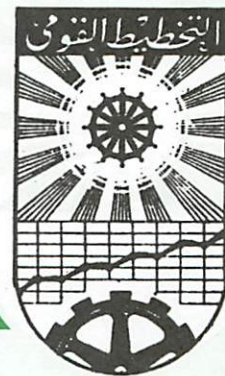


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**Towards Developing an Assessment  
Metric for  
E- services: case study Egypt**

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## **Abstract**

Since the mid 1980s, Egypt has realized significant growth in information and communication technology (ICT) usage across different sectors in the economy. In order to generate economic development and growth, ICT need to be transformed into economic activities offering services, applications and content that create new markets, reduce costs and increase productivity.

In October 1999, a new Ministry of Communications and Information Technology (MCIT) was formed to facilitate Egypt's transition into the global Information Society. The goal of the MCIT is to develop and expand the telecommunications infrastructure, expand the pool of IT skilled labor and create national information systems and databases. Successfully, the Ministry managed to achieve a lot of its goals and provide the context to move on and develop several e-services such as e-learning, e-government, e-commerce, and e-health.

The nature and the characteristics of these services have made them difficult to study. Furthermore, since several developers are involved, this allows a heterogeneous offering of e-applications approaches and makes a delivery of uniform service quality quite difficulty. E-Services, as well, are not easy to communicate because they are intangible. The key factor to encourage and maintain users' interaction and usage is users' perception to the e-services quality. Research in this domain has recommended a wide range of quality dimensions to assess the e-services quality. This research is fragmented and focuses mainly on e-commerce applications' quality. The goal is to investigate the factors determining

the users' perception while using different e-services applications. In other words; the objective of this research is to develop a comprehensive metric to assess users' perception of e-services quality. Having this metric will enable a deep investigation to the current Egyptian e-services.

## Introduction

Information and Communication Technology (ICT) is the main pillar to circulate knowledge and information that allow flourishing the economy by creating more business opportunities and improve government and educational services. “Information and communication technology ICT is not a panacea, but a technology that can be made to enhance business performance” (OECD, 2003) <sup>i</sup>. A proper utilization to the information and communication technologies (ICTs) in their socio-economic development can function as a significant productive economic force. ICT has the potential to create job opportunities, improve delivery and access to health and education, facilitate information sharing and knowledge creation, and increase the transparency, accountability and effectiveness of government, business and non-profit organization; all of which contributing to an enabling environment for socioeconomic development (Morawczynski, and Ngwenyama, 2007) <sup>ii</sup>

In this context, the more people and firms use the IT and network, the higher the benefit becomes. Adopting ICT, however, takes time in order to set the infrastructure and train people to acquire IT skills.

In 1999, Egypt has created a Ministry for Communication and Information Technology. Its mission is to coordinate among government agencies and private sector institutions to expand telecommunications infrastructure, develop the IT skilled labour and create national database (Mahboub and Salman , 2007) <sup>iii</sup>. This

has been translated into a comprehensive national program that includes a number of projects and initiatives namely Egypt Information Society Initiative (EISI). Egypt initial has devoted 2.2% of GDP to expenditure on ICT during the period 1993-2001<sup>iv</sup>. The economic indicators of the second quarter of 2009/2010 show a good performance. The real growth rate of ICT sector is 12.8%; ICT sector contributes 4.24%to real GDP. ICT sector revenues are EGP 10.37 billion and during the fourth quarter in 2009, the ICT gross domestic product at fixed prices has reached EGP 8.74 billion (ICT, March 2010)<sup>v</sup>.

As a start, the focus was on allowing the diffusion of ICT and equal access for all, in other words, e-Readiness, successfully; Internet usage has noticeably proliferated in the last five years. The Internet access costs in Egypt are the lowest among Arab countries, and lower even than those prevailing in the advanced nations. The World bank ICT indicators show that Egypt's Internet usage per 100 people increased from 0.6 in 2000 to 16.6 in 2008. Generally, gauging the networked readiness of Egypt's position in the world, Egypt's position improves continuously from 99 in 2005 to 76th 2009 and to 70th 2010; meanwhile all other countries in the region either remain rather stable or drop in the rankings year 2009-2010(ICT,2010).<sup>vi</sup>

Besides the e- readiness, the EISI projects' objectives were in developing socio-economic development applications in tracks like e-government, e-businesses, e-learning and many others to help bridge the digital divide and facilitate Egypt's integration into the global information society (UNCTAD,2006)<sup>vii</sup> .

E-government applications are of a significant importance as they are a means to reengineer the operation of government, and they are usually designed with the purpose of integrating and managing information in the best fashion. These applications improve government processes by cutting process cost and managing process performance, allowing connecting to citizens, offering citizens the opportunity to share in the decision making process, and greatly improving efficiency and quality. Moving toward this goal effectively, in years 2008–2009, Egypt scored 4.23 to the extent ICTs has been used by the government agencies and to the extent of ICTs used by the government to improve the efficiency of government services, it scored 4.61. These scores are a weighted average between 1 = not used at all to 7 = highly. Looking into the government online service index to assess the quality of government's delivery of online services, Egypt scored 0.53 out of 1 and ranked the 23rd out of 130 countries (ICT, 2010)<sup>viii</sup>.

E-businesses foster the economy as “transitioning from commodity-based approaches to value added manufacturing and information economies is vital for sustainable development. Appropriate use of high technology products is a gateway for successful economic transition”<sup>ix</sup>. E-businesses allow a new way of doing business and require creating new technology-based firms, improving workforce skills, using electronic documents, and developing e-payment infrastructure. The Egyptian government has established the Information Technology Industry Development Authority (ITIDA) to enhance the e-businesses infrastructure and ensure implementation of e-signature law. During 2008–2009, the weighted average for the extent Egyptian companies used the Internet for their business activities such as buying and selling goods. Egypt has scored 4.86. This weight is ranging from value 1 for never to 7 for extensively (ICT, 2010)<sup>x</sup>.



Deploying and developing eLearning applications are particularly challenging for Egypt given the region's comparatively low literacy rates. Approximately 57.9% are illiterate. To nurture human capital, Egyptian government is exerting a great effort to improve the educational systems quality. One focus is to teach computer skills at elementary, secondary and university levels in addition to training within the vocational and traditional educational system. The aim is to create a new generation of citizens who understand and are comfortable with the use of ICT in their daily lives. The ministry of higher education is in the process of building a national e-Learning centre for higher education. The centre aims at introducing courseware development and delivery among Egyptian universities as well as other higher education institutions. Statistical data in June 2009 on ICT use by the higher education sector show that the proportion of faculties with e-labs of the total number of faculties is 8.3%; the proportion of faculties connected to the Internet of the total number of faculties with computers is 8.8%; and the proportion of faculties with computers of the total number of faculties is 100%(ICT, March 2010)<sup>xi</sup>.

The Egyptian government also has realized the importance of developing these applications, i.e. e- government, e-business, and e-learning applications, in Arabic to enable access by the majority of the citizens and to protect Egyptian cultural identity. In May 2005, Egypt has started an initiative for digital Arabic content and the Egyptian government represented by MCIT signed a protocol with the Publishers Union and the e-learning and e-business Solutions Union. In this protocol, *(the MCIT finances a project of 13 million US dollars for three years to*

*digitize and create an Arabic portal for a number of the available Arabic books in different disciplines.) (ESCWA,2007 )<sup>xiii</sup>*

With this in mind, evidently Egypt is making clear and successful steps to develop the ICT sector. Now, the Web has rich Egyptian e-government and e-business applications. At least each government agency, private or public, has a Website that provides information or services. Small businesses as well are flourishing. Websites like e.g., <http://www.yallabina.com/> and <http://www.Nefsak.com> are becoming commonly used. To keep this momentum and to allow equal access for all, a deep assessment to the current e-government and e-business applications would help identifying the gaps and areas that require enhancements.

The previous work assessing the Egyptian e-services focused on issues like the critical challenges facing the diffusion of the Internet (Aladwani, 2003)<sup>xiii</sup>, the e-readiness of the Egyptian government (Azad et.al., 2009)<sup>xiv</sup> and the public acceptance of this service(Elbeltagi,2007)<sup>xv</sup>. Little has been done to assess users' perception of applications recently developed. These applications are establishing new concepts for human communication and interaction that affect economies and societies worldwide. Hence, focusing on users' perception in the assessment will allow spotting the strengths and the weaknesses to improve the efficiency and effectiveness of these applications.<sup>xvi</sup> That triggers the following questions: "how can we assess users' perception? Is there a single instrument that measures users' perception? What are the factors influencing users' perception, How do they influence?"

To answer these questions, this work will combine and synthesize the literature and develop a comprehensive metric to assess users' perception to e-services quality e.g., e-government and e-business. Next, it will investigate the impact of factors like demographic parameters e.g., age, gender, educational background, occupation, and internet usage on users' perceptions.

## Related work

The choice of individuals to use any system depends on the value perceived of this system to them. The Technology Acceptance Model (TAM) (Davis, et.al., 1989)<sup>xvii</sup> models how users come to accept and use a technology. The model suggests that when users are presented with a new technology, a number of factors influence their decision about how and when they will use it, particularly, perceived usefulness (PU), which is *"the degree to which a person believes that using a particular system would enhance his or her job performance"* and perceived ease-of-use (PEOU), which is *"the degree to which a person believes that using a particular system would be free from effort"* (Davis, et.al., 1989).<sup>xviii</sup> Shewhart (Shewhart, 1980)<sup>xix</sup> differentiates between objective and subjective quality emphasizing that the subjective quality, which is *"the level of perceived value reported by the benefited user,"* has a stronger influence on the application usage than objective quality, which is *"the degree of compliance of a process or its outcome with a predetermined set of criteria that are assumed essential to the ultimate value it provides"* (Magoutas et.al.,2007)<sup>xx</sup>.

Though studies on e-service perceived quality have been conducted and different scales have already been developed for measuring e-service quality, the existing research on e-service quality has been described as fragmented (Christy,2003)<sup>xxi</sup> (Costantinides,2004)<sup>xxii</sup>. Furthermore, the majority of the quality dimensions are

developed for e-commerce applications, which are used to evaluate any e-application, and fewer have targeted e-government applications. This work will survey the current perceived quality dimensions and provide a metric that groups these dimensions into general and application specific.

The set of dimensions of e-business differs from one research to another. Dabholkar (Dabholkar ,1996)<sup>xxiii</sup> suggested website design, reliability, delivery, ease of use, enjoyment, and control are the main dimensions. Yoo and Donthu(Yoo and Donthu,2001) proposed four dimensions scale called SITEQUAL; ease of use, aesthetic design, processing speed, and interactive responsiveness<sup>xxiv</sup>. Cox and Dale (Cox and Dale, 2001)used the six dimensions: website appearance, communication, accessibility, credibility, understanding and availability<sup>xxv</sup>. Wolfinbarger and Gilly (Wolfinbarger and Gilly, 2003) put forward their eTailQ scale includes website design, reliability, security and customer service<sup>xxvi</sup>. Lociacono et.al.(Lociacono et. al.,2002) set the WEBQUAL scale, which is composed of 12 dimensions informational fit-to-task; tailored communications; trust; response time; ease of understanding; intuitive operations; visual appeal; innovativeness; emotional appeal; consistent image; on-line completeness; and relative advantage<sup>xxvii</sup>.Parasuraman et. al. (Parasuraman et. al.,1988)recommended the five dimensions of SERVQUAL which are tangibles, the appearance of physical facilities, equipment, personnel and communication materials, reliability, the ability to perform the promised service dependably and accurately, responsiveness, the willingness to help customer and provide prompt services, assurance, the knowledge and courtesy of employees and their ability to convey trust and confidence, empathy, care and individualized attention provided to customers.<sup>xxviii</sup> Li et. al. (Li et. al.,2009)concentrated on nine dimensions: ease of use, website design, reliability, system availability, privacy, responsiveness and

empathy from the perspective of online companies, and experience and trust from the perspective of customers<sup>xxix</sup> Chang and Chin(Chang and Chin,2009) presented different dimensions: customer interface quality, perceived security, customer satisfaction, switching costs, and customer loyalty<sup>xxx</sup>. Cheung et al.( Cheung et al,2003) grouped the medium characteristics of e-commerce into Website design that is considered with social presence, navigation, ease of use, and interface, accessibility , compatibility , functionality , privacy, reliability, security, network speed , network externalities, usefulness, information quality which includes information complexity, information novelty, information architecture, information content, and information accuracy, dynamic pricy strategy, and search attribute. <sup>xxxi</sup>

In the area of perception of e-government applications, Alshawwi and Alalwany (Alshawwi and Alalwany,2009) established a set of dimensions for e-government assessment conveying the Citizen's perception there are as follows: performance that includes efficiency, personalized information and services, accessibility which is about efficient user interface, disability access language translation, cost saving that has money saving, time saving, openness, trust which is about trust in the internet, trust in the government, and perceived ease of use and usefulness.<sup>xxxii</sup> Grimsley and Maahan (Grimsley and Maahan, 2006)<sup>xxxiii</sup> suggested three main dimensions public value, dissatisfaction, and trust. Public value is about citizen satisfaction, sense of alternativeness, friendliness, commitment, aesthetics, and security. Dissatisfaction is focusing on integrity, functionality, flexibility. Finally trust includes sense of being well informed about initial availability, consistency, and timely feedback, sense of personal control of one's life/ autonomy, and sense of influence according to their time, work, family care, and social life (Grimsley and Maahan, 2006).<sup>xxxiv</sup>

Faced with a lot of dimensions, research recognized the need to group these dimensions. First, Barnes and Vidgen (Barnes and Vidgen,2002)and categorized these dimensions into eQual metric that have three main classifications to assess e-government service. *Information quality* focused on information, data and system quality. *Interaction and service quality* are about marketing, e-commerce, and IS service quality. *Usability* is about human computer interaction and Web usability.<sup>xxxv</sup> Second, Constantinides(Constantinides,2004) as well grouped these dimensions factors into functionality, psychological, and content factors. Functionality factors include “Usability” and “Interactivity” elements. Psychological factors are about whether the website and vendor are trustworthiness. Content factors are referring to creative and marketing mix related elements of the Web site which are “Aesthetics” and “Marketing mix”<sup>xxxvi</sup>. Although the work Alshawwi et al and <sup>xxxvii</sup> Grimsley and Maahan <sup>xxxviii</sup> showed extra dimensions about e-government quality, clearly none of the previously presented classifications consider these dimensions.

The following sections will investigate two main questions: Are the general dimensions to assess e-services equally important for e-commerce and e-government? What is the impact of factors like demographic parameters e.g., age, gender, educational back ground, and internet usage on users’ perceptions?