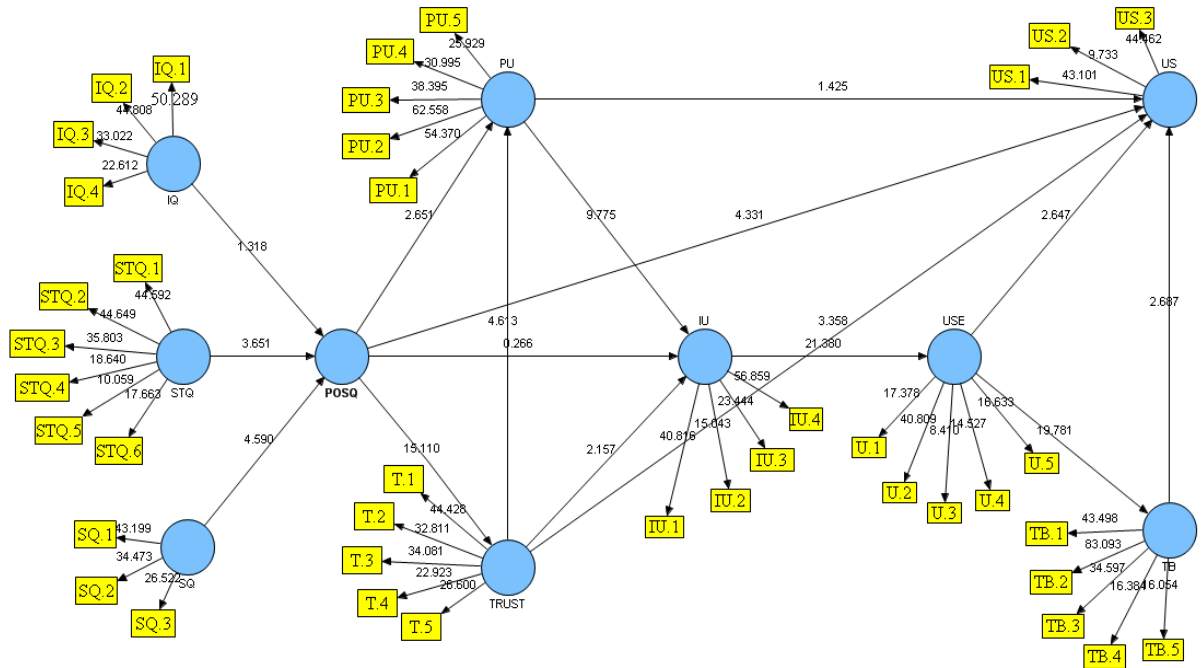
Reliability results from testing the reflective measurement model are reported in Table 39 which shows that the AVE for each reflective measure well exceeds the minimum recommended threshold of 0.5. In addition, the composite reliability indicates that the reflective measures are robust in terms of their internal consistency reliability as they range from 0.85 to 0.95, which is above the recommended threshold of 0.70 (Nunnally 1978).

<b>Table 39: The Reliability Assessment of the Reflective Measurement Model of the second (MOI) group</b>			
<b>Latent Constructs</b>	<b>Average Variance Extracted/Explained</b>	<b>Composite Reliability (Dillon Goldstein's Rho)</b>	<b>Cronbach's Alpha</b>
<b>IQ</b>	0.74	0.92	0.88
<b>STQ</b>	0.63	0.91	0.88
<b>SQ</b>	0.72	0.88	0.80
<b>POSQ</b>	1.00	1.00	1.00
<b>T</b>	0.71	0.93	0.90
<b>PU</b>	0.79	0.95	0.93
<b>IU</b>	0.76	0.93	0.89
<b>Use</b>	0.55	0.86	0.79
<b>TB</b>	0.76	0.94	0.92
<b>US</b>	0.66	0.85	0.73

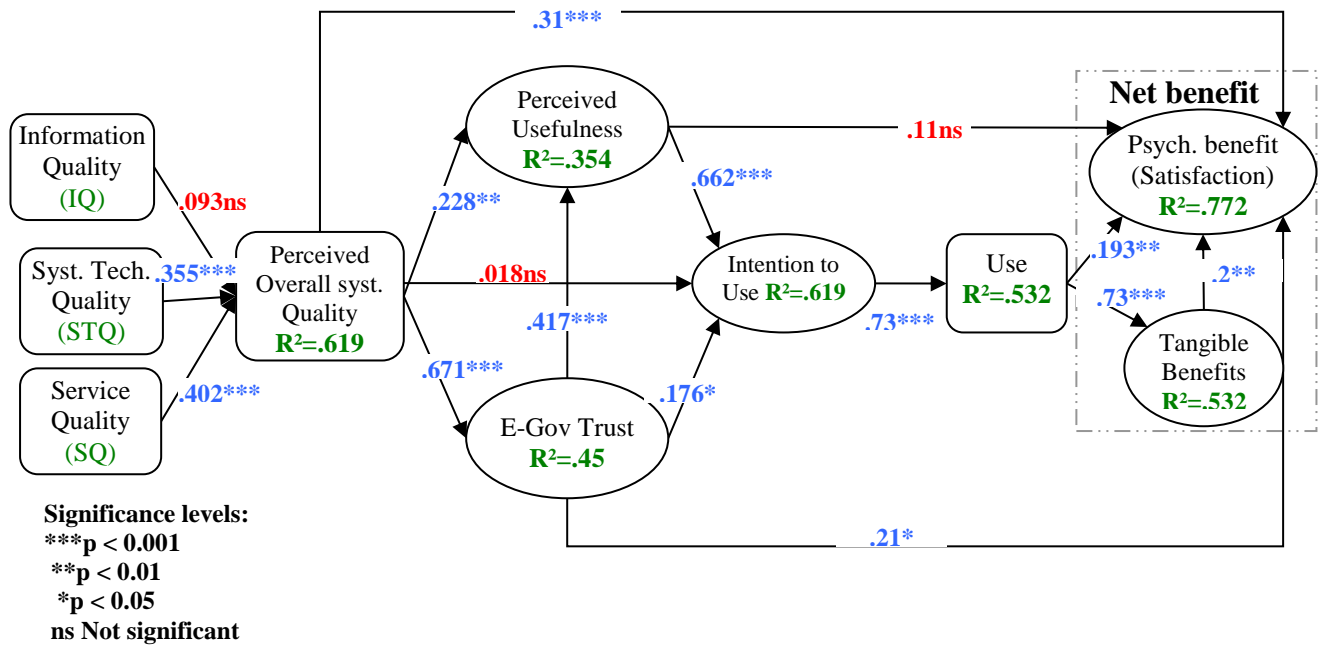
Table 40 displays the standardized total effects on the seven predicted latent variables. Of the three 'ultimate' predicted variables (e.g. TB, US and Use), the strongest total effects are from Use to TB and from IU to Use and both equal (0.73).

<b>Table 40: Total effect in the paths of the model in the second (MOI) group</b>							
	<b>POSQ<sub>1</sub></b>	<b>TRUST</b>	<b>PU</b>	<b>IU</b>	<b>Use</b>	<b>TB</b>	<b>US</b>
<b>IQ</b>	0.13	0.09	0.07	0.06	0.05	0.03	0.08
<b>STQ</b>	0.33	0.22	0.17	0.16	0.12	0.09	0.21
<b>SQ</b>	0.39	0.26	0.20	0.19	0.14	0.10	0.25
<b>POSQ<sub>1</sub></b>		0.67	0.52	0.48	0.35	0.26	0.62
<b>TRUST</b>			0.41	0.45	0.33	0.24	0.37
<b>PU</b>				0.68	0.50	0.37	0.30
<b>IU</b>					0.73	0.54	0.25
<b>Use</b>						0.73	0.35
<b>TB</b>							0.21

The t-test results for the MOI group, displayed in Figure 4-7, reveal three insignificant paths from IQ to POSQ, from POSQ to IU, and from PU to US as also displayed in Figure 4-8. Also, the explained variances ( $R^2$  values) for the predicted latent variables range from a low of 35% (i.e., PU) to a high of 77% (i.e., US) which fall into the moderate to high range.



**Figure 4-7: Bootstrap Results for the Structural Model and Measurements for the second group (*MOI*)**



**Figure 4-8: CEM showing R<sup>2</sup> and the path coefficients for the second (*MOI*) group**

### **4.3.3 Testing the Third group (*Gov Agencies – MOI*)**

When testing the convergent validity for all (exogenous) reflective measurement items for the second group, we find that the factor loadings and cross loadings (shown in Table 41):

- (1) loaded on their respective reflective latent construct from a lower bound of 0.65 to an upper bound of 0.95;
- (2) loaded more highly on their own respective latent construct than they loaded on any other latent construct; and
- (3) each item's factor loading on its respective construct is statistically significant at  $p < 0.001$ .

All the previous results confirm the convergent validity of these reflective indicators to represent distinct latent constructs in our research model.

Table 41: Factor Loadings and Cross Loadings for the third (Gov- MOI) group										
	IQ	STQ	SQ	POSQ	TRUST	PU	IU	Use	TB	US
<b>IQ.1</b>	<b>0.93</b>	0.78	0.64	0.64	0.64	0.63	0.51	0.54	0.55	0.66
<b>IQ.2</b>	<b>0.93</b>	0.75	0.67	0.63	0.63	0.58	0.53	0.53	0.58	0.70
<b>IQ.3</b>	<b>0.91</b>	0.66	0.64	0.62	0.67	0.51	0.45	0.54	0.51	0.66
<b>IQ.4</b>	<b>0.90</b>	0.72	0.66	0.56	0.65	0.52	0.48	0.51	0.56	0.69
<b>STQ.1</b>	0.73	<b>0.86</b>	0.68	0.68	0.64	0.51	0.47	0.49	0.49	0.58
<b>STQ.2</b>	0.78	<b>0.90</b>	0.69	0.69	0.72	0.62	0.55	0.59	0.60	0.64
<b>STQ.3</b>	0.64	<b>0.82</b>	0.56	0.55	0.63	0.51	0.41	0.47	0.47	0.45
<b>STQ.4</b>	0.63	<b>0.82</b>	0.66	0.57	0.70	0.59	0.54	0.51	0.57	0.64
<b>STQ.5</b>	0.53	<b>0.73</b>	0.60	0.55	0.67	0.41	0.42	0.36	0.36	0.41
<b>STQ.6</b>	0.52	<b>0.72</b>	0.62	0.51	0.58	0.50	0.55	0.52	0.46	0.52
<b>SQ.1</b>	0.66	0.76	<b>0.84</b>	0.67	0.72	0.55	0.54	0.62	0.59	0.72
<b>SQ.2</b>	0.66	0.65	<b>0.87</b>	0.56	0.67	0.46	0.45	0.55	0.49	0.58
<b>SQ.3</b>	0.52	0.60	<b>0.85</b>	0.65	0.58	0.46	0.42	0.47	0.49	0.57
<b>PP.1</b>	0.67	0.73	0.74	<b>1.00</b>	0.71	0.68	0.59	0.57	0.62	0.69
<b>T.1</b>	0.70	0.70	0.70	0.60	<b>0.82</b>	0.57	0.55	0.50	0.58	0.58
<b>T.2</b>	0.53	0.62	0.52	0.48	<b>0.80</b>	0.46	0.48	0.48	0.38	0.51
<b>T.3</b>	0.42	0.62	0.52	0.53	<b>0.81</b>	0.54	0.51	0.49	0.47	0.50
<b>T.4</b>	0.60	0.66	0.69	0.63	<b>0.83</b>	0.52	0.52	0.51	0.52	0.60
<b>T.5</b>	0.67	0.73	0.73	0.66	<b>0.89</b>	0.59	0.55	0.56	0.55	0.64
<b>PU.1</b>	0.54	0.59	0.51	0.59	0.61	<b>0.94</b>	0.76	0.67	0.79	0.64
<b>PU.2</b>	0.50	0.58	0.48	0.60	0.60	<b>0.94</b>	0.76	0.65	0.77	0.62
<b>PU.3</b>	0.51	0.57	0.48	0.57	0.55	<b>0.92</b>	0.76	0.63	0.73	0.57
<b>PU.4</b>	0.49	0.48	0.47	0.57	0.53	<b>0.88</b>	0.72	0.65	0.74	0.65
<b>PU.5</b>	0.70	0.69	0.66	0.73	0.63	<b>0.83</b>	0.66	0.64	0.73	0.68
<b>IU.1</b>	0.52	0.57	0.55	0.57	0.59	0.76	<b>0.94</b>	0.72	0.79	0.68
<b>IU.2</b>	0.43	0.49	0.47	0.46	0.55	0.69	<b>0.88</b>	0.66	0.70	0.61
<b>IU.3</b>	0.54	0.59	0.54	0.59	0.61	0.79	<b>0.96</b>	0.71	0.79	0.67
<b>IU.4</b>	0.50	0.57	0.48	0.55	0.58	0.77	<b>0.92</b>	0.66	0.77	0.60
<b>U.1</b>	0.48	0.50	0.52	0.47	0.52	0.58	0.56	<b>0.85</b>	0.67	0.63
<b>U.2</b>	0.55	0.57	0.55	0.58	0.52	0.79	0.68	<b>0.87</b>	0.76	0.69
<b>U.3</b>	0.43	0.43	0.51	0.37	0.48	0.55	0.60	<b>0.82</b>	0.66	0.61
<b>U.4</b>	0.51	0.57	0.59	0.54	0.55	0.56	0.66	<b>0.86</b>	0.68	0.60
<b>U.5</b>	0.48	0.49	0.57	0.47	0.54	0.54	0.65	<b>0.85</b>	0.69	0.57
<b>TB.1</b>	0.61	0.64	0.60	0.61	0.57	0.81	0.72	0.72	<b>0.91</b>	0.75
<b>TB.2</b>	0.62	0.61	0.62	0.62	0.62	0.79	0.80	0.78	<b>0.96</b>	0.80
<b>TB.3</b>	0.57	0.60	0.61	0.58	0.59	0.78	0.76	0.74	<b>0.94</b>	0.77
<b>TB.4</b>	0.41	0.40	0.46	0.44	0.45	0.68	0.68	0.73	<b>0.86</b>	0.62
<b>TB.5</b>	0.53	0.52	0.54	0.59	0.56	0.76	0.80	0.78	<b>0.91</b>	0.72
<b>US.1</b>	0.70	0.67	0.75	0.68	0.67	0.61	0.55	0.61	0.66	<b>0.89</b>
<b>US.2</b>	0.54	0.44	0.51	0.43	0.48	0.62	0.65	0.60	0.74	<b>0.80</b>
<b>US.3</b>	0.67	0.62	0.64	0.69	0.63	0.60	0.61	0.69	0.70	<b>0.92</b>

Table 42 presents the results of testing the discriminant validity of the reflective measurement scales. As in the previous tests, we find that the square roots of the AVEs in bold seem to be virtually higher than the off-diagonal elements in their corresponding rows and columns affirming discriminant validity. However, there appears to be an inter-correlation between IQ and STQ with the square root of AVE for STQ and between Use and TB with the square root of AVE for Use as was seen in the previous groups. Once again, this suggests that there may be a correlation between the pairs of constructs where one was not theoretically expected which are worth testing in future studies.

Table 42: Discriminant Validity (Inter-correlations) for the third ( <i>Gov– MOI</i> ) group										
	IQ	STQ	SQ	POSQ	T	PU	IU	Use	TB	US
IQ	<b>0.916</b>									
STQ	0.795	<b>0.813</b>								
SQ	0.713	0.785	<b>0.853</b>							
POSQ	0.669	0.734	0.739	<b>1.000</b>						
T	0.711	0.806	0.772	0.706	<b>0.829</b>					
PU	0.611	0.647	0.581	0.680	0.649	<b>0.903</b>				
IU	0.538	0.601	0.553	0.589	0.630	0.813	<b>0.928</b>			
Use	0.580	0.605	0.645	0.574	0.615	0.718	0.744	<b>0.849</b>		
TB	0.602	0.609	0.619	0.622	0.608	0.835	0.822	0.818	<b>0.917</b>	
US	0.737	0.667	0.732	0.693	0.687	0.702	0.692	0.731	0.803	<b>0.869</b>

Reliability results from testing the reflective measurement model are reported in Table 43. Like the previous tests, the AVE for each reflective measure exceeds the minimum recommended threshold of 0.5.

<b>Table 43: The Reliability Assessment of the Reflective Measurement Model for the third (Gov–MOI) group</b>			
<b>Latent Constructs</b>	<b>Average Variance Extracted/Explained</b>	<b>Composite Reliability (Dillon Goldstein's Rho)</b>	<b>Cronbach's Alpha</b>
<b>IQ</b>	0.82	0.95	0.93
<b>STQ</b>	0.60	0.90	0.86
<b>SQ</b>	0.71	0.88	0.80
<b>POSQ</b>	1.00	1.00	1.00
<b>Trust</b>	0.70	0.92	0.89
<b>PU</b>	0.81	0.96	0.94
<b>IU</b>	0.84	0.95	0.94
<b>Use</b>	0.67	0.91	0.88
<b>TB</b>	0.83	0.96	0.95
<b>US</b>	0.74	0.89	0.82

In addition, the second-group data indicates that the reflective measures are robust in terms of their internal consistency reliability as indexed by the composite reliability. The results show that the composite reliabilities of the different measures in the model (Dillon Goldstein's Rho) range from 0.88 to 0.96, and all well exceed the minimum recommended threshold value of 0.70.

<b>Table 44: Total effect for the model paths in the third (Gov–MOI) group</b>							
	<b>OSPQ</b>	<b>TRUST</b>	<b>PU</b>	<b>IU</b>	<b>Use</b>	<b>TB</b>	<b>US</b>
<b>IQ</b>	0.14	0.10	0.09	0.08	0.06	0.05	0.07
<b>STQ</b>	0.31	0.22	0.21	0.19	0.14	0.11	0.17
<b>SQ</b>	0.39	0.28	0.27	0.23	0.17	0.14	0.21
<b>POSQ</b>		0.71	0.68	0.59	0.44	0.36	0.53
<b>TRUST</b>			0.34	0.43	0.32	0.26	0.34
<b>PU</b>				0.71	0.53	0.43	0.17
<b>IU</b>					0.74	0.61	0.42
<b>Use</b>						0.82	0.57
<b>TB</b>							0.54

Table 44 displays the standardized total effects. Of the three 'ultimate' predicted variables (TB, US and Use), the strongest total effects are from Use to TB (0.82) and from IU to Use (0.74).

Unlike the previous models, the bootstrap test reveals that that there are 2 more insignificant paths. So there are 4 insignificant paths compared to. 12 significant paths, as displayed in Figure 4-10. The insignificant paths are H1 from IQ → POSQ, H6 from POSQ → IU, H12, from PU → US, and H14a from Use → US. Also, the explained variances (R<sup>2</sup>) of the predicted latent variables range from a low of 50% (i.e., Trust) to a high of 73% (i.e., US), thus they fall into the moderate to high range.

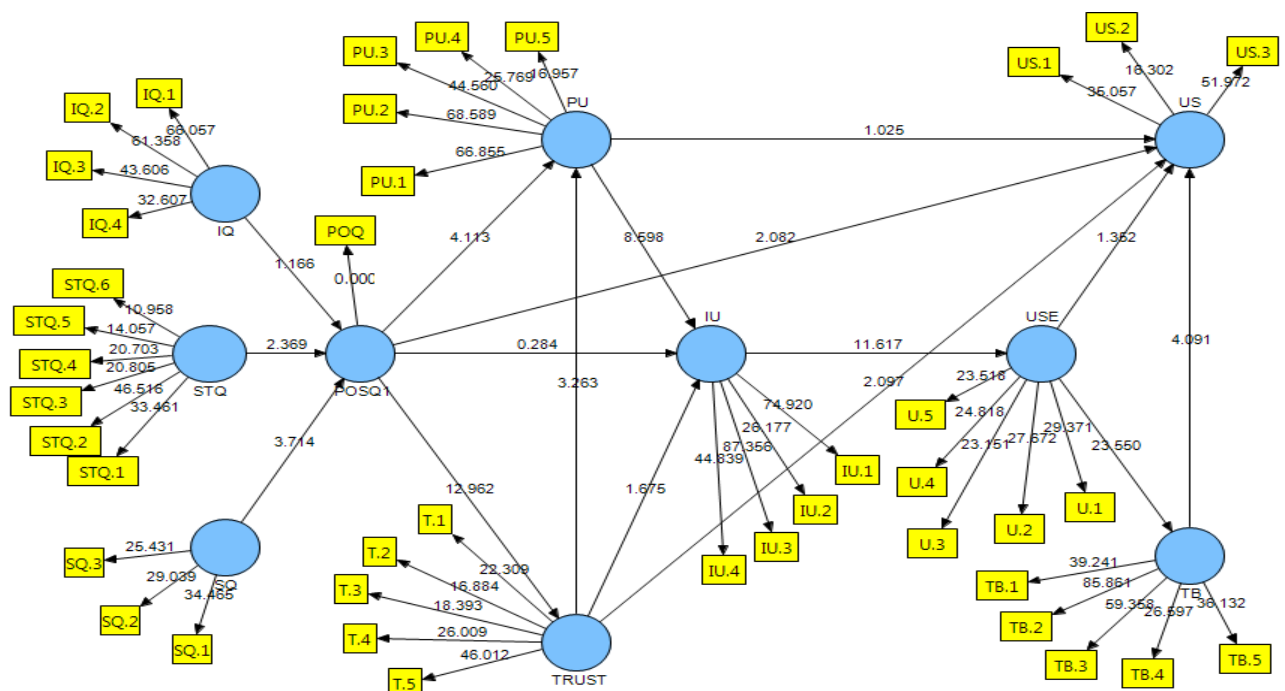


Figure 4-9: The Bootstrap Results for the Structural Model and Measurements for the third (Gov-MOI) group

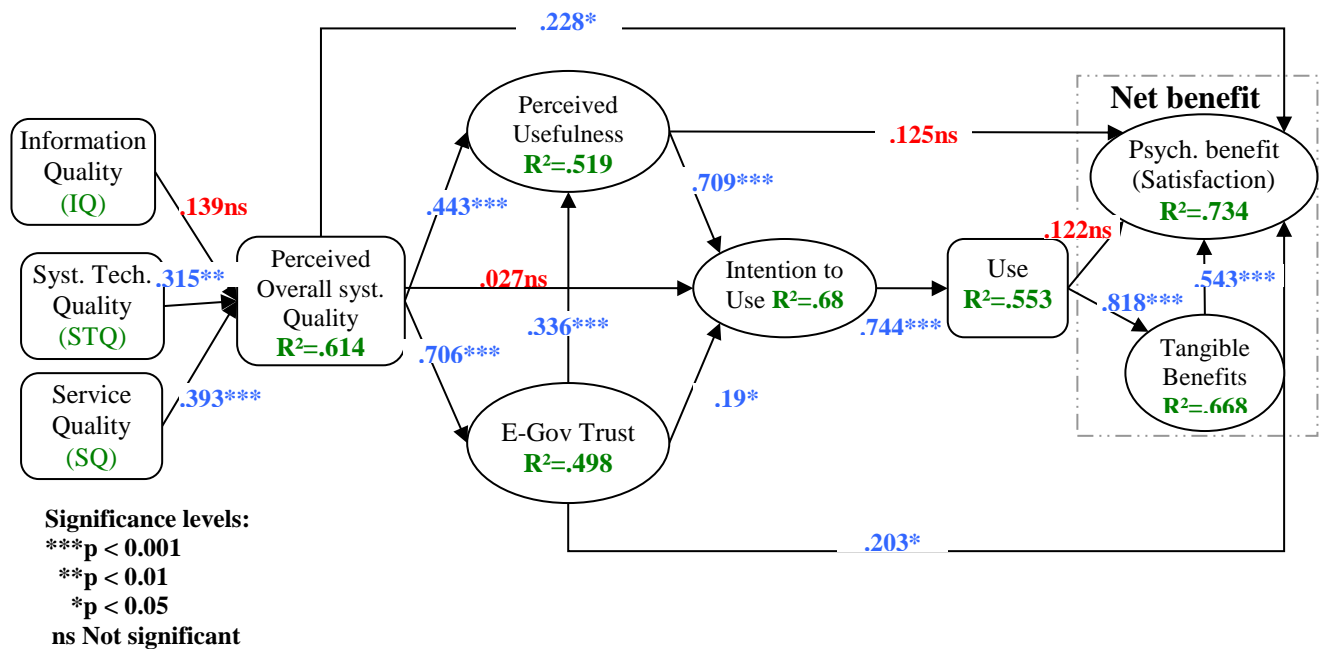


Figure 4-10: CEM showing R<sup>2</sup> and the path coefficients for the third (Gov-MOI) group.



#### **4.3.4 Testing the sub-hypotheses for the three groups**

Since we are only testing the first part of the model which is concerned with the relation between the system attributes and the aspects of trust, there will be no changes to the other path correlations or to the  $R^2$ . Therefore, we will mostly focus on reporting the results of the validation of the sub-hypotheses for the three groups, discarding the results of the measurement model and anything beyond the Trust construct in the structural model. The three sub-hypotheses are:

**H7a:** IQ has significant positive impact on the level of trust in information credibility provided in an EGS

**H7b:** STQ has significant positive impact on citizens' Trust in the Integrity, Privacy and Security of an EGS

**H7c:** SQ has significant positive impact on citizens' Trust in the operational competency of an EGS.

As shown in Figure 4-11 , Figure 4-12, and Figure 4-13, for the three groups, all the Trust sub-hypotheses H7a, H7b, and H7c were supported at the level  $p < .001$  which is consistent with the literature as previously discussed in Section 2.5.1. This step is intended to confirm the validity of the relationship between the first-order constructs IQ, STQ, and SQ with the aspects of perceived trust or sub-attributes (i.e., Trust in IQ, Trust in STQ, and Trust in SQ). This step also helps ensuring that the validity and reliability of the results are not jeopardized when a second-order  $POSQ_2$  is used instead of  $POSQ_1$ . That is because in the case of using a second-order of the overall system quality, only the second-order construct is connected to the other constructs such as trust. Consequently, the explicit relations between the 'first-order' system attributes and the corresponding trust sub-attributes are not detectable.

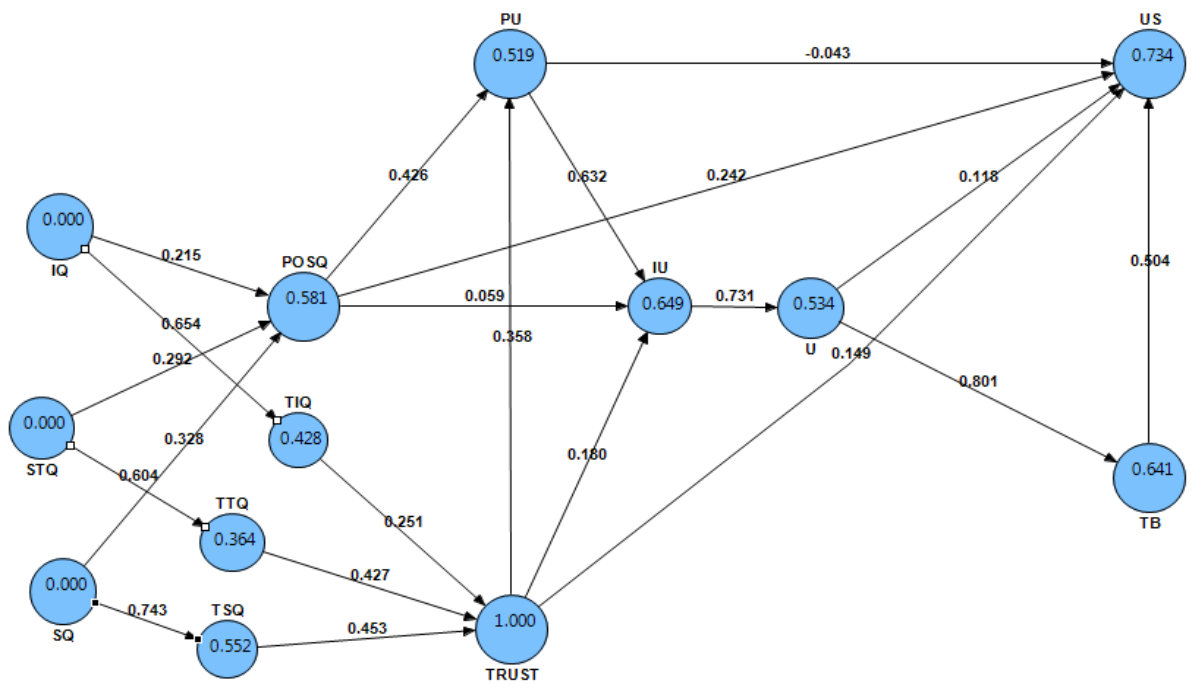


Figure 4-11: PLS Results for the structural model for the first (*All - MOI*) group

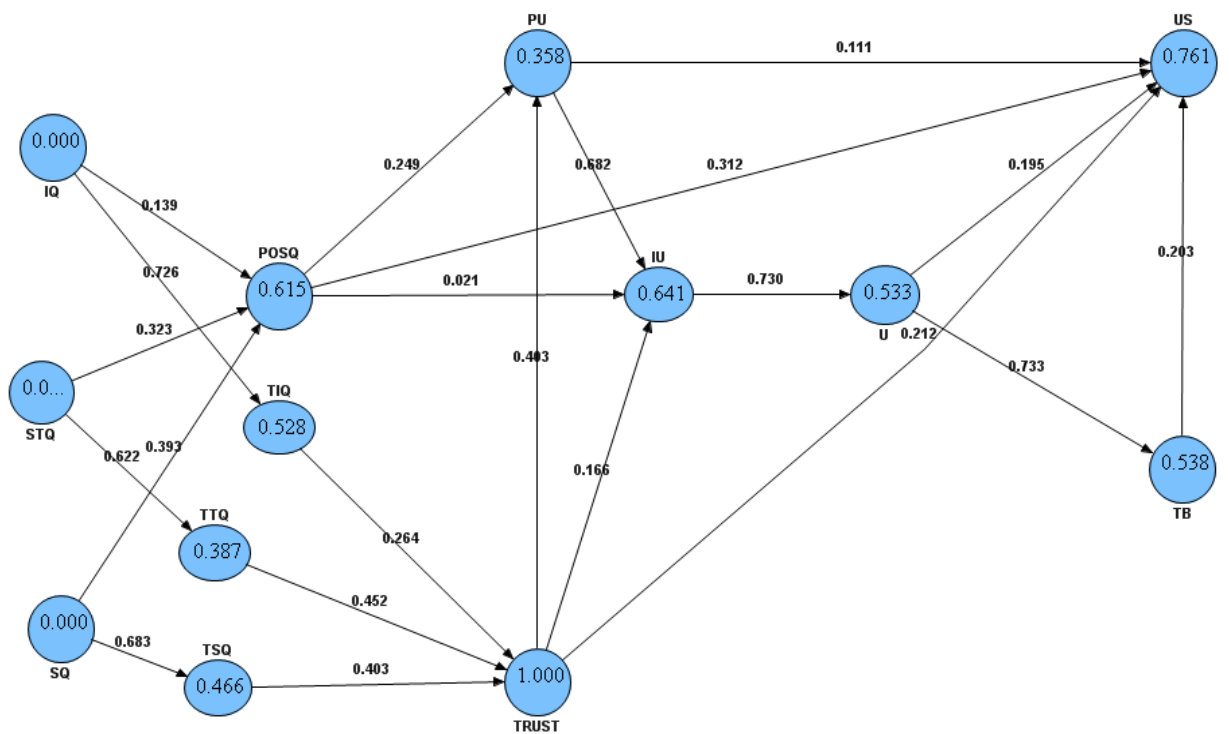


Figure 4-12: PLS Results for the structural model for the second (*MOI*) group

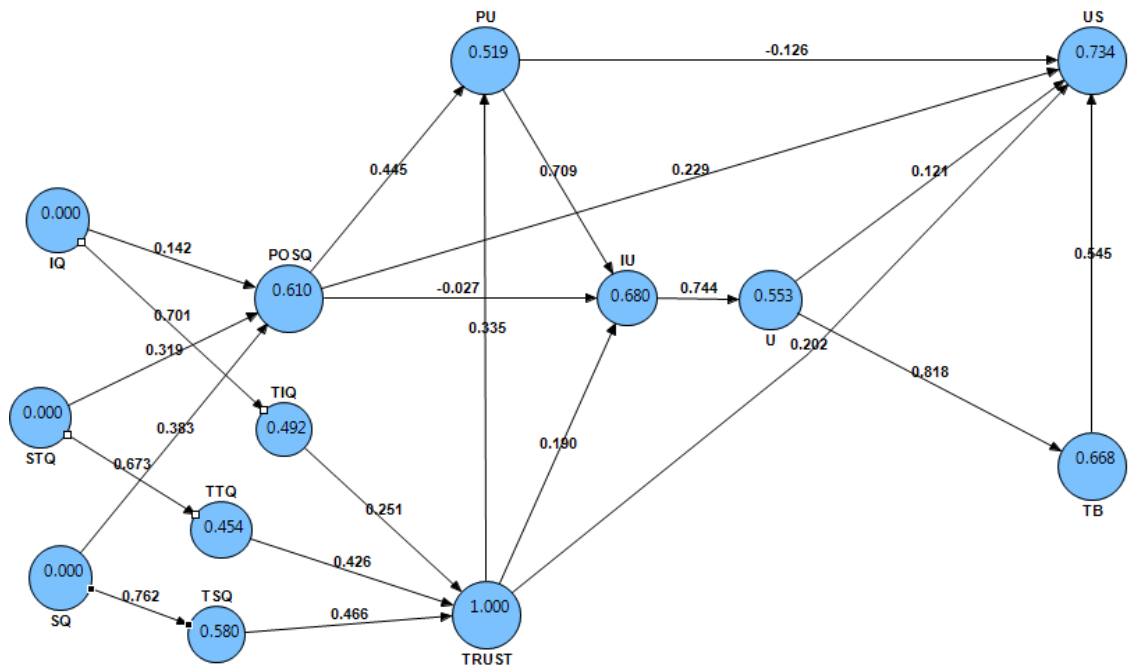


Figure 4-13: PLS Results for the structural model for the third (*Gov-MOI*) group

#### 4.3.5 Discussion: A comparative analysis for the three groups

To better understand the appropriateness of the model in the e-government context we tested how the model behaves in the three data subsets. We focused more on the possible variations in the structural (inner) model because the measurement model had already been validated and no significant difference was expected among the groups. However, there was one noticeable difference in the discriminant validity assessment. The data of the second (*MOI*) group seemed to have more instances where the inter-correlations between Use and another construct were close to the square root of AVE of Use; namely, the correlations of Use and PU, Use and IU, in addition to the Use and TB inter-correlation that existed in all groups.

Table 45 presents the explained variance ( $R^2$ ) for the three groups. As shown in the table, all the explained variances ( $R^2$ ) fall in the ‘moderate’ range though there are some variations among the three groups. The difference in  $R^2$  between the constructs ranged from 2.1 (e.g., in Use) to 6.1 (e.g., in IU). However, among the three groups, there were two significant drops for  $R^2$  where the change between the highest and lowest values went up to 13.6 in PU and 16.5 in TB; and both instances occurred in the second (*MOI*) group. To more accurately represent this change for any construct, we calculated the

percentage of difference (i.e., the difference between the highest and lowest  $R^2$  in the three groups divided by highest value of  $R^2$ ). So, the percentage change ranged from a minimum of 3.8% to as high as 31.8% in PU.

Table 45: Comparison of the explained variance for each construct in the three groups						
	Construct	First group (All-MOI)	Second group (MOI)	Third group (Gov-MOI)	Dif ( $\Delta$ )	$\Delta\%$
1	Perceived Usefulness (PU)	51.9	35.4	51.9	16.5	31.8
2	Tangible Benefits (TB)	64.1	53.2	66.8	13.6	20
3	Intention to Use (IU)	64.8	61.9	68	6.1	9
4	Trust (T)	47.8	49.8	45	4.4	8.8
5	Perceived Overall System Quality (POSQ)	58.2	61.9	61.4	3.7	6
6	User Satisfaction (US)	73.4	77.2	77.2	3.8	5
7	Use	53.4	53.2	55.3	2.1	3.8
Notes: - The presented figures are all in percentages (%) - Dif= The difference between the highest and lowest $R^2$ in the three groups - $\Delta\% = \text{Dif} \div \text{highest } R^2 \text{ among the three groups}$						

It can be seen in Table 45 that the greatest difference in the explained variances, were 31.8%, 20%, and 9%, for the constructs, PU, TB, and IU, respectively. All appeared in the second (MOI) group. In fact all the  $R^2$  for other constructs in the same second (MOI) group were higher than, if not approximately equal to, the  $R^2$  in another group. Interestingly, those low  $R^2$ s, in the second (MOI) group, for the mentioned constructs happen to be the same ones that had the highest inter-correlation with the square root of AVE for Use, as mentioned above. The results also shows that PU in the second (MOI) group was the least explained among the three groups. It appears to have had a large decrease in its explained variance as it had the largest drop down of 32%.

When comparing the 3 groups, we found that there were two insignificant paths in all groups and they were for **H6** from POSQ to IU and **H12** from PU to US. Our interpretations for these two results were presented earlier in Section (4.2.3) when interpreting the results of the 'all data' group. Apart from these two paths, we found some variation in the significant paths among the three groups – (see Table 46). The following discussion about the insignificant paths, for the three groups, will only discuss the paths other than those from POSQ to IU and from PU to US which were discussed earlier.

The first (*All-MOI*) group, which contained all data excluding the MOI data set, (i.e., composed of the other government agencies + Education Institutions (equals 205) – (see Section (3.4.3)), had two more insignificant paths. The first insignificant path was for **H14a** from Use to US.

Table 46: A comparison for the significant paths in the three groups and the supported hypotheses					
	Hypothesis	First group (205)	Second group (196)	Third group (131)	Conclusion
		All - MOI	Only MOI	Gov Agencies - MOI	
1	<b>H1</b> IQ → POSQ	++	-	-	Partially supported
3	<b>H2</b> STQ → POSQ	+++	+++	++	Supported
2	<b>H3</b> SQ → POSQ	+++	+++	+++	Supported
4	<b>H4</b> POSQ → US	+++	+++	+	Supported
5	<b>H5</b> POSQ → PU	+++	++	+++	Supported
6	<b>H6</b> POSQ → IU	-	-	-	Not supported
7	<b>H7</b> POSQ → T	+++	+++	+++	Supported
8	<b>H8</b> T → IU	++	++	+	Supported
9	<b>H9</b> T → PU	+++	+++	+++	Supported
10	<b>H10</b> T → US	++	+++	+	Supported
11	<b>H11</b> PU → IU	+++	+++	+++	Supported
12	<b>H12</b> PU → US	-	-	-	Not supported
13	<b>H13</b> IU → U	+++	+++	+++	Supported
14	<b>H14a</b> U → US	-	++	-	Partially supported
15	<b>H14b</b> U → TB	+++	+++	+++	Supported
16	<b>H15</b> TB → US	+++	++	+++	Supported
<div> <div>For a one-tailed test the critical t-values are:</div> <div> <div>+</div> <div>CI 95% significance, t-value (p &lt; .05) = 1.65</div> </div> <div> <div>++</div> <div>CI 99% significance, t-value (p &lt; .01) = 2.33</div> </div> <div> <div>+++</div> <div>CI 99.9% significance, t-value (p &lt; .001) = 3.12</div> </div> </div> <div> <div>For a two-tailed test the critical t-values are:</div> <div> <div>CI 95% significance, t-value (p &lt; .05) = 1.96</div> </div> <div> <div>CI 99% significance, t-value (p &lt; .01) = 2.58</div> </div> <div> <div>CI 99.9% significance, t-value (p &lt; .001) = 3.33</div> </div> </div>					

This means that US does not seem to be correlated with citizens' Use of an EGS. It appears that this first (*All-MOI*) group doesn't have any particular feeling of satisfaction from using the EGS. This could be interpreted that simply using an EGS will not lead to satisfaction unless TB was obtained first, that is, the users are mostly concerned with accomplishing a specific task in an efficient manner. This again could be inferred to the e-government context where users are mostly interested in obtaining tangible benefits from using an EGS and not seeking pleasure per se.

There are several studies proposed that there is a positive significant relationship between the two constructs (see for example, Lee *et al.* 1995, DeLone, 2004 #135; Bokhari 2005). However, there has been a lot of controversies and conflict on agreeing of which construct influence the other as some argued that Use leads to US while others argued otherwise showing no clear cut as to which leads to which (Bokhari 2005). However, it has been suspected that some of those studies might have been biased toward showing statistically significant findings (Bokhari 2005). Some empirical studies showed weak relationships, and others revealed a negative relationship (see, Bokhari 2005). In all of the above cases, the studies suggested the existence of some sort of a relationship between Use and US.

Some studies, on the other hand, argued otherwise saying that there was no relationship between Use and US (see for example, Schewe 1976; Bokhari 2005; Khalil and Elkordy 1997). Srinivasan (1985), for instance, suggested that the relationship is not always positive. In fact as we earlier discussed in Section (2.2.5.6.1) "[Use] does not necessarily mean that the users are satisfied, the system may be all they have and it's better than nothing" (Cheney and Dickson 1982, p. 175).

Indeed, it is more logical to expect that US will increase/ decrease based on the level of the obtained Tangible Benefits. This is evident in the significant correlation between TB and US in the three groups, as shown in Table 46 where Use is highly correlated with TB and TB is highly correlated with US. This means that users' obtained TB plays an important role as a pre-requisite for their satisfaction. In other words, the relation between Use and US must be mediated by the TB in order for it to be significant; and that would make sense, especially in the e-government context. From the results shown in the previous table, we can conclude for the first (*All-MOI*) group, citizens'

satisfaction is only influenced by their perception of the systems' quality (i.e., POSQ) and TB, which are both direct antecedents. Nevertheless, the relation between Use and US appears to be significant at the level of  $P < .001$  (two-tailed) in the 'all data' group which may be due to the bigger sample size.

It is worth noting that when Use has links to US and TB while there is also a link from TB to US, the effect of Use on US decreases because of this mediation effect of TB. When the path between TB and US is removed, the path from Use to US turn to be highly significant (at  $p < .001$  two- tail), as it demonstrated in Figure 4-14 and Figure 4-15.

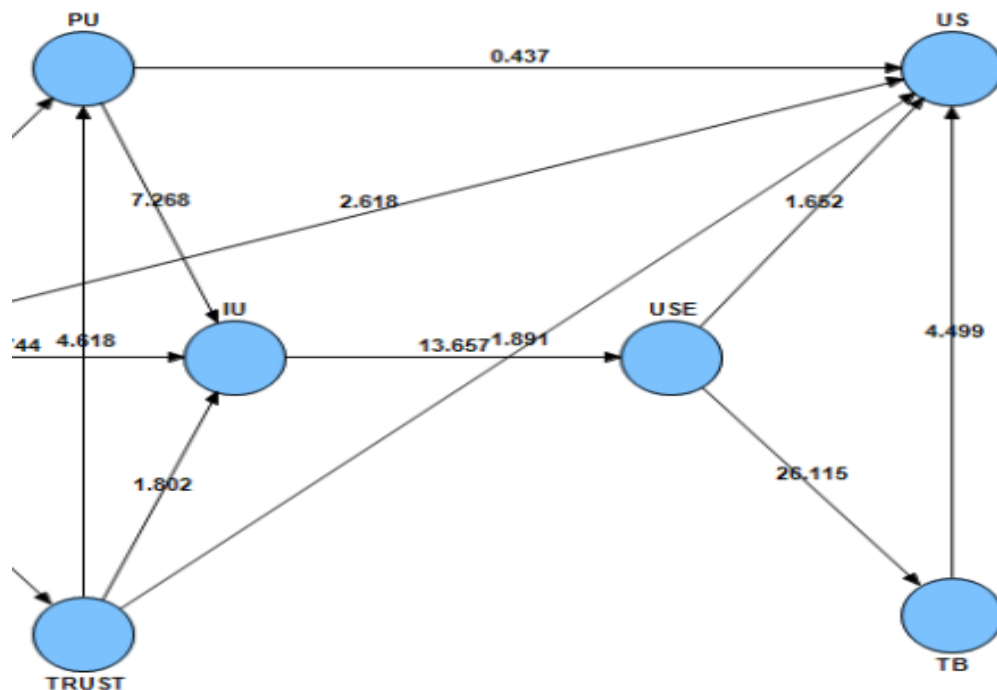


Figure 4-14: Bootstrap Results for the Structural Model for the first (All- MOI) group when there is a link between TB and US

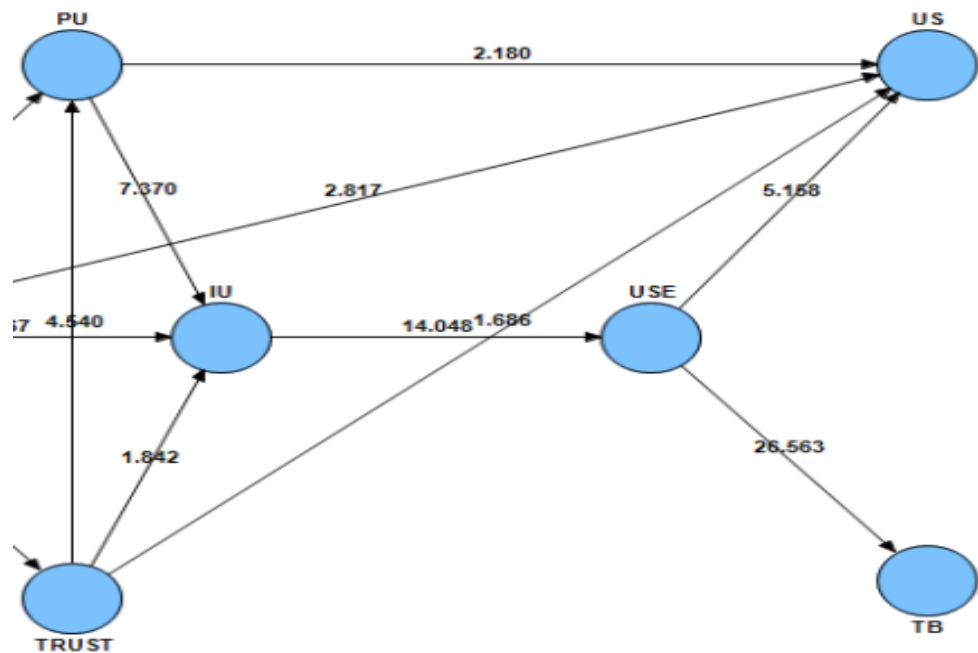


Figure 4-15: Bootstrap Results for the Structural Model for the first (*All- MOI*) group excluding the link from TB to US

However, removing the path from TB to US causes the  $R^2$  of US to drop from 73.4 to 67.5 which reflects a decrease of 8%, though it is still in the high-range classification as suggested by Chin (1998c). Given the high correlation between TB and Use, it undermines the power of the preceding construct which in this case is Use. Also logically, the existence of more paths that lead to a particular construct helps in explaining more variance in that construct.

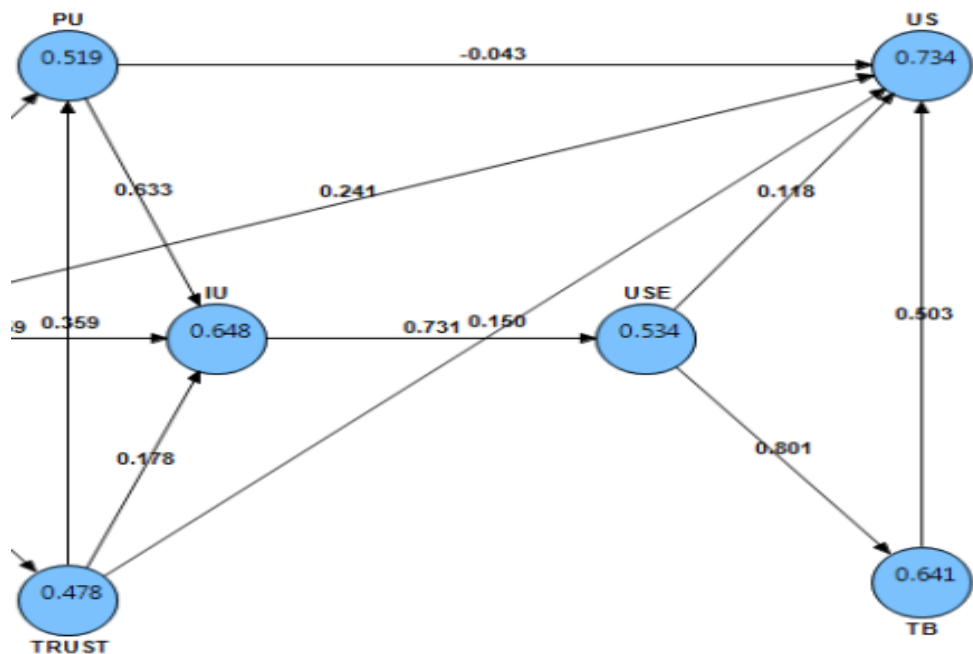


Figure 4-16: PLS Results showing the t-value for the first (*All- MOI*) group when there is a link between TB and US



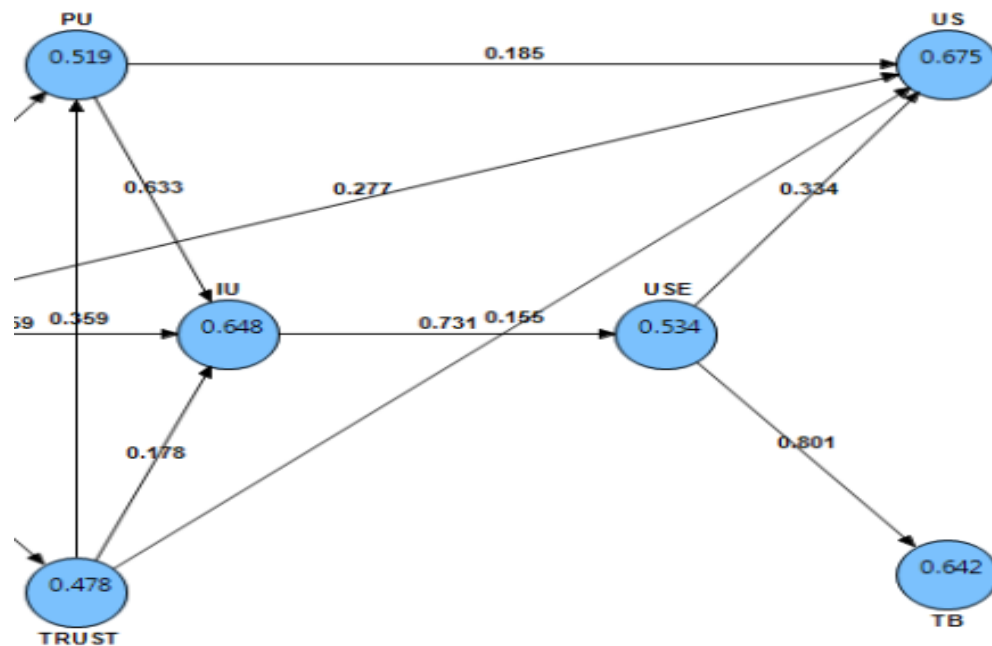


Figure 4-17: PLS Results showing the path coefficients and R<sup>2</sup> for the first (*All- MOI*) group excluding the path from TB to US

Like H14a, it appears in the above figures that the complexity of the model and the mediation effect of the Use, IU, and TB have strongly influenced the power of PU on US, which resulted in an insignificant path from PU to US. As shown in Figure 4-15, removing the path from TB to US has reduced the mediation effect which consequently caused the direct path from PU to US to be significant at  $p < .01$ , which is consistent with the literature. The absence of the mediation effect of TB in the previous studies explains why the relation between PU and US was always found to be positively significant.

Nevertheless, based on the findings from this study, there is a strong indication that the relation from TB to US is very important and should be therefore kept in the model. This relation may be more specific to the e-government context and this is what differentiates the previous studies from this one, demonstrated by the insignificant paths. The insignificant paths appear to be a consequence of the addition of the TB variable and most importantly the link between TB and US; yet they are deemed to be logically justified. Therefore, the results from this study identifying ‘non-significance’ does not necessarily contradict previous studies but may be specific to this context of e-government.

In the second (MOI) group, which was composed of 196 responses forming the MOI data set, the other<sup>74</sup> insignificant path was different from the first (*All-MOI*) group. Interestingly, the path from IQ to POSQ was insignificant; thus, **H1** was not supported in the second group.

It is possible that the reason for this insignificant path between IQ and POSQ is related to users' previous experiences and expectation(s). For example, a frequent and experienced Web user might think that an EGS has great IQ but may be so used to good IQ on other websites that the EGS still remains unimpressive, even though the EGS has good IQ. Alternatively, a user may have had a bad experience on a number of websites, so his/her expectations of SQ are very low. Accordingly, when that person uses our EGS, his/her positive experience of its SQ makes him rate the POSQ much higher than other respondents<sup>75</sup>.

The third (*Gov-MOI*) group, on the other hand, had two additional insignificant paths other than the ones from POSQ to IU and PU to US, which existed in all groups. Like the second (*MOI*) group, the path from IQ to POSQ, for H1, was found to be insignificant. The other insignificant path was from Use to US for H14a, as in the first group.

To explain the differences that occur between groups, it is necessary to examine the membership of those groups. For example, the first (*All-MOI*) group (which comprises the users of all the agencies excluding the user of MOI) and the third (*Gov-MOI*) group (which comprises government agencies excluding the MOI) are only distinguished by the Education Institutions users. So the difference between the first and third group is likely to be influenced by the presence and variance of the Education Institutions users (74 responses) which count exceeds the minimum sample required to 'theoretically' produce robust results. For that reason, we can infer that the responses of Educational Institutions users are the ones which caused the correlation between IQ and POSQ in the first group to be significant while it is not in the third (*Gov-MOI*) group. This higher-

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<sup>74</sup> Indicating to a path other than the one from POSQ to IU which was found insignificant in all three groups.

<sup>75</sup> These were just examples and do not correlate to the demographic question s introduced in the survey.

level of correlation for the first correlation can be inferred to the environment of the Education Institutions webpage or online system, which could be caused by the fact that:

- the Education Institutions' users care more about IQ;
- IQ plays an important role as a component of the system; and that
- the services that the users use are more information-oriented.

The insignificant path in the third (*Gov-MOI*) group, on the other hand, means that the users in this group are probably more interested in a different type of services that are not very much information-based, regardless what exactly the e-service is. Possibly, the e-services that are information-related, in ordinary government agencies, mostly involve checking personal status. That does not mean that IQ has absolutely no impact on the POSQ. The results have shown that IQ will probably influence one's perception of the POSQ of an EGS but does not determine it, which means that there is a weak relationship between IQ and POSQ. It is expected that IQ would affect POSQ especially that we conceptualized POSQ to be a higher-order (even if measured by a single general question) which theoretically would regards IQ as conceptually part of an EGS.

Although H1 for the relation between IQ and POSQ was not supported in the second (*MOI*) and third (*Gov-MOI*) groups, which jointly forms all the government agencies (327 responses)<sup>76</sup>, it was supported in the first (*All-MOI*)<sup>77</sup> group (205 responses) which is the only group of the three that include Education Institutions users. H1 was also supported in the 'all data' group, which is technically composed of the responses in the three groups (401 responses)<sup>78</sup>. In the 'all data' group, the responses of the government agencies form a higher proportion of the sample, and the Education Institutions users represent only 18% of the total responses, compared to 36% in the first (*All-MOI*) group. Given the low proportion of the Education Institutions users in the 'all data' group, it was expected that the path from IQ to POSQ would be insignificant as in the case of the second and third (*Gov-MOI*) groups. However, H1 was supported in the 'all data' group and at  $P < .01$  level, being consistent with the literature.

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<sup>76</sup> The second (*MOI*) group of [196 responses] + the third (*all government agencies other than MOI users*) group [131] = **327** responses

<sup>77</sup> The first group has **205** responses and is composed of the education institutions users + the government agencies users other than the MOI

<sup>78</sup> The 'all data' group has the all the government agencies responses [327]+ the educational institution users [74] which is equal to **401** responses

We could justify this significance because the sample is larger and this may have consequently formed a better reliability. In addition, this could mean that larger sample sizes might provide more information about the perception of IQ which may not be used as much as the online services. Accordingly, we will accept H1 to be partially supported and future investigation would be useful to confirm the validity of this hypothesis.

Finally, when comparing the path ‘total effect’ on the dependent variables for the three groups – (see Table 36, Table 40, and Table 44) – it was noticed that, of the three ultimate dependent variables (i.e., Use, TB, and US), US had the least value. At first we were inclined to refer this result to the insignificant path(s) leading to US. However, with a more careful analysis, we realized that this explanation is not valid. First, throughout the model, the paths that lead to US are the same as the ones that leads to TB, yet there are even three more direct paths that also lead to US, and they are coming from POSQ, Trust, and PU. That means that there are more paths that lead to US than to TB and they are not all insignificant.

Second, US in the second (*MOI*) group showed the least total effect of (.21) among the three groups. The total effect on US in the first and third (*Gov-MOI*) group were similar to each other representing, .5, .54 respectively. So, despite that the third (*Gov-MOI*) group had the highest number of insignificant paths leading to US, it still had the highest total effect value of .54. These results contradict the suggestion that the insignificant paths preceding US causes the value of the total effect to be lowest for US.

The next section will present the revised model based on the results and the issues discussed in this section as an attempt to obtain the most reasonable model that would serve the purpose of this study.

#### **4.4 The revised model (CEM)**

In the previous section we found that there were some paths that were significant in some groups and not significant in others. For example, the paths from POSQ to IU and from PU to US were found to be insignificant in all groups. This section presents a revised model based on the results of the validation of the structural (inner) model. That

revised model was tested using PLS on the three groups to confirm the final results after the modification.

To produce the revised model we set some guidelines as a starting point based on the initial results, which were presented and discussed earlier in this chapter. Accordingly, we will do the following:

1. Eliminate the path from POSQ to IU because it was insignificant in all three groups. The empirical findings confirm that there is no correlation between citizens' perception of the overall system quality and their intention to use it. This means that citizens' Use of an EGS is not driven or induced only because of its 'good' quality. Rather, they must believe that it is useful for them in terms of sufficing their need and providing them with Tangible Benefits. Therefore, the path from POSQ to IU path should be discarded.
2. Eliminate the path from PU to US because it was insignificant in all three groups. The empirical findings suggest that there is no direct relationship between citizens' perception of the usefulness of the system and their level of satisfaction. It appears that, in context of e-government, citizens' beliefs of whether a system is useful, on its own does, will not influence their satisfactions unless they use the system and obtain tangible benefits. This means that the relation between PU and US needs to be mediated by Use and TB.
3. Exclude IU from revised model, as in previous other studies (e.g., [Petter et al. 2008](#); [Wang and Liao 2008](#)). We justify this step based on the following reasons:
  - i- We are more interested in the actual Use variable rather than the IU because the attainment of final benefits will only occur after the actual use rather than the intention to use per se.
  - ii- The correlation between IU and Use is very high. So this path can be dropped as Use is sufficient on its own, especially since having IU to the model does not add more explained variance to the ultimate dependent variable.
  - iii- To reduce the needlessly reduced effect of some constructs on others due to the mediation effect, which will also reduce the complexity of the model, while at the same time preserving the value of our model in evaluating the system characteristics and the obtained benefits.

4. The paths which originally lead from PU and Trust will be directly connected to Use instead because IU has been removed from the model.
5. For those hypotheses that were partially supported:
  - i- The path from Use → US will be kept as is in the original model because we believe that Use has a direct impact on US. The lack of significance was strongly influenced by the mediation effect which was not very prominent in the ‘all data’ group, probably because the larger sample size reduced that mediation effect.
  - ii- The path from IQ → POSQ will be kept for further validation in the future studies because the results show variability in the significance of this path among the different groups. The concepts of the IQ as being an important segment of the overall system quality is well supported in the literature and we have no legitimate justification to exclude this path from the CEM at this stage.

Figure 4-18 shows the revised CEM based on the previous results and discussion excluding the path from POSQ to IU and the IU construct and the path from PU to US while leaving in the partially supported paths, i.e., IQ to POSQ and Use to US.

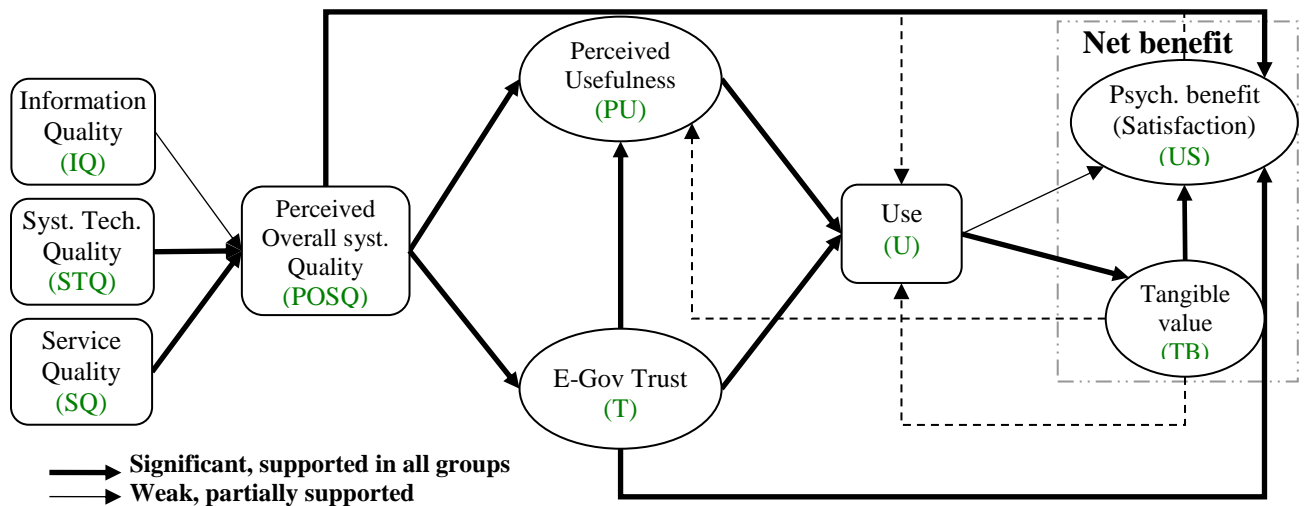


Figure 4-18: The revised CEM including the recommended feedback loops

The revised model was tested for the three groups and the PLS and the bootstrap results are shown in Figure 4-19, Figure 4-20, and Figure 4-21.

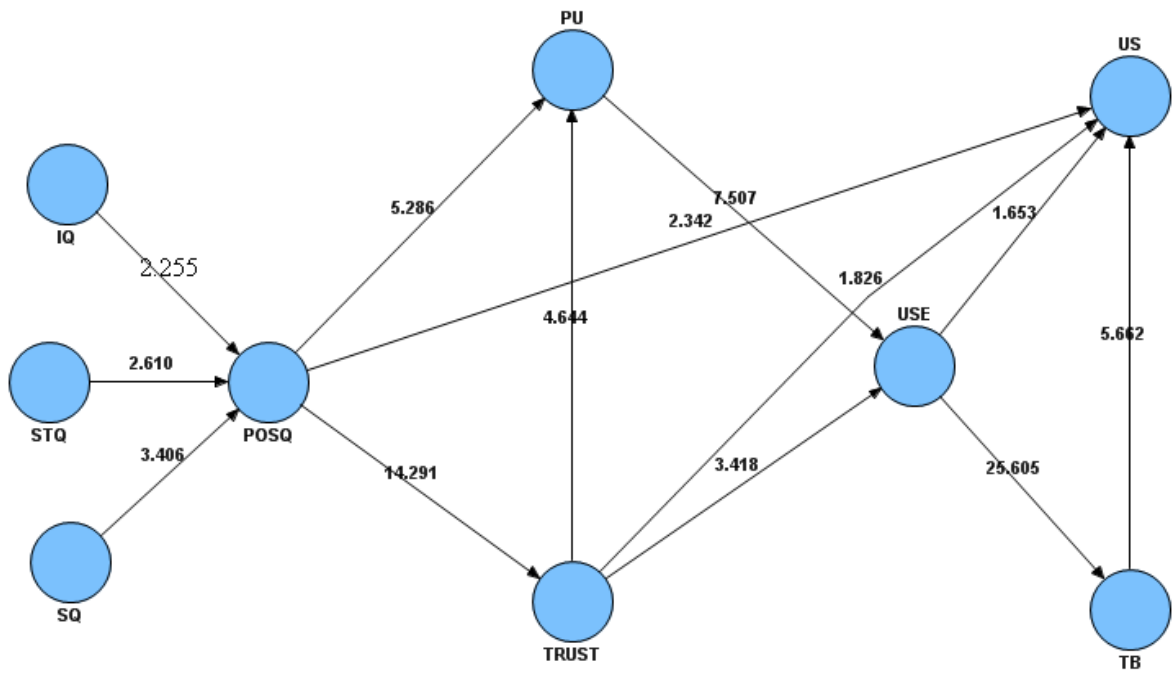
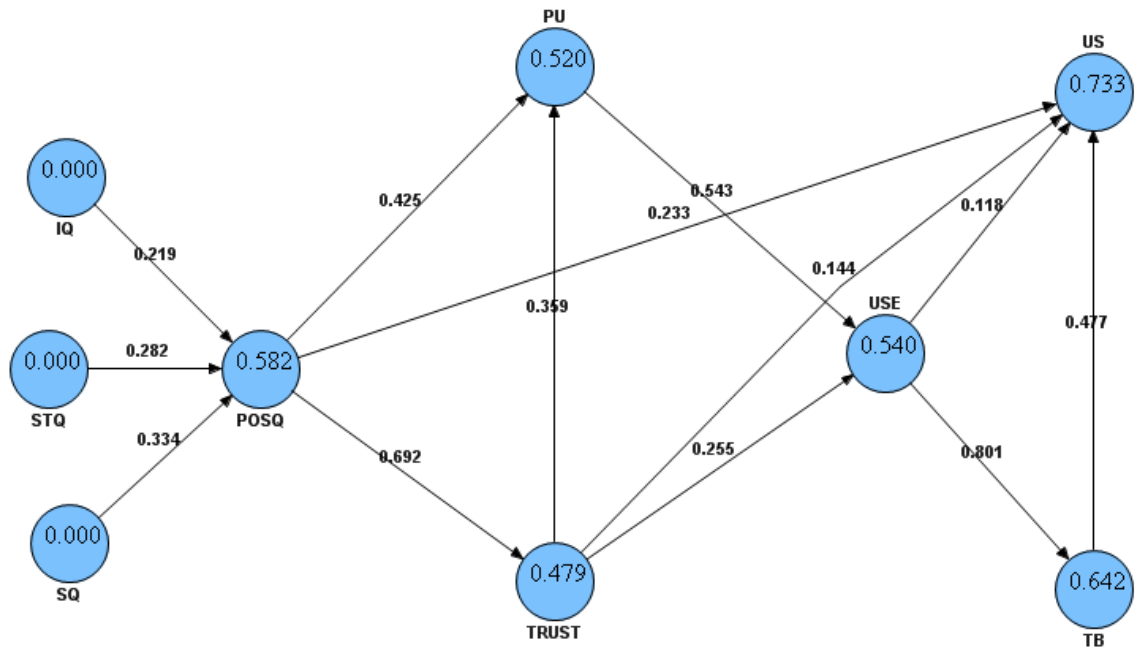


Figure 4-19: PLS and Bootstrap results for the first (*All-MOI*) group, after the modification

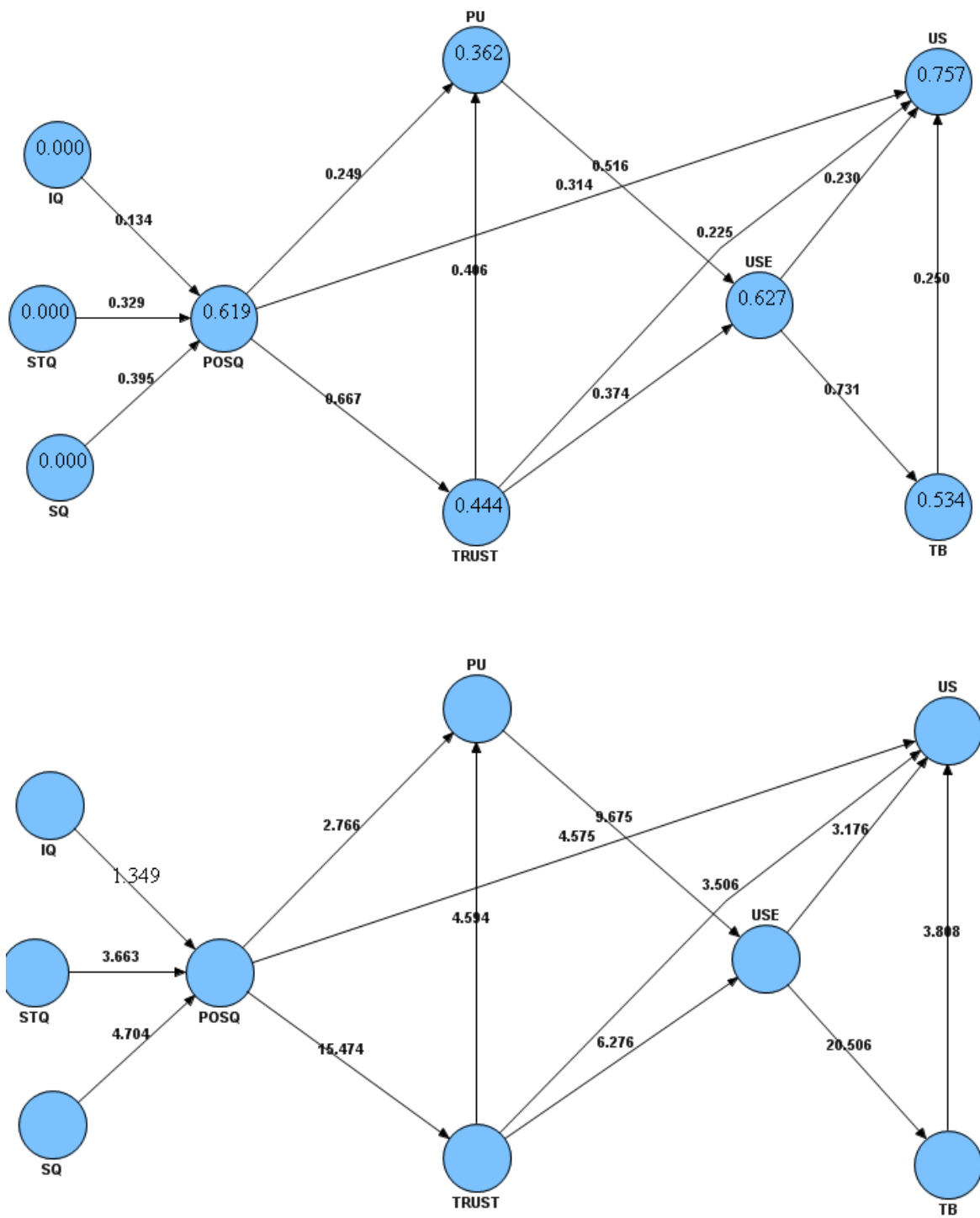


Figure 4-20: PLS and Bootstrap results for the Second (*MOI*) group, after the modification



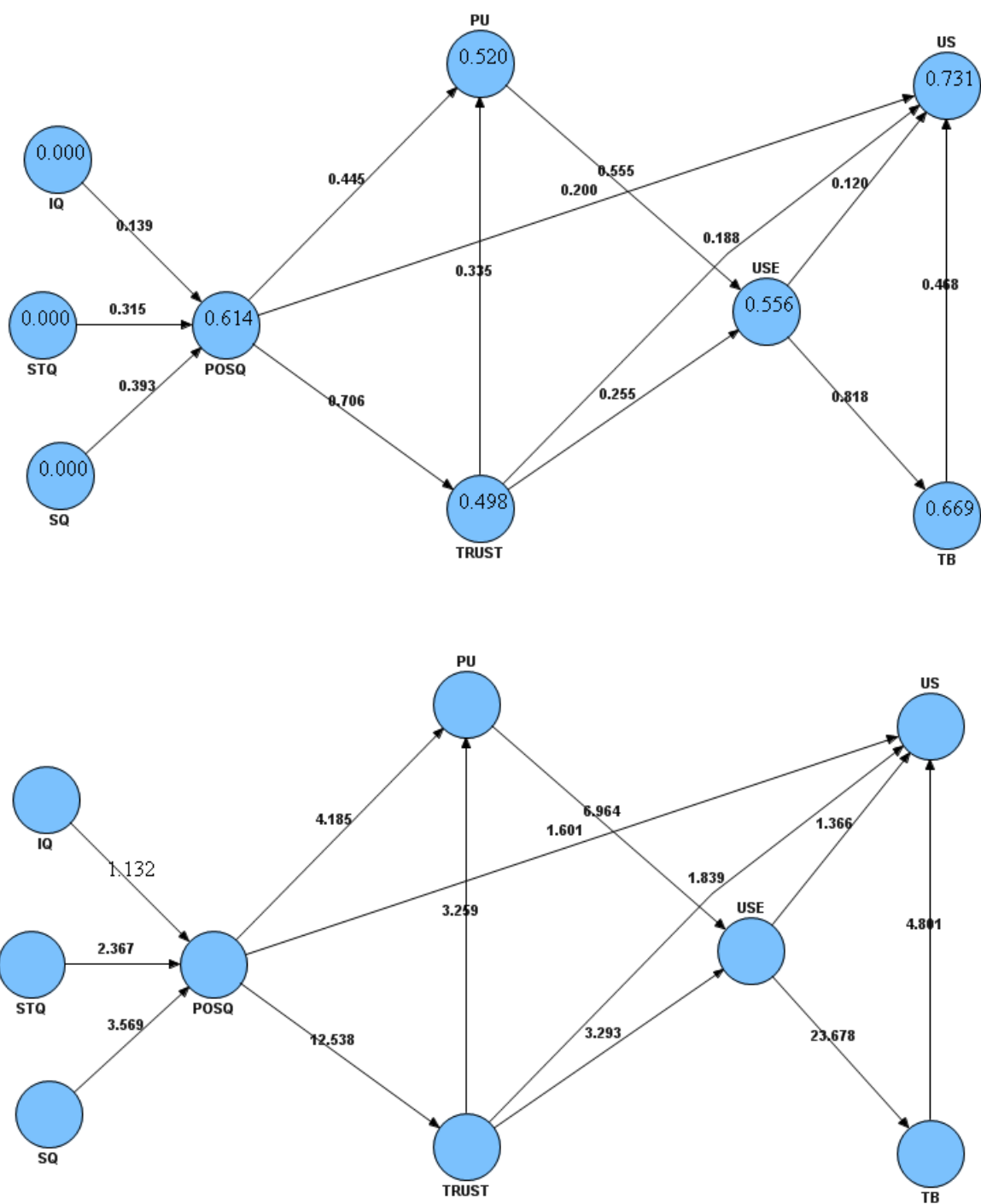


Figure 4-21: PLS and Bootstrap results for the third (*Gov-MOI*) group, after the second modification

The results of the structural model for the three groups show that:

- 1- The exclusion of the path from POSQ to IU from the original model did not cause any change on the other paths in the revised model. None of the significant paths have become insignificant nor have the insignificant paths become significant.
- 2- The  $R^2$  values remained the same in the revised model. This indicates that removing the IU construct and the path from POSQ to IU did not have any effect on the understating of the ultimate dependent variables which reflect the consequences of using an EGS. However, the effect of removing the IU construct has caused explained variance of Use to increase by 18% indicating that some of the explained variance of IU has been transferred to Use due to the direct link from PU and Trust to Use bypassing IU.
- 3- All the paths for the three groups are significant except the path from IQ to POSQ and from Use to US which remain insignificant in the first and third group. The path of IQ to POSQ remains insignificant of course because there was not change to the first part of the model.
- 4- The path significance for the new paths from PU to Use and from Trust to Use, after excluding IU) are significant at  $p < .001$  in all groups.

## ***4.5 Conclusion***

This chapter has presented the process that was used to validate our conceptual CEM. In the first section of this chapter, a comparison was carried out for our conceptual CEM while treating POSQ as a first-order construct and then as a second-order construct. This was conducted due to the way we conceptualized POSQ. This step was conducted for the sake of completeness and to see whether either of these treatments would be better or is different from the other. The results confirmed our expectation that POSQ is better treated as a first-order construct. Thus for the remainder of this chapter we used the first-order POSQ to test the hypotheses and sub-hypotheses and evaluate CEM for the three groups.

The validation of the model revealed that the model was largely supported. The validity and reliability of the measurement model was confirmed. In testing the structural model, only one path was insignificant in all groups, which was from POSQ to IU, and it was possible to rationalize that based on the e-government context. So, its exclusion was justifiable. Three other paths appeared insignificant in some groups and significant in others. Our analyses of the results included possible explanations for the variation of why some paths were significant in some groups and insignificant others. The paths of those partially supported hypotheses were not excluded from the revised model which would be worth studying in future research. Based on the results of the validation of the CEM and based on our analyses, revised model was introduced along with justification for the suggested changes. The model was then tested again for the three groups and the final results were summarized accordingly. The results of the testing of the refined model did not reveal dramatic or unexpected changes; in fact, confirmed the validity of the revised model over the original model.

The next and last chapter concludes this study by summarizing the important findings. It will point out the importance of this study in terms of its purpose, its results, and its significance in practice and contribution to the literature.

## 5 CONCLUSION

### 5.1 Introduction

The previous chapter presented the results of the validation of the conceptual CEM, which was largely supported. The non-supported hypotheses were expected and justifiable in the e-government context. This chapter provides an overview of the most significant aspects of this study which were presented in the previous chapters. Initially this chapter presents a summary of the key issues of this study including the motivation behind this study and the most important findings and conclusions, followed by the study's significance in the way it was produced for, both, academic researchers as well as e-government practitioners and decision makers. Finally, the study's limitations are presented which incorporates our suggestions for potential directions of future studies.

### 5.2 Summary of Key Issues

#### 5.2.1 Motivations for this study

The significance of e-government projects, and the implications of implementing such initiatives, requires critical analysis and evaluation of the level of their success. This can be accomplished by assessing each objective as a success factor. Since one core objective of implementing an EGS is to provide an accessible tool to better serve the public, especially citizens, it is imperative to assess their perception of what they receive and the consequences of using this particular system. Using an evaluation instrument that is reliable and reflects reality is vital for governments in order to assess their ongoing progress, performance, and service quality provided through their online system. So the research question for this study was: ***“is there a valid model that can be used to assess an EGS performance and quality and the obtained psychological and tangible benefits for the citizens who use it?”***

The obvious differences between the e-government and e-commerce contexts require a suitable evaluation tool that measures the level of EGS success in terms of its efficiency by assessing its quality as well as how citizens “as users” benefit from it. It was therefore important to ensure the availability of an evaluation tool that takes into consideration these aspects in addition to the motivators that encourage citizens' use of an EGS in order to benefit from the system.

After reviewing the literature, it appeared that there was a lack of a sufficient and reliable assessment tool that can serve this purpose. Therefore, the aim of this study was to develop and validate a model that can be used to assess an EGS from the citizens' perspective and their obtained psychological and tangible benefits. Accordingly, we opted for proposing a model extracted from the relevant literature from which an appropriate assessment tool can be developed.

### **5.2.2 The process of producing the model**

In order to ensure the validity of our proposed model (CEM), we empirically validated it based on data collected from Kuwait for citizens using government agencies EGS. For the purpose of validating the CEM, a sample of citizen-users (i.e., EGS users) was essential as only they can provide their feedback on their perception of the EGS quality and performance, and only the citizens who used the system are able to indicate whether the system provided them with benefits. The statistical approach that was used for validating the model and the data collected through our proposed survey instrument was Partial Least Squares (PLS) of Structural Equation Modeling (SEM). PLS, which is generally used for exploratory research of a priori model, such as ours, was also chosen for its known robustness in dealing with complex models. It is not demanding in its underlying assumptions that are related to small sample sizes, reflective constructs, and the number of measurement items of each construct. A thorough explanation of SEM was presented, comparing PLS with the CB-SEM and justifying why PLS was chosen at this stage over CB-SEM.

To ensure the reliability of our proposed model, it was empirically and rigorously validated. Since EGS perceived overall system quality (POSQ) was conceptualized in our study as a higher-order concept which includes all system attributes and reflecting their qualities altogether. For the sake of completeness, the model was compared with another one reflecting two cases:

1. POSQ<sub>1</sub> was set as first-order construct measured by a single general item reflecting the EGS quality.
2. POSQ<sub>2</sub> was considered as second-order construct measured by all the measurement items of the first-order factors.

Thereafter, the model that appeared to be more suitable was used to carry out the rest of the validation process in the next stage. In this next stage the model was compared with a combination of three sub-groups of the whole collected to further validate and understand how the model behaves in different cases. These three groups were differentiated considering the type of institution.

### **5.2.3 Key findings and interpretations**

The results in general show that the CEM was, by and large, supported and the non-supported hypotheses were justifiable. The path from POSQ to ‘Intention to Use’ (IU) was as not significant, as expected in the e-government context, unless mediated by ‘Perceived Usefulness’ (PU). So no matter how good an EGS is perceived, citizens will not intend to use it unless they believe that the system is beneficial for them. This is especially true because citizens are not interested in using an EGS for fun per se. Rather, they are more interested in being more efficient while they perform their required task.

In addition, the path from PU to ‘User Satisfaction’ (US) was not supported in all groups which contradictory to previous studies. It is possible that the reason for the non-significance of this path is due to the addition of Use and most importantly the Tangible Benefits (TB) construct to the model, which also mediated the indirect path from PU to US and consequently undermined the effect of PU on the other constructs. In addition the missing effect of the feedback loops has probably contributed to the weakness of the PU explanatory power and its effect on US.

Moreover, it is possible that the non-significance of the path from PU to US is due to the nature of the e-government context. We suggested that the use of an EGS is influenced by the motive and anticipation of obtaining Tangible Benefits rather than satisfaction, as is the case of e-commerce. Therefore, it is possible that PU does not have a strong correlation with one’s satisfaction unless he/she actually uses the system. In other words, citizens’ satisfaction will not be influenced directly by their perception of the system’s Usefulness regardless of anything else. Their perception of an EGS being useful must be followed by actually using it in order for them to sense or realize its usefulness and accordingly be satisfied with its quality and outcome. This is

especially true where citizens are mainly motivated to use an EGS to obtain Tangible Benefits which are not attainable through the off-line service channel.

Likewise, the previous rationalization could also be applied to the non-significant path from Use to US, which appeared to be insignificant in two of the three groups. EGS users will not be satisfied simply because they used an EGS even if they perceived to be of 'good-quality'. They must achieve what they want from using the system, and that is again, increasing their efficiency and saving time and effort which is a prerequisite for citizens' satisfaction. Nevertheless, the mixed or inconsistent result of path from Use to US was significant only in the MOI group would require further investigation.

Lastly, the path from 'Information Quality' (IQ) to POSQ appears to be partially supported. The comparison among the three groups reveals that the reason why the path was supported in one group, but not in the other two, could be because of the inclusion of the educational institutions' users. So for these users, the IQ is more important in this environment where the information-related tasks constitute more than those of the services-related tasks, unlike in typical government agencies.

In addition to our interpretation of the paths and their significance, our study showed that adding the TB construct contributed in significantly improving the accuracy of the models used in explaining EGS success which ultimately influence citizens' System Use. Although our model works for both the e-government and e-commerce contexts, it is specifically important in the e-government context. That's because, our model can successfully be employed in the e-commerce context since, individuals who use WIS seek convenience and want to save time and effort. However, the models used in the e-commerce context, which are predominantly dependent on using US as a success measure, are not sufficient in terms of adequately answering the success magnitudes with regards to citizens' use of EGS and its benefit to them.

### ***5.3 Significance of the research***

The results of this study have important implications both for e-government practice and for IS researchers. This research highlights the importance of simultaneously considering attributes introduced by IS-researchers in general and e-government researchers in particular to evaluate the success of an EGS from an external-user perspective. It aids system designers and government decision makers in understanding how citizens perceive the effectiveness of a particular EGS and how it eventually impacts their obtained psychological and tangible-benefits. This research is also important because it particularly emphasizes the need to incorporate citizens' tangible benefit as part of assessing EGS success, which was not sufficiently studied in the previous e-government literature.

This section is concerned with highlighting the areas of importance of this research. The significance of this research will be presented from three perspectives:

- A. What makes CEM an important model, in terms of the way the model was constructed and with respect to other models presented in the e-government literature for evaluating EGS success
- B. How could researchers benefit from this contribution
- C. How could e-government practitioners and decision makers.

#### **5.3.1 Advantages of the model**

The proposed model of this study seems to be comprehensive in that it combines concepts from two highly studied models, namely, the D&M (2003) IS success model and TAM (1989)<sup>79</sup> while also taking in consideration the Trust attribute. Below is a list of points that characterize CEM as being superior compared to the existing models in the e-government literature.

##### **1- More realistic in its assessment**

The CEM is designed in way that makes it more realistic because it takes into consideration: 1- the most important attributes that reflect the quality of an evaluated EGS as perceived by its users, 2- the key incentives that encourage citizens to use an

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<sup>79</sup> Other theories are embedded within this model, such as Theory of Reasoned Action (TRA) and Theory of Planned Behavior (TPB).



EGS, and ultimately 3- the impact on users when using that system. To be more specific, when comparing CEM to the other models of EGS in the e-government literature, CEM (see for example Table 1):

- i. does not rely solely on measuring the website quality of an EGS (e.g., Wang *et al.* 2005) because
  - a) not all the services provided through the interface are completed by the users as some need government employees to complete them;
  - b) it needs to be regularly updated with government news, information, etc. as well as updated with the citizens' personal information, especially when it comes to checking their status in an area of interest.
- ii. does not rely solely on using System Use or Intention to Use<sup>80</sup> as a success measure of an EGS (e.g., Carter and Belanger 2005; Mahadeo 2009) because citizens might be using the system not necessarily because of its high-quality performance and the benefits it provides but because of the following reasons:
  - a) There is no other online service provider that provides the same services and allows citizens to get their task done.
  - b) They may encounter specific circumstances which hinder them from going in person and so force them to use the EGS.
  - c) It is only a better alternative to having their task done using a face-to-face channel which may be also offering poor service quality in numerous ways.
- iii. does not rely solely on using User Satisfaction (US) as a success measure for an EGS (e.g., Mohamed *et al.* 2009) because
  - a) Citizens might be influenced by their perception of another website or WIS or a previous experience which may reflect on their attitude towards the EGS they have to use.
  - b) US is an indirect measurement and will be unlikely to provide an actual and accurate measure that reflects the quality of an EGS and the benefits it provides to its users.
  - c) The main objective for using an EGS is not focused on seeking fun or luxury as it is, typically, the case of using an e-commerce website.

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<sup>80</sup> Note that attribute of Intention to Use was dropped from the revised model.

## **2- Explicitly measuring citizens' Tangible Benefits**

Citizens' objectives for using an EGS are mostly focused on increasing their efficiency in terms of saving time and effort. As explained previously, in order to accurately assess the user's efficiency, in terms of getting his/her task done while saving time and money, tangible benefits must also be incorporated and investigated in field studies (DeLone and McLean 2003). Accordingly, the Tangible Benefits variable appears to be an essential attribute for evaluating the success of an EGS from citizens' perspective. However, reviewing the relevant literature revealed that the Tangible Benefits were not thoroughly discussed and included in the IS success models and evaluation studies, except for the internal-user (in organization workplace) context in which user performance is measured based on IS use (e.g., Beaudry and Pinsonneault 2005). We found no comprehensive and adequate model that fits within the e-government context, where the tangible benefit variable was included. Therefore, we are also contributing to the e-government evaluation literature by explicitly measuring the Tangible Benefits as a part of the final consequences or benefits of using an EGS.

## **3- Using more than one dependent variable (success measure) to assess EGS success**

Instead of using one dependent variable to explain the effectiveness and success of an EGS from the citizens' perspective, the proposed conceptual model incorporates three key success measures, namely, System Use, User Satisfaction, and Tangible Benefits. Summing up, using a combination of these attributes should overcome the weakness of using only one indicator for system success (Petter *et al.* 2008), give a more accurate and accumulative measure of the total benefits, and provide a realistic evaluation for an EGS from citizen-users' perspectives. Only a few studies in the literature consider multiple attributes to measure IS success and study the interrelation among them (Petter *et al.* 2008), especially in the e-government domain.

## **4- Including "trust" in the proposed model**

With the growth of utilization of the World Wide Web, the trust construct, which evolves from the perceived trustworthiness of a particular system or an online vendor, is receiving increasing attention by researchers. Researchers emphasize the importance of

the trusting issues<sup>81</sup> in the online environment, where trust was also empirically shown to be a significant determinant of US and Intentions to Use, and a meaningful measure of WIS success. Therefore, the trust construct was included in the CEM.

#### **5- Ensuring non-replication the model constructs or their item components**

Given the systematic literature review on US, a number of attributes that were significantly correlated with US were identified. However, while constructing the proposed model, the concepts that were deemed important to the context of our study and which capture the multiattributed and complex nature of IS success, especially the EGS, were carefully added to our proposed model. We made sure that none of the added model constructs or their item components overlapped with constructs that share similar concepts (Sedera *et al.* 2004; Petter *et al.* 2008).

#### **6- Increasing the understandability of each construct and its validity**

Assigning at least 3 measurement items for each construct, captures multiple aspects (i.e., looking at more than one aspect of the construct) and provides the evaluator with a better understanding of each construct (Sedera *et al.* 2004; Petter *et al.* 2008). In addition, having included several measurement items for each construct would help the respondents to have a deeper sense of the constructs in terms of what is being evaluated and differentiating between the questions being asked. This will increase the likelihood of adequately covering up the concept of the construct being measured.

#### **7- Introduced a structured assessment tool that is clear and validated**

The measuring instrument (survey) is not prone to error in assessment process because the measurement instrument is well understood and structured where it uses clear precise ‘questions’. Models that were suggested to fit more in an e-government context, which is complex in nature, needed to be generic<sup>82</sup>. Such models are conceptual but have no specific or a clear measurement instrument and consequently cannot be validated and guaranteed for effectiveness in assessing an EGS. Accordingly, they tend to be somewhat vague because they are subject to manipulation by different assessors.

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<sup>81</sup> See Section (2.5.1) on Trust.

<sup>82</sup> Such as that proposed by Wang *et al.* (2005)

### **5.3.2 Importance to researchers**

As we constructed the model, we reviewed research from different areas to cover the concepts included in our proposed model (CEM) which was mostly published in the field of IS, marketing and e-commerce, e-government, and minimally to psychology and management. Given the complexity and multiattributability of the CEM, the researchers who would mostly be interested in our research are those who are related to the IS and e-government fields as well as those who are interested in human-computer studies, particularly in the WIS context. This research can be used as basis for future research or can be adopted it to another context.

In the vast majority of the recent IS studies, there is a general agreement that all system attributes (IQ, STQ, and SQ) are important in reflecting the overall performance of a system and all have an impact on its users' perception and satisfaction. However, the results of this study show that this is not necessarily true in all cases. This is evident in the variation of path significance of IQ to the overall system quality. Therefore, it is important for researchers to take into account the context before assigning any of the attributes or measures to study a specific IS success or user adoption related-phenomenon.

In addition, the study confirms the importance of taking into consideration PU which occurs as an intermediate stage to adopt a particular system, especially in the WIS context which is based on voluntary use, such as in e-commerce or semi-voluntary use, such as in the e-government context. Individuals will not use a system unless they believe that it is useful for them in some way or least more efficient than the traditional face-face channel. Of course, the quality of a system plays an important role in determining their perception of the usefulness of that system. If a system's quality is generally not good, this will inevitably have a negative impact on a user's perception of its usefulness simply because a bad system will not lead to any benefits from using it. There is a downside to using a bad system including risking personal and financial information, wasting time and effort. This means that a bad system would not be perceived as useful if there is risk issues involved in using the system.

Likewise with trust which goes hand in hand with the concept of Perceived Usefulness as being determinants of one's adoption of a WIS. Trust is another important key

motivator for opting to use a system in a voluntary or semi-voluntary context. Trusting issues, which are influenced by the perceived trustworthiness of a particular WIS, are very important in determining an individual's use of that system. If there is lack of trust, Perceived Usefulness of that system will be undermined and it is unlikely that users would want to use or continue to use a system. In fact, they would not want to encounter any kind of risks. Our study confirmed the significant correlation between trust as a determinant of Perceived Usefulness of a system and use behavior.

Complementary with the notion of Perceived Usefulness and trust is the notion of attaining Tangible Benefits post-System Use. The connection between them is based on the idea that a good-system which is believed to provide benefits with no risks involved will encourage using the system and ultimately obtain the anticipated benefits. This leads us to the proposition, which was confirmed in this study, that the ultimate obtained benefits, particularly the tangible one are very important when studying the success of a WIS, and most importantly an EGS.

### **5.3.3 Importance to e-government practitioners**

This research is important to e-government practitioners, especially system designers who are responsible for the development of the project management of WIS and decision makers who potentially could include roles from the Chief Information Officer (CIO) to individual project managers. It is of value to them because they can use the model and survey instrument as a 'diagnostic' tool to assess the quality, performance, effectiveness of their EGS. It can be:

- 1- useful in showing what the most important aspects are that citizens care about in an EGS and how they perceive its quality and any shortcomings. So, it can help them understand what are the strengths or weaknesses on an EGS including citizens' perception of its usefulness and trustworthiness which are very crucial as without them it is highly unlikely that anyone will use the EGS. Government personnel or designers of the system could focus on the aspect that mostly impact citizens' perceptions and work on enhancing this perspective. For example, understanding what influences citizens' trust, how to take this in consideration, and what to do to fix any lacking issues or maintain the 'good' things that already exist.

- 2- helpful in ensuring that an EGS is able to provide the anticipated level of performance and benefits to its users and even to improve the quality. It can help the government personnel who are in charge of following up or maintaining a system to understand and monitor how citizens see the system so they can pay more attention on those shortcomings. For example, can work on developing the system or improving any downside upon the perception of its users. It can also help to understand or measure the effectiveness of the system, given its quality, and how it could exactly benefit its users in terms of their efficiency.

## ***5.4 Limitations and Recommendation for Future Research***

As with all research, the current study has a number of limitations, each of which provides opportunities for future research. In this section, we state the limitations that exist in this research from two perspectives or levels which are presented in two sub-sections. The first sub-section is concerned with a higher-level concept in which we point out the boundaries of the context of this study in general in terms of what has been and has not been studied, explained or discussed by this research. The second sub-section presents a more specific explanation of the limitations found or encountered while conducting this study. Each limitation in this research is followed by suggestions for possible future directions that future research might take.

### **5.4.1 The limitation of the context of this research**

This research is dedicated to develop an assessment tool that is combined of a conceptual model and a measurement instrument that can be applied in an EGS, can also be used in a broader WIS context, to evaluate its success from the external-user perspective. However, this study is limited and particularly focused on understanding:

- 1- the e-government context where the proposed assessment tool is used to evaluate the success of an EGS from the public perspective;
- 2- the citizens' perspective only without considering the business or private organizations' perspective;
- 3- the system's overall quality and effectiveness as perceived by citizen-users;

- 4- the citizens' use of an EGS and its impact on them in terms of their obtained tangible benefits and satisfaction, which are the ultimate variables of the success measures.

Hence, the attribute of User Satisfaction, only involves citizens' satisfaction that evolves from:

- 1- their perception of the overall used system quality,
- 2- their cognitive beliefs of the system's usefulness and Trustworthiness, and
- 3- the Tangible Benefits they obtain in terms of their increased efficiency through saving time, effort, and costs.

This means that other factors that are related to citizens' use or perception of e-inclusion/participation (e.g., e-democracy, e-voting, transparency) as part of the assessment and its impact on their satisfaction are not considered. Although, these concepts are considered as potential advantaged from using an EGS, they are regarded as part of the commonly known types of e-services. This study is limited to the type of utilization which involves the citizens' general uses of the commonly used tasks in any EGS where the impact or consequences on the citizen-users are realized instantly. In addition, the concept of e-participation and its implications do not solely impact the EGS citizen-user; rather, the whole nation is influenced directly and indirectly by the different individual e-participation. The e-participation and its closely related concepts are very complex and relate to a different context than this study. Therefore, the political-related aspects, such as e-participation and its closely relation concepts, were not taken into account in this study.

#### **5.4.2 The limitations found in this research**

Having incorporated feedback loops in the model based on reasonable logic and theories presented in the literature, it thus requires longitudinal assessment and further validation. However, due to the limited resources of this thesis (i.e., time); it is important to acknowledge the limitation of validating the model in only a snapshot of the environment we are studying. By definition taking this single snapshot has a number of implications and does impose some limitations. For example, it is not possible to understand or assess what happens over a period of time. Accordingly, gathering data

over a period of time and testing the feedback-loops would be beneficial in looking at the process of adopting and benefiting from an EGS in an adaptive manner. This may in turn provide a richer understanding and a better insight of the progress and real benefit of an EGS.

It may also shed some light on the path significance of the unsupported hypotheses, especially those that had mixed results of significance and we accepted them as partially supported, such as from PU to US and from Use to US. It is recommended that a study is conducted with users of a single government agency using a larger sample size to confirm the validity of those two paths.

Therefore, conducting a longitudinal study to test the feedback loops at some future time is also recommended. However, it may be worth noting that PLS cannot handle feedback loops, so future studies may need to be conducted using an alternative statistical analysis approach and software packages, such as LISREL, given there are no constraints, to see the full effects on all the paths while including the feedback loops.

It is worthwhile noting that the development of websites including EGS takes place in a dynamic process where new designs or information are added. The number or types of the provided e-services could increase and become more complex. Citizen-users familiarity from the frequent use of EGS or increased use of ICT may also play a role in influencing the users' perception with which they interact. These external and non-controllable factors must be taken in consideration while conducting future longitudinal studies as different results may be obtained.

Furthermore, from those hypotheses that were partially supported, future studies are worthwhile to investigate the direct effect of IQ on the POSQ and to pin-point the actual reason for H1 non-significance. There is a need to confirm whether IQ has significant impact on the POSQ in the e-government context. Also, we have to acknowledge that upon conducting the pilot study and according to participants suggestions we had to remove some questions to reduce the length of the survey. This was to reduce the ratio of abandoned surveys. From the comments of the participants of the pilot study and the respondents of the survey, it is clear that the people in this nation are not used to surveys and feel reluctant to participating in them. This may not be the case in other countries.



This has posed an obstacle in collecting a larger number of responses and added more questions. However, we believe that incorporating more questions to measure the constructs of our proposed model would add more value and confirmation to clarity of each construct. This includes adding a question of the overall perception for each system attribute which had to be removed in this survey. Therefore, future research could test the model with more questions to see how they could serve the purpose of the model.

It is also worth noting that, in this study, a number of respondents could have used the online services of the different government agencies on very limited bases; which might also impact their overall perceptions. The reason for the limited use is, as mentioned earlier, due to the nature of e-government, a range of services would need to be conducted on an irregular, long term bases, if not once. For example, renewing a civil ID which validity could range from 5 to 10 years, depending on the age of the applicant; or, applying for a scholarship, through the Ministry of Higher Education, which requires entering the personal details and uploading the necessary documents.

Given, that the study was conducted using a sample from Kuwait, the context of the study and the respondents of the sample on which the study is carried out are considered to control and limit the generalizability of the results outcomes. That's because of the limited specification of the model and its constructs that should fit the context of the study in order to reveal reflective and valid results, yet not necessarily generalizable. It may also be noteworthy that due to the relatively recent introduction of the EGS in Kuwait and its maturity stage which lacks a variety of online services as compared to the developed countries.

A recent study conducted by Aladwani (2013) comparing the perception for EGS quality between two different cultures (i.e., British users as an example of a developed country vs. Kuwaiti users as an example of a developing country) suggest that the quality of the EGS's attributes may not be equally important for the different nations. Therefore, due to the cultural difference, future studies are needed to validate CEM in both developing and developed countries and to see if there are any variations of the accuracy of the model.

## **5.5 Conclusion**

Given the importance of EGSs it was important to identify an assessment tool that is combined of a conceptual model and a measurement instrument that can be used an evaluation approach to assess their success. This study was focused on measuring the success of an EGS from citizens' perspective since it is mostly directed to them to use as a modern service channel. A review of the relevant literature showed that there was a lack of such an assessment tool. Therefore, in this study, we proposed to construct an EGS success evaluation model incorporating the attributes that effect the perception of its performance and quality, the motivators that promote citizens' adoption of that system, and the final impact or benefits of using the system, especially the tangible ones. This objective was accomplished and presented in chapter 2.

We also proposed to validate the conceptual CEM to ensure its reliability in the e-government context. We proposed, tested and used a measuring (survey) instrument to validate the CEM. We validated the model using a rigorous validation process while validating the model in different situations. Finally, the results of this study revealed a significant support to our produced CEM. These objectives were achieved and presented in chapter 3 and 4.

This chapter has presented the main aspects of this study, summarizing the key issues of this research and the conclusions based on the results of the validation. The significance of this research was also pointed out as an evaluation approach and with respect to researchers and e-government practitioners. We have also listed the aspects of the limitations of this study along with our recommendations for future studies.

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# APPENDICES

## A *The HREC approval*

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University of Wollongong



### INITIAL APPLICATION APPROVAL

In reply please quote: HE10/217  
Further Enquiries Phone: 4221 4457

24 June 2010

Ms Shatha Al-Haddad  
13/4 Bank St  
Wollongong NSW 2500

Dear Ms Al-Haddad,

Thank you for your response to the HREC review of the application detailed below. I am pleased to advise that the application has been approved.

Ethics Number: HE10/217

Project Title: Developing and validating a model of citizens' perception of e-government system performance and their attained net benefit.

Researchers: A/Professor Peter Hyland, Ms Shatha Al-Haddad

Approval Date: 24 June 2010

Expiry Date: 23 June 2011

The University of Wollongong/SESIAHS Humanities, Social Science and Behavioural HREC is constituted and functions in accordance with the NHMRC *National Statement on Ethical Conduct in Human Research*. The HREC has reviewed the research proposal for compliance with the *National Statement* and approval of this project is conditional upon your continuing compliance with this document. As evidence of continuing compliance, the Human Research Ethics Committee requires that researchers immediately report:

- proposed changes to the protocol including changes to investigators involved
- serious or unexpected adverse effects on participants
- unforeseen events that might affect continued ethical acceptability of the project.

You are also required to complete monitoring reports annually and at the end of your project. These reports are sent out approximately 6 weeks prior to the date your ethics approval expires. The reports must be completed, signed by the appropriate Head of School, and returned to the Research Services Office prior to the expiry date.

Yours sincerely

A/Professor Steven Roodenrys  
**Chair, Human Research Ethics Committee**

Cc: A/Professor Peter Hyland, SISAT



## ***B Participants Information Sheet for E-government Users***

This is an invitation for you to participate in a study conducted by researchers at the University of Wollongong. This PhD research is about “**Developing and Validating a Model of Citizens’ Perception of e-Government System Performance and their Attained Net Benefit**”.

### **PURPOSE OF THIS RESEARCH**

The scope of this research is focused on creating a valid and reliable assessment tool that governments can use to evaluate users of the e-government online services of their perception of the service they receive. This tool will ultimately help government rectify its shortcoming and provide the good level of service that it anticipate.

### **THIS RESEARCH IS CONDUCTED BY:**

Ms. Shatha Al-Haddad  
(+612) 4221 4116  
Faculty of Informatics  
[sah579@uow.edu.au](mailto:sah579@uow.edu.au)

Prof. Peter Hyland  
(+612) 4221 3759  
Faculty of Informatics  
[phyland@uow.edu.au](mailto:phyland@uow.edu.au)

### **ABOUT THIS RESEARCH**

The questionnaire is based participants’ feedback about their beliefs with relation to the e-government online services they receive. It is designed such that it is easy to understand and answer the questions.

The approximate time required to complete this survey is around 10 minutes. The participants have all the freedom to continue or discontinue participating in this survey. Your participating in survey will help us ensure the validity of our proposed assessment tool. This will help governments to continually provide the e-government users with high quality service and respond to any shortcoming.

This survey is anonymous and no personal information need to or will be collected. Having completed the survey all participants are entitled to enter a draw for prizes. However, participants who wish to enter the draw for prizes need to provide some contact detail, such as an e-mail, telephone number, or a name.

### **PARTICIPANTS PRIVACY**

Apart from the 10-15 minutes of your time to answer the questionnaire, we can foresee no risks for you. Your involvement in the study is voluntary, and by submitting your questionnaire, you are accepting to participate. You may withdraw your participation from the study at any time; however, because the questionnaire is anonymous, after submission the questionnaire cannot be identified and deleted.

To ensure the privacy of all participants and that the survey remains anonymous, all contact information is separated from the responses on the questionnaire. In addition, after the draw competition is complete, all contact information will be deleted.

Furthermore, the anonymous questionnaires will be only accessible by the researchers. The findings of this investigation will be published for the PhD thesis and possibly in journal articles.

### **ETHICS REVIEW AND COMPLAINTS**

This study has been reviewed by the Human Research Ethics Committee (Social Science, Humanities and Behavioral Science) of the University of Wollongong. If you have any concerns or complaints regarding the way this research has been conducted, you can contact the UoW Ethics Officer on (02) 4221 4457.

Thank you for your interest in this study.

### *C The information sheet as appeared in the final survey*

## **Survey- Evaluating User's Perception of the Government E-Services and their Obtained Benefits**

### **Introduction**



KUWAIT GOVERNMENT ONLINE

### **Please read this page before answering the questionnaire**

This survey reflects a crucial part of my PhD research conducted at the University of Wollongong in Australia. This questionnaire is supposed to serve as an assessment tool for governments or government agencies. The questionnaire is based on measuring two main things;

- 1- Evaluating the perception of citizens and residents who use the electronic services (e-services) that government agencies provide; and,
- 2- Measuring the benefits they obtain from using the online services.

When the government or the government agency facilitate the online system (internet) to interact with individuals, private organizations, and other government agencies to provide information and services, it is then referred to as a public e-service system or an e-government system. By referring to an e-government system, we mean the online e-service system provided by the government or a government agency.

This study will help in identifying the important aspects to evaluate the services that the government agency has provided. It will therefore assist the government agency in evaluating whether it was able to fulfill its objective from employing the online services, through satisfying both citizens and residents, and saving them time and effort. The government agency can accordingly provide you with better services and respond to any shortcomings.

The suitable person to participate in this study and fill out the questionnaire is the one who used e-services provided by any of the Kuwaiti government agencies through the internet. For example, to find information, use an e-service to complete a task independently, lodge a request, inquire about his personal status (infringements, civil ID, expiry date, etc.), or follow-up a lodged request, etc. For the purpose of this questionnaire, you need to select only one government agency from a list and remember to base all your answers in the survey on that selection.

In order to ensure the anonymity of the survey and to respect individuals' privacy, no personal information will be collected or can be tracked.

Your valuable participation in answering the survey till the end will contribute to the success of this study which will in turn assist the different government agencies in Kuwait or elsewhere to know exactly how to increase citizens' and residents' satisfaction, and save their time and effort. **Your response will only be accounted for when the survey is totally completed NOT partially. Completing the questionnaire will only take about 10 minutes of your time.**

Be an effective member through participating in this study. Your involvement will contribute in providing better services for you and for the community as a whole.

**We highly appreciate and very much thank you for your help and valuable contribution**



**\*PS.** This study has been presented to and approved by the Human Research Ethics Committee at the University of Wollongong. If you have any complaints regarding the way this research has been conducted, you can contact the Ethics Officer on +61242214457. If you have any inquiries or concerns please contact me on [sah579@uowmail.edu.au](mailto:sah579@uowmail.edu.au)

**Your participation is voluntary. By clicking NEXT you agree to participate in this study**

## *D The draft Questionnaire*

### **Assessing the government performance from the citizens perspective and the obtained net benefit**

#### **Section (1)** **Demography**

**Gender:** Female ☐ Male ☐

**Citizenship:** Kuwaiti ☐ non-Kuwaiti ☐

**Age:** 18-25 ☐ 26-35 ☐ 36-45 ☐ 46-55 ☐ 56< ☐

**Education:**  
Intermediate ☐ high School ☐ Diploma ☐ University ☐ Higher studies ☐

**Work:**  
Student ☐ Unemployed ☐ Gov. emp. ☐ Private sector emp. ☐ Private business ☐ Retired ☐

#### **Section (2) General**

1-How often do use the internet?

Rarely ☐ sometimes ☐ usually and on regular bases ☐ always ☐

2- Do you use e-commerce (shop or perform financial transaction using the internet)?

No ☐ Rarely ☐ sometimes ☐ usually/on regular bases ☐ always ☐

3-Is this your initial use for the online government service?

Yes ☐ No ☐

4- Which service channel is more preferable to you?

In person/ face-to-face ☐ e-government website (internet) ☐

5- Why?

.....  
.....



### **Section (3)** **Model constructs**

*Select the level to which you agree with the following sentences*

<i>Totally disagree</i>	<i>very much disagree</i>	<i>partially disagree</i>	<i>Neutral /not applicable</i>	<i>partially agree</i>	<i>very much agree</i>	<i>Totally agree</i>
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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**Information Quality**

IQ1- The information provided is well laid, clearly presented, and understandable.

IQ2- The information provided is comprehensive.

IQ3- The information available provides me with all information I need.

IQ4- Generally, the information available is recent and up-to-date.

IQ5- The information provided could be described as accurate.

#### **System Technical Quality**

STQ1- EOU: The website is easy to use.

= The website is user-friendly.

STQ2- Ease of learning: I found it easy to learn using this website.

STQ3- Website design: This website is easy to navigate.

STQ4- Security standards of the website is acknowledged

STQ5- Reliability and loading time: The website operates well. (availability of titled links, slow loading time, moving between different pages)

STQ6- Accessibility: I can access and use the government website/s whenever I need.

STQ7- Overall, I would say that this system technical quality is high

#### **Service Quality**

SQ1- I found it easy to get this website to do what I want to do.

SQ2- When using the website, the task gets accomplished in a timely fashion.

SQ3- I find the available e-services options meet my needs.

SQ4- The system is accurately and promptly updated with my status, or the progress of my request.

For the services that needs to be completed by government employees (such as requesting renewal or issue of ID/Passport/License/ etc.

SQ5 - The completion of my order/request was finalized in the assigned time frame

#### **Performance of e- government system**

P1- By introducing the e-government online service channel, I think the performance of the government have advanced

P2- The current government performance is sufficient

P3- Overall, I find/believe the performance of the e-government through the online service channel is very good.

P4- I think that the performance of e- government service channel is better than the traditional one.

#### **E-government Trustworthiness**

*Information trust*

T1- I trust the information provided on the e-government websites

#### *Technical trust*

T2- I trust that the transactions and information transferred will be handled securely.

T3- I believe that my personal information and privacy are protected.

#### *Service and operational competency*

T4- I believe that the online system is reliable to fulfill my needs

T5- I believe that my inquiry/task required will be appropriately completed by the government personnel.

T6- I trust that the information I provided is stored, integrated, and allocated appropriately.

T7- Overall, I believe that this system is trustworthy and reliable.

#### **Perceived Usefulness**

PU1- I believe that this website, service delivery channel will enable me to get my work/task done more quickly.

PU2- I believe that when I need to complete a task urgently or in a limited/ certain time, using the website helps me accomplish that. (e.g., Off hours time accessibility)

PU3- I believe that using this channel improves my efficiency in completing my task. (e.g., save time, effort, & independency)

PU4- I believe that this website would make my task easier to do.

PU5- I find using this service channel to complete a task, better suits my circumstances when I have obstacles (i.e., transportation, overseas, commitments or time inconvenience, whether, females, health issues etc.)

PU6- I believe that the website would update me with new information and news.

PU7- I believe that I can get more detailed information using this service channel rather than the traditional channel.

PU8- I believe that using this channel will help me increases my efficiency in doing other responsibilities.

PU9- I believe that this service channel will diminish the administrative burden.

PU10- Overall, I believe this website is effective and useful for me.

#### **Intention to Use**

UI1- I predict to use this website/service delivery channel to get the information I need and download forms in the future.

UI2- I intend to use/continue use the website/ service delivery channel, when I need, to find information and download forms.

UI3- I predict to use this website/service delivery channel to do transactions.

UI4- I intend to use/continue use the website/service delivery channel to do transactions.

#### **Use:**

U1- I use the website on regular bases

U2- I depend on this website to get my task done when I can

U3- I use the website to do transactions

U4- I mostly use the website to find information and/or download forms.

U5- I use the website to check a status or process (i.e., passport/license/ID renewal, lost & found, infringements, etc.)

**Net benefit****[Psychological]**

PB1- The e-government system (website) meets my needs adequately. ([Rai et al. 2002](#); [Kulkarni et al. 2006](#); [Wang and Liao 2008](#))

PB2- I prefer using this website / service delivery channel rather than the traditional way, unless I have no choice.

PB3- Overall, I am very satisfied with the experience of using this website/ service delivery channel.

**[Tangible]**

TB1- This website made it easier for me to do my task.

TB2- I found that the service delivery through the e-government system (website) had saved me a lot of time.

TB3- I found that using this service delivery channel had saved me a lot of effort.

NB4-By using this service delivery channel I didn't need to depend on others to perform a task on my behalf when I couldn't do it on my own. (e.g., Disability/ health issues, females, work or other commitments, out of the country, etc.)

## E The Final Questionnaire

### Assessing the government performance from the citizens perspective and the obtained net benefit

#### Section (1) Demography

**Gender:** Female      Male

☐☐

**Citizenship:** Kuwaiti      non-Kuwaiti

☐☐

**Age:** 18-25    26-35    36-45    46-55    56<

☐☐☐☐☐

**Education:**

Intermediate

high School

Diploma

University

Higher studies

☐☐☐☐☐

**Work:**

Student

Unemployed

Gov. emp.

Private sector emp.

Private business

Retired

☐☐☐☐☐☐

#### Section (2) General

1-How often do use the Internet?

Rarely

sometimes

usually and on regular bases

always

☐☐☐☐

2- Do you use the internet to purchase or conduct any form of financial transaction?

No

Rarely

sometimes

usually/on regular bases

always

☐☐☐☐☐

3-How often do you use the e-services provided by the government agency(s)?

Never

Only once

Rarely

sometimes

Often

☐☐☐☐☐

4-Which Government agency did you use its online e-services system?

Please specify -----

- Which website did you use, the agency's website or the e-government portal?
- Which language did you choose Arabic or English?

5- For what purpose did you use the e-services provided online by the government agency you selected? (You can choose more than one answer)

- a- Find information about processes, procedures, policies, regulations, required documents for completing a specific task, etc.
- b- Complete tasks independently, such as online payment, downloading forms, etc.
- c- Lodge a task request for government employees to complete (e.g., renew ID, etc.)
- d- Follow-up a process for a request that has already been lodged, or, check the personal status (status inquiry) (e.g., infringements, expiry date, sponsorship, residency, bills, etc.)

### **Section (3)** **Model constructs**

*Based on your experience in using the EGS (or government online e-service) for the government agency you chose, (that is, .....), please answer the following questions.*

*Please select the level to which you agree to the following sentences, otherwise, select "don't know / not applicable" if you did not perform a task that is relevant to the given sentence or when you don't know the answer.*

<i>Don't know / Not Applicable</i>	<i>Totally disagree</i>	<i>very much disagree</i>	<i>partially disagree</i>	<i>Neutral</i>	<i>partially agree</i>	<i>very much agree</i>	<i>Totally agree</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### **Information Quality**

*Evaluating the information quality and its characteristics in terms of its clearness, easiness to understand, comprehensiveness in terms of fulfilling the individual needs, recency, and accuracy.*

IQ1- The information provided is well laid, clearly presented, and understandable.

IQ2- The information provided is comprehensive and provides me with all the information I need.

IQ3- Generally, the information available is up-to-date.

IQ4- The information provided could be described as accurate.

#### **System Technical Quality**

*Evaluating the government agency's website in terms of its ease of navigating and using the e-services, the speed and effectiveness of the design, the applied security system, and the accessibility of using the website 24hours/7days.*

STQ1- The government agency's website for the online service is easy to use.

STQ2- It is easy to use the e-services provided in the government agency's website.

STQ3- I found it easy to learn using the government agency's website.

STQ4- The website operates reliably, quickly, and without errors.

(e.g., Loading time, availability of titled links, moving between different pages, etc.)

STQ5- The security and privacy standards of the website are clearly published

STQ6- can access and use the government agency's website whenever I need and at any time (24hours/7days).

STQ7- Overall, I would say that this system technical quality is high

#### **Service Quality**

*Evaluating the service quality in terms of the availability and variety of the e-services options which meets the individual's needs; the promptness and accuracy in updating the system with individual's information of his status; and the time in completing the required task.*

SQ1- I believe that the available e-service options are various and meet my needs.

SQ2- The system is accurately and promptly updated with the information of my status, or the progress of my request..

For the service-requests that are submitted online but needs to be completed by the specialized employees.

SQ3- The completion of my online request gets finalized by the employees in the assigned time Frame

### **The Perceived Performance of the System**

*Evaluating users' perception of the overall e-government / e-service online system's performance while taking into consideration the information quality, the technical quality of the government agency's website, and the service quality.*

P1- Overall, I believe the performance of the e-government/ e-service online system for that government agency is very good and efficient

### **Trust in the E-government / E-service Online System**

*Evaluating users' trust in the available information on the government agency's website, the level of security in protecting the private information, and the operational competency of the system and the government employees in completing the required tasks.*

#### *Information trust*

T1- I trust the information provided on the website of the e-government / e-service system

#### *Technical trust*

T2- I trust that the transactions and information transferred will be handled securely.

T3- I believe that my personal information and privacy are protected.

#### *Service and operational competency*

T4- I believe that if I lodge a request for a service online, it will be appropriately completed by the specialized employees.

T5- I trust that the information I provided is stored, integrated, and allocated appropriately.

### **Perceived Usefulness**

*We would like to evaluate users' perception of the e-government / e-service online system that the government agency provides, and the benefits they expect to gain from using the system.*

PU1- I believe that the e-government / e-service online system will enable me to accomplish the task

I want more quickly.

PU2- I believe that the e-government / e-service online system would make my task easier to do.

PU3- I believe that using the e-government / e-service online system to complete a task, better suits my circumstances when I have difficulties.

PU4- I believe that the e-government / e-service online system would meet my needs.

PU5- Overall, I believe that the e-government / e-service online system which the government agency provides is effective and useful for me.

### **The Actual Use of the System**

*We would like to measure the usage behavior and the level to which the user is depending on the e-government / e-services online system.*

U1- I use the e-government / e-service online system on a regular basis

- U2- When I can, I depend on the e-government / e-service online system to get my task done
- U3- I use the e-government / e-service online system to pay online. (e.g., pay fees, fines, bills, etc.)
- U4- I use the e-government / e-service online system a lot to find information and/or download the forms that I need.
- U5- I use the e-government / e-service online system to check my personal status information or to follow-up a request.

### **Net benefit**

#### **[Psychological]**

*We would like to measure the level of user satisfaction with using the e-government / eservice online system provided.*

- US1- The e-government / e-service online system for the government agency met my needs adequately.
- US2- I prefer using the e-government / e-service online system rather than visiting the government agency in person, unless I have no choice.
- US3- Overall, I am very satisfied with my experience in using the e-government / e-service online system for this government agency.

#### **[Tangible]**

*We would like to measure the level of the Tangible Benefits that the user gained from using the e-government / e-services online system, in terms of saving time, cost, effort, and decreasing the need to depend on others.*

- TB1- I found that using the e-government / e-service online system made it easier for me to do my task..
- TB2- I found that the e-government / e-service online system saved me a lot of time.
- TB3- I found that the e-government / e-service online system saved me a lot of effort.
- NB4- I found that the e-government / e-service online system saved me a lot of cost
- NB5- By using this e-service online system, I didn't need to depend on others to perform a task on my behalf when I couldn't do it on my own.  
(e.g., Disability/ health issues, being females, work or other commitments, out of the country (overseas), etc.)

### **Intention to Use**

*We would like to understand users' intention to reuse the system in the future which is typically based on their experience in using the e-government / e-service online system.*

- UI1- I intend to use the e-government / e-service online system, when I need, to find the information and/ or download forms.
- UI2- I intend to use the e-government / e-service online system, when I need to, to complete a task and/or perform financial transactions. (e.g., pay fees, fines, bills, etc.)
- UI3- I intend to use the e-government / e-service online system, when I need, to lodge a request for a particular service.
- UI4- I intend to use the e-government / e-service online system to check my personal status, or follow-up a process for a request that I applied for. (e.g., passport, ID, license, etc.).

Are there any comments that you would like to add? .....

## F *Missing value test results*

Table 47: Factor Loadings (Bolded) and Cross Loadings for Reflective Constructs (case 2)										
	IQ	STQ	SQ	POSQ1	TRUST	PU	IU	USE	TB	US
IQ.1	<b>0.90</b>	0.72	0.65	0.65	0.63	0.61	0.55	0.57	0.56	0.61
IQ.2	<b>0.92</b>	0.73	0.68	0.68	0.62	0.52	0.51	0.56	0.58	0.66
IQ.3	<b>0.87</b>	0.63	0.64	0.61	0.59	0.45	0.40	0.49	0.46	0.60
IQ.4	<b>0.88</b>	0.68	0.65	0.58	0.60	0.50	0.49	0.51	0.52	0.60
STQ.1	0.67	<b>0.87</b>	0.68	0.65	0.62	0.54	0.47	0.56	0.52	0.60
STQ.2	0.73	<b>0.89</b>	0.71	0.67	0.66	0.58	0.51	0.61	0.57	0.66
STQ.3	0.67	<b>0.83</b>	0.62	0.59	0.65	0.55	0.45	0.57	0.53	0.56
STQ.4	0.56	<b>0.75</b>	0.61	0.52	0.54	0.42	0.41	0.42	0.40	0.50
STQ.5	0.56	<b>0.73</b>	0.56	0.51	0.64	0.42	0.36	0.43	0.46	0.49
STQ.6	0.52	<b>0.75</b>	0.54	0.54	0.53	0.52	0.49	0.52	0.50	0.55
SQ.1	0.67	0.74	<b>0.88</b>	0.73	0.69	0.51	0.47	0.59	0.52	0.70
SQ.2	0.68	0.66	<b>0.88</b>	0.65	0.69	0.46	0.48	0.54	0.48	0.60
SQ.3	0.56	0.60	<b>0.86</b>	0.64	0.64	0.42	0.42	0.47	0.42	0.56
PSQ	0.71	0.73	0.78	<b>1.00</b>	0.72	0.60	0.55	0.62	0.61	0.77
T.1	0.69	0.71	0.74	0.67	<b>0.85</b>	0.61	0.57	0.59	0.60	0.66
T.2	0.52	0.59	0.56	0.55	<b>0.84</b>	0.53	0.55	0.57	0.48	0.58
T.3	0.52	0.57	0.58	0.55	<b>0.85</b>	0.49	0.49	0.52	0.49	0.56
T.4	0.56	0.64	0.72	0.63	<b>0.83</b>	0.46	0.42	0.52	0.48	0.60
T.5	0.58	0.66	0.66	0.64	<b>0.86</b>	0.48	0.45	0.56	0.51	0.60
PU.1	0.51	0.57	0.47	0.52	0.57	<b>0.93</b>	0.77	0.68	0.73	0.64
PU.2	0.52	0.57	0.46	0.52	0.57	<b>0.94</b>	0.78	0.67	0.75	0.63
PU.3	0.48	0.52	0.40	0.46	0.49	<b>0.92</b>	0.73	0.62	0.72	0.58
PU.4	0.46	0.48	0.43	0.48	0.47	<b>0.88</b>	0.69	0.65	0.67	0.61
PU.5	0.64	0.66	0.63	0.69	0.65	<b>0.85</b>	0.67	0.71	0.75	0.73
IU.1	0.54	0.54	0.52	0.54	0.53	0.74	<b>0.93</b>	0.73	0.76	0.69
IU.2	0.37	0.40	0.38	0.38	0.49	0.63	<b>0.86</b>	0.64	0.66	0.56
IU.3	0.54	0.55	0.53	0.55	0.57	0.80	<b>0.94</b>	0.72	0.75	0.71
IU.4	0.53	0.54	0.46	0.50	0.55	0.75	<b>0.92</b>	0.69	0.75	0.63
U.1	0.46	0.50	0.48	0.46	0.49	0.53	0.48	<b>0.76</b>	0.52	0.57
U.2	0.53	0.54	0.48	0.53	0.57	0.72	0.67	<b>0.86</b>	0.71	0.68
U.3	0.37	0.38	0.29	0.36	0.39	0.51	0.60	<b>0.70</b>	0.58	0.52
U.4	0.49	0.55	0.60	0.57	0.56	0.54	0.56	<b>0.80</b>	0.55	0.62
U.5	0.51	0.57	0.57	0.53	0.56	0.61	0.68	<b>0.82</b>	0.67	0.61
TB.1	0.60	0.62	0.54	0.60	0.61	0.76	0.73	0.73	<b>0.92</b>	0.76
TB.2	0.57	0.59	0.52	0.58	0.57	0.76	0.78	0.75	<b>0.95</b>	0.75
TB.3	0.57	0.59	0.51	0.55	0.57	0.75	0.75	0.71	<b>0.93</b>	0.73
TB.4	0.41	0.45	0.38	0.45	0.45	0.62	0.62	0.60	<b>0.81</b>	0.60
TB.5	0.51	0.52	0.49	0.56	0.52	0.72	0.75	0.69	<b>0.89</b>	0.68
US.1	0.63	0.66	0.73	0.75	0.70	0.50	0.50	0.63	0.60	<b>0.87</b>
US.2	0.48	0.48	0.41	0.44	0.45	<b>0.73</b>	0.72	0.65	0.72	<b>0.75</b>
US.3	0.63	0.62	0.64	0.72	0.63	0.57	0.58	0.64	0.64	<b>0.88</b>



Table 48: Cross correlation among constructs (Case 2)										
	IQ	STQ	SQ	POSQ1	TRUST	PU	IU	USE	TB	US
IQ	<b>0.893</b>									
STQ	0.773	<b>0.806</b>								
SQ	0.736	0.771	<b>0.871</b>							
POSQ1	0.707	0.726	0.778	<b>1.000</b>						
TRUST	0.682	0.753	0.772	0.717	<b>0.847</b>					
PU	0.583	0.627	0.537	0.596	0.614	<b>0.903</b>				
IU	0.546	0.560	0.523	0.545	0.589	0.805	<b>0.912</b>			
USE	0.597	0.647	0.616	0.620	0.654	0.743	0.763	<b>0.790</b>		
TB	0.595	0.619	0.543	0.610	0.610	0.803	0.804	0.772	<b>0.902</b>	
US	0.691	0.698	0.711	0.766	0.711	0.710	0.713	0.763	0.781	<b>0.838</b>

Table 49: Reliability results (Case 2)			
	AVE	Composite Reliability	Cronbachs Alpha
IQ	0.80	0.94	0.92
STQ	0.65	0.92	0.89
SQ	0.76	0.90	0.84
POSQ1	1.00	1.00	1.00
TRUST	0.72	0.93	0.90
PU	0.82	0.96	0.94
IU	0.83	0.95	0.93
USE	0.62	0.89	0.85
TB	0.81	0.96	0.94
US	0.70	0.88	0.79

Table 50: The change in the explained variance R <sup>2</sup>			
	case 1	case 2	dif
POSQ	0.596	0.658	10.4%
Trust	0.457	0.514	12.5%
PU	0.42	0.426	1.4%
IU	0.649	0.664	2.3%
USE	0.533	0.582	9.2%
US	0.739	0.772	4.5%
TB	0.599	0.597	-0.3%

Table 51: Descriptive statistics								
	Mean	Median	Mode	Standard Deviation	Sample Variance	Standard Error	Skewness	
<b>IQ.1</b>	5.197	6	6	1.540	2.372	0.077	-1.015	skewed
<b>IQ.2</b>	4.893	5	6	1.656	2.741	0.083	-0.864	skewed
<b>IQ.3</b>	4.816	5	6	1.720	2.959	0.086	-0.683	skewed
<b>IQ.4</b>	4.849	5	6	1.598	2.552	0.080	-0.697	skewed
<b>STQ.1</b>	5.092	5	6	1.614	2.604	0.081	-0.918	skewed
<b>STQ.2</b>	5.206	6	6	1.557	2.423	0.078	-1.061	skewed
<b>STQ.3</b>	5.443	6	6	1.457	2.124	0.073	-1.187	skewed
<b>STQ.4</b>	4.236	5	5	1.769	3.129	0.088	-0.422	skewed
<b>STQ.5</b>	4.699	4.699	6	1.577	2.488	0.079	-0.686	skewed
<b>STQ.6</b>	5.034	5.034	6	1.674	2.801	0.084	-0.735	skewed
<b>SQ.1</b>	4.640	5	6	1.676	2.810	0.084	-0.654	skewed
<b>SQ.2</b>	4.768	5	6	1.574	2.477	0.079	-0.796	skewed
<b>SQ.3</b>	4.285	4.285	4.285	1.469	2.157	0.073	-0.414	skewed
<b>POSQ</b>	4.940	5	6	1.721	2.961	0.086	-0.788	skewed
<b>T.1</b>	5.066	6	6	1.599	2.556	0.080	-0.912	skewed
<b>T.2</b>	5.096	5.096	6	1.496	2.237	0.075	-0.853	skewed
<b>T.3</b>	4.778	5	6	1.628	2.652	0.081	-0.614	skewed
<b>T.4</b>	4.507	4.507	6	1.553	2.412	0.078	-0.537	skewed
<b>T.5</b>	4.782	5	6	1.548	2.397	0.077	-0.762	skewed
<b>PU.1</b>	5.807	6	7	1.461	2.135	0.073	-1.574	skewed
<b>PU.2</b>	5.850	6	7	1.447	2.092	0.072	-1.618	skewed
<b>PU.3</b>	5.792	6	7	1.486	2.207	0.074	-1.528	skewed
<b>PU.4</b>	5.519	6	6	1.448	2.097	0.072	-1.190	skewed
<b>PU.5</b>	5.451	6	6	1.559	2.432	0.078	-1.226	skewed
<b>U.1</b>	4.929	5	6	1.493	2.230	0.075	-0.824	skewed
<b>U.2</b>	5.232	6	6	1.569	2.462	0.078	-1.092	skewed
<b>U.3</b>	4.981	5	6	1.798	3.232	0.090	-0.858	skewed
<b>U.4</b>	5.161	5.161	6	1.552	2.407	0.077	-1.094	skewed
<b>U.5</b>	5.499	6	6	1.402	1.964	0.070	-1.281	skewed
<b>US.1</b>	4.606	5	5	1.667	2.780	0.083	-0.721	skewed
<b>US.2</b>	5.753	6	7	1.670	2.790	0.083	-1.565	skewed
<b>US.3</b>	4.912	5	6	1.797	3.230	0.090	-0.865	skewed
<b>TB.1</b>	5.457	6	7	1.606	2.581	0.080	-1.127	skewed
<b>TB.2</b>	5.647	6	7	1.593	2.537	0.080	-1.345	skewed
<b>TB.3</b>	5.637	6	7	1.574	2.478	0.079	-1.325	skewed
<b>TB.4</b>	5.082	5.082	7	1.665	2.774	0.083	-0.808	skewed
<b>TB.5</b>	5.537	6	7	1.625	2.642	0.081	-1.345	skewed
<b>IU.1</b>	5.749	6	7	1.430	2.045	0.071	-1.400	skewed
<b>IU.2</b>	5.640	6	7	1.571	2.467	0.078	-1.328	skewed
<b>IU.3</b>	5.769	6	7	1.479	2.188	0.074	-1.523	skewed
<b>IU.4</b>	5.997	6	7	1.392	1.937	0.070	-1.896	skewed

## ENDNOTES

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### i E-Government versus E-Governance

Lyon *et al.* (2003) define e-governance or electronic governance as the use of ICT to fulfil governance functions. It is a concept that builds on existing processes of corporate and political management in local government. They also suggest that there are a number of other terms that are sometimes used to cover the notion of e-governance and this includes: 1- online governance, or digital governances, and 2- online, digital or electronic government (Lyon *et al.* 2003). Similarly, other authors defined e-governance as basically providing governance through electronic solutions such as computerization and integration of computerized solutions (Prasad and Ieee 2003)

Definitions for e-Government and e-Governance range from the working definitions like “the ability for anyone visiting the city website to communicate and/or interact with the city via the Internet in any way more sophisticated than a simple email letter to the generic city (or webmaster) email address provided at the site”(Kaylor *et al.* 2001) to “the use of technology to enhance the access to and delivery of government services to benefit citizens, business partners and employees” (Deloitte Research 2000 ). The focus of these definitions range from those focusing on Information and communication technologies (ICTs) to those focusing on ICT-enabled government and governance transformation Some examples of such definitions include:

- The use of ICTs, and particularly the Internet, as a tool to achieve better government (OECD 2003 ).
- The use of information and communication technologies in all facets of the operations of a government organization (Koh and Prybutok 2003).

However, in the UNDP (2010) e-government report, the notion of ‘e-governance’ refers to the wider process of bringing about the corresponding transformation in society ((Guida and Crow 2008) cited in (UN 2010)). Accordingly e-governance can be defined as the use of ICTs as a tool to achieve better governance, and is understood to extend the scope by including citizen engagement and participation in governance.

In summary, the terms e-government and e-governance are very closely related but are technically different such that the former reflects a whole system and the latter focuses on the consequence as a strategic value. While the notion of e-government is mostly focused on adopting ICT, particularly the Internet, as an interaction tool, e-governance as a notion is more focused on the consequences. In other words, e-governance is seen to link between the input which is using ICT as interaction to (Internet) and the consequence of deploying ICT which is the transformation and providing better services to citizens.

### ii “Implementation” or “Maturity “Stages

E-government implementation goes through several stages which are different in characteristics and complexity to each other (Conklin 2007). These stages are referred to as maturity stages, each of which requires specific considerations from both an organizational internal perspective (such as management, process restructuring, financial and resources allocation, policy and decision making, etc.) and an external perspective (e.g., citizen-oriented considerations which seek to understand citizens’ needs, preferences, capabilities, etc.). Given that EGS are available for citizens to use during the different stages, their reaction to it could change dramatically based on what they expect and what they receive from it.

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Authors differ in the number and content of the e-government maturity stages, with the proposed stages ranging from three to six. The terms that authors use for each stage also differ, so we will only use a number for each stage. In general, e-government maturity stages could be distinguished as follows:

*Stage 1*

Publish/Web presence/Catalogue (Atallah 2001; Layne and Lee 2001; Government Western Australia 2004; Conklin 2007; Yildiz 2007).

This stage reflects the presence of a government website which provides information for the public and is characterized to be one-way communication.

*Stage 2*

Interact & Transact (Atallah 2001; Layne and Lee 2001; Government Western Australia 2004; Conklin 2007; Yildiz 2007).

In this stage, individuals have the ability to conduct and complete a task through the Internet. For example: infringement payment, ID/ passport/ driver's license issue or renewal, tax payment, lodging an application, etc. It is characterized to be two-way communication. In addition, the government, starts enforcing high security standards so that personal and financial information of users conducting transactions cannot be tracked.

*Stage 3*

Integrate (horizontally and vertically) (Atallah 2001; Layne and Lee 2001; Government Western Australia 2004; Conklin 2007; Yildiz 2007).

In this stage, government departments and agencies are connected together through networks and databases, which facilitate sharing of information and reducing redundancies and inconsistencies. In addition, with greater accessibility to individuals' information a more complex security and privacy standard needs to be considered.

*Stage 4*

Transform to e-Democracy (Shackleton *et al.* 2004; Backhouse 2007).

Some authors consider e-democracy to be the last in the maturity stages of e-government development. After an e-government online service channel has been widely adopted by the public, it starts to be a useful channel to post comments, suggestions, complaints and e-voting, which should contribute to government decision and policy making.

### **iii Background on Kuwait Efforts in Implementing the E-Government Initiative**

In 2000 the Kuwaiti Government established a National Committee called Central Technical Body (CBT) to supervise the establishment of its e-government project. The first task was to set up a web presence and build an e-government portal that would initially be an informative website, before evolving into a multi-faceted Portal.

FAPCO- (which is an Internet Services & Solutions Company)- won the tender, for a project which consisted of:- (FAPCO – e-Government – Portal Project )

- Portal development
- Content management
- Application development
- Data input
- Maintenance for a period of one year
- Supply of hardware.

Accordingly the proposed benefits were:

- 
- Used flexible modern technology
  - Provided an enhanced web presence
  - Operates in line with Kuwait's e-strategy
  - Increased public awareness of services

While there was enthusiasm for e-government in Kuwait, however, in 2003 the Kuwaiti government was struggling and facing political and Bureaucratic obstacle, and there were concerns that the practice of “wasta” (akin to nepotism) is undermining the efforts to create the e-services. Nevertheless, in October 2003 Kuwait took its first steps towards employing electronic technology in the business and successfully launched the e-Government Portal, offering a wide range of services and information.

Kuwait government considered collaborating with the private sector and non-governmental organization as very important to implement and develop an effective ICT initiative. Thus, Kuwait has done some agreements and cooperated with other parties to make sure that it can come up with a reliable e-government portal. For example:

1- The Kuwaiti Government had cooperated with UNDP. (Which supported a communication protocol for all government agencies in Kuwait, and supported the Kuwait Ministry of Justice in designing & developing a judiciary information database. (Sami Atallah 2001))

2- The Kuwaiti Government and Singapore did the following:

a. In 2004 - Singapore provided support to the development of an e-Government Blueprint for the State of Kuwait, and to the establishment of the Central Agency for Information Technology (CAIT) (which acted for 2 years as an active driver of e-government programs, and made recommendations on budget).

b. In 2005 – Singapore supported two high priority e-Government projects, the Kuwait Information Network and the Kuwait Government Online.

c. In 2006 (CAIT)- which was established and transferred to the authority of the Ministry of Communication - had cooperated with Singapore and signed a Memorandum of Understanding (MOU) to facilitate co-operation in e-Government, such as accelerating the implementation of e-Government, serving as an advisor to CAIT on matters related to IT and e-Government. (Kuwait IT Report, (2009))

3- In April 2007, the Kuwaiti government had signed a strategic partnership (SPA) with Microsoft, and since then it has worked closely with (CAIT) to develop the Kuwait's National ICT strategy. By Nov 2008, Microsoft announced that its technologies are powering (phase 1) of the newly launched Kuwait Government Online Portal (KGO)

In Feb 3 2009, (CAIT) announced that the official portal of the state (e-government) consisted of 45 services reflecting 20 state authorities, as well as 175 information services.