

FACTORS INFLUENCING THE ADOPTION AND USAGE OF ONLINE SERVICES IN SAUDI ARABIA

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ABSTRACT

Advances in electronic service technology have created great opportunities as well as threats to organizations in various business and services sectors. As such businesses, either willingly or reluctantly, are increasingly embracing the Internet as distribution channel in order to remain competitive or gain market share. With particular reference to e-services, absence of accurate information on factors that have influenced users' behaviour to adopt or use e-services could mislead an organization into adopting unhelpful solutions as it strives to accelerate the implementation of e-services. This study, based on the diffusion of innovations (DOI) theory leveraged into the online environment, investigates factors that influence adoption and usage of e-service, especially, in Saudi Arabia. Factors were empirically tested against data collected from 651 participants using survey questionnaires. Perceived Complexity was found to be the most significantly related factor affecting e-service adoption in Saudi Arabia, followed in turn by Privacy and Compatibility. Quality of the Internet and its relative advantage also had a notable affect on e-service usage and adoption in Saudi Arabia.

1. INTRODUCTION

The internet, one of the most successful innovations in the world, has created great opportunities as well as threats for organizations in various business and services sectors, compelling them (either willingly or reluctantly) to support their products or deliver their services 'on line' using the Internet as distribution channel (Chau & Lai, 2003).

Public and private organizations across the world are realigning their strategies to take advantage of this opportunity and overcome the challenges to the way they operate, deliver services and compete with each other using online services (Chan & Lu, 2004). Boyer et al., (2002) have defined online services as "*the initial landing on the home page until the requested service has been completed or the final product has been delivered and is fit for use*".

The objectives of online services include cost containment through reduction in operating cost and increasing return on investment (ROI), raising the productivity and efficiency of the public and private sectors by making the service available at all times of the day, wider coverage by enabling the access to service from any location, providing the required information in a timely and highly accurate fashion, and providing better and more easy-to-use services (Buckley, 2003; Drinjak et al., 2001; Marshall, 2001).

Turning briefly our attention to Saudi Arabia we find that there is no reliable local production in the fields of software or the hardware. The increased demand for ICTs is met by acquiring overseas technologies (Alferaihi, 2003).

The trend towards increased reliance on ICTs by the Saudi people, in particular computers and internet services, is one of the highest when compared with other developing countries; however it is still far below the ownership rate in developed countries. Table 1 illustrates the ownership rate of equipment such as fixed-line telephones, cellular phone and

personal computers. The ownership rate was calculated per 1000 persons in variant countries over the world.

Table 1 The Trends Toward Using and Owning a Technology.

Telephones and Internet Users by Country, 1990 and 2005 (Rates per 1,000 persons)

Data from: <http://hdr.undp.org>, <http://www.infoplease.com/ipa/A0883396.html> and <http://www.internetworldstats.com/stats.htm>

Country	Telephone main lines		Cellular phone subscribers		Internet users		
	1990	2005	1990	2005	1990	2005	2008
Developed Countries	1990	2005	1990	2005	1990	2005	2008
Sweden	683	717	54	935	6	764	805
United Kingdom	441	528	19	1,088	1	473	798
Australia	456	564	11	906	6	698	796
South Korea	310	492	2	794	no data	684	773
Switzerland	587	689	19	921	6	498	758
United States	545	606	21	680	8	630	741
Japan	441	460	7	742	no data	668	740
Canada	550	566	21	514	4	520	717
France	495	586	5	789	1	430	677
Germany	401	667	3	960	1	455	671
Italy	394	427	5	1,232	no data	478	501
Russia	140	280	0	838	0	152	271
Developing Countries	1990	2005	1990	2005	1990	2005	2008
Colombia	69	168	0	479	0	104	417
Lebanon	144	277	0	277	0	196	391
China	6	269	no data	302	0	85	253
Saudi Arabia	75	164	1	575	0	70	251
Egypt	29	140	no data	184	0	68	159
Ecuador	48	129	0	472	0	47	112
Pakistan	8	34	no data	82	0	67	106
India	6	45	0	82	0	55	70
Cuba	32	75	0	12	0	17	no data

The goal of this article is to raise awareness and enhance understanding of factors that influence adoption and usage of online services in Saudi Arabia in the light of the Rogers' (2003) diffusion of innovations theory DOI (Chau & Lai, 2003; Lai & Guynes, 1994; Rogers, 2003). More precisely, online service adoption will be studied from the information systems adoption point of view referring to the idea that consumers are using online information system via the Internet (e-service) directly and hence more knowledge on the factors that affect information systems adoption is needed.

In the paper, the terms online service, Internet services and e-service are used interchangeably to identify the services that are being offered online. Both e-government and e-commerce could be good instances of e-service (Buckley, 2003). In addition, the article will only cover the online services that are offered by Internet websites in Saudi Arabia.

The paper is divided into four parts: the first part reviews the accumulated knowledge and available literature that is relevant to the topic and then several hypothesised relationships are formulated between e-service adoption and major independent variables. The second part presents the research methodology used in this work. The third part comprises of the results and analysis. In this part the data is analysed using a factor, regression and correlation analyses. The final part consists of the conclusions and practical implications of the research.

2. FACTORS INFLUENCING ADOPTION

This part of the paper aims to review relevant accumulated knowledge and available literature in order to evaluate related research. Several relevant topics have been reviewed and organized based on context and integrative reviews categories. Moreover, at the end of each topic testable hypotheses are formulated if needed. An overview about ICTs and Internet activity in Saudi Arabia are initially presented followed by a discussion about adopter characteristics and sort of most important factors that have a notable impact on adoption.

2.1 New Technology Adopter Characteristics

According to Rogers (2003), the adopter of a new technology is typically younger, has a good income and appropriate level of education and more reactive to new innovation than the non-adopter. Rogers (2003) also indicates that innovative individuals have positive attitudes, ability to communicate with others and a high level of social participation. This trend has been confirmed by many researchers such as Madden and Savage (2000), Dobbins (2002), Mason and Hacker (2003), Chinn and Fairlie (2004), Choudrie and Dwivedi (2005) and Marchionni & Ritchie (2007) who concluded that adopters are younger, wealthy, usually have a good level of education, and possess more social mobility than those who adopt innovations later.

In fact, there is an agreement that demographic or socio-economic variables such as *age*, see So, Wong and Sculli (2005), Venkatesh et al. (2003), Choudrie and Lee, (2004), *education*, see Choudrie and Dwivedi (2005), Choudrie and Papazafeiropoulou (2006), *income*, see Mason and Hacker (2003), Chinn and Fairlie (2004), Choudrie and Dwivedi (2005) and even *occupation*, see Gilligan and Wilson (2003), significantly helped to explain differences between the adopters and non-adopters (Dwivedi and Lal, 2007).

Madden and Savage (2000) found that the individuals who tended to use the Internet early in Australia were young males, with high level of income and education. Choudrie and Dwivedi (2005) also confirmed that the economic status for individuals influences their ability to own and then use a technology. Moreover, Rogers (2003) showed that demographic attributes play an important role in predicting adoption and that economic status (income) is highly correlated to initial adoption. Rogers, in his diffusion of innovation (DOI) theory proposes that new technologies are initially adopted by those who have more resources. Therefore, the following hypothesis is proposed:

H1: *Of the demographic variables (age, gender, education, and income), income is stronger predictor for e-service adoption.*

Although, income level, age, gender, and geographic location have a significant effect on people's access to and use of the Internet and its services, adoption patterns across gender were notable in many countries. Chen & Wellman (2004) in a study which focused on Internet usage in China, Germany, Korea, Italy, Japan, Mexico, UK, and USA found that men were more likely than women to use the Internet and the rate of adoption was high for young people who understand English and live in urbanised environments. Taking a step further, MacGregor and Vrazalic (2006) conducted a study into eCommerce adoption barriers in small businesses and the differential effects of gender. The results indicated that adoption barriers fall into one of two distinct groupings: too difficult to implement or unsuitable to the business. The results also showed that "females were more concerned about e-commerce being unsuitable for their business, while males expressed more concern about the difficulty of implementing e-commerce" (MacGregor and Vrazalic, 2006; pp. 19). Thus the following hypothesis is proposed:

H2a: *There is a significant difference between male and female participants regarding the adoption of e-service in Saudi Arabia.*

In conclusion, for most countries, adopter characteristics can be found among people who have a high level of income, are well educated, young, male, living in urban areas and have a good grasp of the English language.

Although a number of studies (Chen & Wellman, 2004; Laukkanen & Pasanen, 2008; MacGregor & Vrazalic, 2006; Slyke et al., 2002; Venkatesh & Morris, 2000) conducted in "Western cultures" show that males are more likely than females to adopt e-service, the same may not hold in Saudi Arabia (Siddiqui, 2008) with females more likely to adopt over males. This difference is probably due to the nature of the Saudi society which can be described as conservative (Berkman, 2005). In such a society a female tends and prefers to achieve her needs from home by using the internet (Siddiqui, 2008). Thus the following hypothesis is proposed:

H2b: *Females are more likely to adopt the e-service in Saudi Arabia rather than the males.*

In conclusion, studies with different perspective on the subject can be readily found. Perhaps this can be best explained by Gatignon and Robertson (1985), who in their research, noted this inconsistency and recognised that the diffusion of technology especially Internet use can be affected by technological and social accesses. The technological access refers to infrastructure and person's capability in field of computer software and hardware, while the social access refers to the mix of education, knowledge and economic resources required for the use of the internet (Kling, 1999).

Accordingly, innovators' characteristics can be accurately identified by accounting on a particular product-category basis rather than across various innovations or products groups. Gatignon and Robertson (1985) stated: "The overriding conclusion is that innovators must be identified and characterized on a particular product-category basis and that there is not a generalized innovator across product category or interest domains" (p. 861). To some extent, inconsistency in the studies findings which are focused on characteristics of the technology adopters can be referred to the fact that no two products or innovations can be used or adopted in equivalent degree and are usually perceived in a different way from person to other (Bolton, 1983; Dickerson & Gentry, 1983).

2.2 Trust

Sense of customer's trust is greatly decreased in the online shopping environment due to lack of face-to-face interaction between both buyer and consumer and consumer and product (Cho et al. 2007). Trust in online environments exceeds the common meaning of trust to include trust in technically or socially abstract systems (Sydow, 1998). The concept of system trust in online environments is therefore based upon belief in the aptness of the principles relating not only to personal interaction but also to abstract systems (Giddens, 1990; Sydow, 1998).

Online consumers not only need to trust online vendors, they also need to trust the Web itself as a transaction medium (McKnight and Chervany, 2002). Therefore, Rea (2001) suggested that increasing the awareness of how to implement system designs that exploit the user's semantic understanding of electronic commercial process can be a helpful technique in building trust in electronic environments. Likewise Zuboff (1988), in her study focused on information technology usage, found that the lack of trust in a new technology would affect its usage. Actually, trust is an important factor influencing consumer behaviour and it determines the success of technologies adoption such as eCommerce (Holsapple and Sasidharan, 2005) and according to Palvia, (2009) trust has a significant effect on participation intention through usage attitude. In the context of B2C eCommerce, building trust between two parties is crucial for companies which choose to do business online (Chawdhry et al., 2002; Chew, 2007; Luarn and Lin, 2005; Petre et al., 2006). Several studies found that consumers trust is significantly related to trust in the eCommerce Web site itself and perceived site quality is positively related to trust in the Web site (Flick, 2009; Hwang, 2008; Joseph-Vaidyan, 2008).

Joseph-Vaidyan (2008) conducted a study to identify factors that enhance customer trust in eCommerce Web sites and examined those factors in relation to the eCommerce success metrics. The study found that certain functional, organizational, security, and infrastructure factors in Web design have significant impact on the customer trust in eCommerce Web sites which positively influence eCommerce success (Joseph-Vaidyan, 2008). This finding is in line with prior studies from Farah & Higby, 2001; Sipior et al., 2004 which confirmed that the success of eCommerce is highly related to eConsumer's trust. Likewise, a more recent study conducted by Hwang (2008), showed that trusting belief has a positive effect on purchase intention. Moreover, the trust factor was found to be an important predictor for the adoption of eCommerce and mCommerce (Luarn and Lin, 2005; Cho et al., 2007), a finding supported by Wei et al. (2009), who showed that there is a strong positive relationship between trust and the mCommerce adoption.

According to McKnight et al., (2002) lack of trust in the technical and institutional environment hinders the adoption of eCommerce. This is supported by Ha and Stoel (2009) who conducted a study into consumer acceptance of eShopping by investigating eShopping quality, enjoyment, and trust in addition to the original constructs of the technology acceptance model (TAM). The study showed that shopping enjoyment and trust play significant roles in the consumers' adoption of eShopping.

As this study focuses on eCommerce adoption in Saudi Arabia, a developing country from the Arabic region, according to El Said and Galal-Edeen (2009), "To implement e-commerce successfully in high uncertainty cultures, such as the Arab countries, will need to pay relatively more attention to measures that reduce the uncertainty associated with internet shopping" (El Said and Galal-Edeen, 2009). Consequently, from the above debate that represents a review of available literature about effect of trust on eCommerce adoption, the following hypothesis is formulated:

H3a: *There is a significant relationship between perceived trust and e-service adoption in Saudi Arabia.*

H3b: *There is a positive correlation between perceived trust and the e-service adoption in Saudi Arabia.*

2.3 Security

Security concepts, in general, refer to the ability to protect against potential threats. However, in online environments, security is defined as the ability of the online company website to protect consumer information and their financial transactions data from being stolen during transmission. While perceived security controls describe the degree to which an e-commerce website is perceived to be secure and able protect other information from potential threats (Hua, 2009).

Since 2000, online services security has become gradually noticeable as a critical issue, in particular, after a number of well publicised attacks on outstanding Internet sites, such as CNN, Yahoo, eBay, and Amazon. As a result of the attacks; these companies lost approximately \$1.2 billion USD. Besides, successful electronic attacks, on-going costs including the loss of business, reputation and customer trust (Stephen, 2001). Therefore, heightened security concerns could stop potential damages ensuing from insecure transactions, hacking, or poor access control to important data (Hesson and Alameed, 2007).

Fram and Grady (1995) conducted a study focused on Internet buyers from an online consumer perspective. They found that most concerns condensed into a collection of transaction issues such as lack of credit card security, vendors not fully identified and a lack of payment alternatives. Likewise, Then and DeLong (1999) stated “fear of doing financial transactions over the Internet” as the most significant barrier that prevents online browsers from becoming online buyers. Security concerns in this context refer to consumers’ beliefs that online companies are not able to protect their transaction’s information from being stolen during transmission or storage (Belanger et al., 2002; Salisbury et al., 2001) and these concerns have a notable impact on individual decision to buy online (Yang and Jun, 2002).

Research findings in general, have shown that customers’ behavioral intention to use e-commerce websites is significantly influenced by their perception about the level of security control that website has. Salisbury (2001) found that perceived security is a much stronger determinant of intention to purchase online than the perceived ease of use and usefulness of the website. Likewise, Miyazaki and Fernandez (2001) showed that the rate of online product purchase is highly related to perceived security control possessed by a website. Lee (2009) conducted a study to investigate effect of perceived risk and benefit on customers’ behavioral intention to use online banking and to clarify which factors are more influential in affecting the decision to use online banking. He examined five specific risk facets – financial, security/privacy, performance, social and time risk, and found that “the intention to use online banking is adversely affected mainly by the security/privacy risk, as well as financial risk”. These findings have been supported by another recent study conducted by Hua (2009) investigating online banking acceptance in China. Hua (2009) showed that perceived ease of use is of less importance than privacy and security and clarified that “security is the most important factor influencing user’s adoption”.

Belkhamza and Wafa (2009) confirmed that security issues and system risks of e-commerce are the major determinants of the adoption behavior in Algeria. Moreover, in another developing country Shafi (2002) conducted a study in Saudi Arabia to investigate impact of Internet technology use among Saudi business organisations. He found that Saudi businesses use the Internet mostly for conservative tasks such as communications and information gathering, and due to security concerns and access issues they are less likely to

use the Internet in a more advanced form of e-commerce such as sales and purchases. Thus, these hypotheses are proposed:

H4a: *There is a significant relationship between perceived security and e-service adoption in Saudi Arabia.*

H4b: *There is a positive correlation between perceived security and the e-service adoption in Saudi Arabia.*

Due to some commonality the literature has often reported on, and used privacy and security interchangeably (Lee, 2009; Liu et al., 2005; Xu and Teo, 2004). However, Belanger et al. (2002) recommend that due to a lack of understanding of their correlations; security and privacy should be treated as distinct. Scholars supported this finding and affirmed that security and privacy are two different constructs (Chang et al., 2005; Gurung, 2006; Hua, 2009; Vijayarathy, 2004).

Within the scope of this study we treat security and privacy as two distinct factors. Security concerns refers to financial transactions' risks, while privacy refers to the degree of safeguard of personally sensitive information excluding financial details or payment-related information. A discussion about privacy concerns and its impact on e-service adoption is presented in next section.

2.4 Privacy Issues

Consumers utilize online services because they offer convenience and save time. However, some researchers have showed that online consumers might refrain from using online services because of their concerns about privacy, including the safeguard of personally sensitive information which may be sold to third parties.

Lessig (1999), mentioned that as the number of consumers' purchases through the Internet increases, electronic vendors can increasingly obtain online buyers' private information such as demographic profiles or consumer shopping behaviour which can be passed on to third parties. Lessig also claimed that companies might have no reason to protect their customers' information if they are not aware of any responsibility concerning the social cost of privacy invasions. However, Shapiro (2000) argued that many successful online service providers have customized their services and redesigned the offered products to match individual customers needs identified through the customer's personal information. Shapiro also found that privacy problems can be solved from the interaction of law, code of conduct and markets which can strengthen the existing regulations about compliance of online service providers to their own privacy policy as specified on their web sites, letting consumers have control over their personal information for their own benefits such as money, goods, or services.

The Saudi constitution does not provide for a right to privacy, but 2007 saw the introduction of the "IT Criminal Law" which defines IT crimes and their relevant punishments. However, the IT Criminal Law, written in Arabic, does not define the privacy right nor does it mention any relevant punishments that might be applied to organisations, companies and websites owners that do not protect their visitors/customers' privacy. Did does little to instil confidence in the system.

In conclusion, online consumers could be deterred from using online services because of their concerns about the privacy and sensitivity of personal information. As such these hypotheses are tested:

H5a: *There is a significant relationship between perceived privacy and e-service adoption in Saudi Arabia.*

H5b: *There is a positive correlation between perceived privacy and e-service adoption in Saudi Arabia.*

2.5 E-Service Quality

Over the last 20 years, service quality and ways to measure it have been analysed a great deal (Buckley, 2003). However, there are disagreements in the literature on what e-service quality really means (Zeithaml et al., 2000). For instance, a number of studies have focused on the technical by considering the quality of the website itself. However, quality could be seen as a representation of the entire service delivered through the online service providers (Gronroos et al., 2000) and characteristics such as age, gender, income level, and experience and technology tendency may affect the customer perceptions and evaluations of the service and consumer satisfaction (Zeithaml et al., 2000).

In fact, service quality on the Internet is part of the consumer shopping experience and affects the overall satisfaction level; therefore, numerous studies found that e-service quality is highly related to consumer satisfaction (Balasubramanian et al., 2003; Pitt et al., 1997; Watson, et al., 1998; Zhang and Prybutok, 2005). Thus, these hypotheses are proposed:

H6a: *There is a significant relationship between e-service quality and e-service adoption in Saudi Arabia.*

H6b: *There is a positive correlation between e-service quality and e-service adoption in Saudi Arabia.*

2.6 Loyalty

Customer loyalty is “a deeply held commitment to rebuy or repatronize a preferred product/service consistently in the future, thereby causing repetitive same-brand or same brand-set purchasing despite situational influences and marketing efforts having the potential to cause switching behaviour” (Oliver, 1999). Subsequently, Anderson and Srinivasan (2003) have defined e-loyalty, in brief, as the best preferable attitude of a customer headed for an e-business, leading to repetitive online purchasing.

Due to widened diffusion and diversity of the services offered via the Internet; the level and amount of competition between online service providers have escalated increasingly granting the online consumer power (Barsh et al., 2000; Porter, 2001; Reichheld & Schefer, 2000). Continuous development in web technology, content, service and product value helps to acquire and keep online customers loyalty which is critical to the success of any online service provider in today's online competitive environment.

In the context of Saudi Arabia, there is a lack of research on factors that affect customer loyalty. A study conducted by Tunsi (2000) found that loyal customers considered service/product quality and reputation important, reinforcing the notion that Saudi people prefer companies that assure their privacy and this “reflects the most desirable condition in the Saudi culture” (p.102). According to Tunsi (2000) “due to cultural differences, the factors that affect customer loyalty in Saudi Arabia may vary and may be quite different than factors that determine customer loyalty in other countries” (Tunsi, 2000, p. 8). However, in general, customers are most likely to be loyal to company or shop that meet their needs and expectations (Tunsi, 2000). Therefore, the following hypotheses are formulated:

H7a: *There is a significant relationship between online user loyalty and e-service adoption in Saudi Arabia.*

H7b: *There is a positive correlation between online user loyalty and e-service adoption in Saudi Arabia.*

2.7 Diffusion of Innovation

As the study examines some basic factors that were derived from Rogers' (2003) diffusion of innovations theory; this section identifies and clarifies its most important aspects.

According to Rogers (2003), diffusion is "the process by which an innovation is communicated through certain channels over time among the members of a social system" (p. 5). Moreover, Rogers (2003) stated that innovation is an "idea, practice, or object that is perceived as new by an individual or other unit of adoption" (p. 11).

Rogers (2003) classified five characteristics of an innovation that can affect people's rate of adoption as follows:

1. Relative advantage: the degree to which an innovation is perceived as 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 difficult to understand and use.
4. Trialability: the degree to which an innovation may be experimented with on a limited basis.
5. Observability: the degree to which the results of an innovation are visible to others.

Rogers (2003) also proposed that innovations with high relative advantage, observability, trialability, compatibility, and less complexity will be adopted more quickly than other innovations.

2.8 Innovation Characteristics

This section of the study presents a review of extant literature related to the five attributes of innovation (relative advantage, complexity, trialability, compatibility and observability) as proposed by Rogers (2003).

According to Rogers: "*It is the receivers' perceptions of the attributes of innovations, not the attributes as classified by experts or change agents, that affect their rate of adoption. Like beauty, innovations exist only in the eye of the beholder. And it is the beholder's perceptions that influence the beholder's behavior*" (Rogers, 2003, p.212). Likewise, Hiltz and Johnson (1989) showed that these attributes have the ability to measure the trends towards adopting new innovation and to distinguish between potential adopters and non-adopters of different technologies.

However, not all of these attributes were consistent. Inconsistent or non-interpretable findings were reported for observability and trialability, while most studies found that relative advantage and compatibility were consistently and positively correlated to adoption of innovations. Similar results are seen for complexity, consistently but negatively related to adoption (Tomatzky & Klein, 1982; Rogers, 2003).

There is actual consensus that the degree to which an innovation is perceived as relatively difficult to understand and use, affects adoption significantly, reflecting the importance of the role of ease of use variable on adoption (Chau and Lai, 2003).

According to Steinfield (1986), both complexity and compatibility have a significant relationship with e-mail adoption and both were found to be a strong predictor of task-related use. Likewise, Bolton (1983) and Lai & Guynes (1994) found that complexity of the system, its relative advantage and its compatibility with user's culture, past experience and beliefs were highly related to adoption rate and were seen as more effective predictors for adoption. Thus the following hypothesis is formulated:

H8: *From the innovation attributes (relative advantage, compatibility, complexity, observability, and trialability); Complexity and relative advantage are the best predictors for e-service adoption.*

The next sections provide more details about the (five) innovation attributes and their ability to measure the perceptions of an information technology as key independent variables. Furthermore, at the end of each section a relative hypothesised relationship between each attribute as an independent factor and its adoption is formulated.

2.9 Relative Advantage

Relative advantage is mostly referred to in terms of expediency, saving of money, effort and time, and reduced inconvenience in using or adopting an innovation. According to Rogers (2003, p.212), “*relative advantage is the degree to which an innovation is perceived as better than the idea it supersedes*”.

In the e-service context, users may perceive a relative advantage in accessing the Internet and use its website services from any location and at any time of the day. Online services present other advantages for the organisations in addition to providing continuous access. They potentially contribute to valuable promotions of the company; enhance the quality and speed of customer services; create competitive advantages; entice shoppers and encourage customer interaction; support core business functions that are integral to business strategy; and provide new business opportunities by increasing market presence and facilitating online purchasing (Drinjak et al., 2001; Polatoglu & Ekin, 2001; Tan & Teo, 2000).

According to Polatoglu & Ekin (2001) and Tan & Teo (2000), these advantages may have an effect on individuals adoption decisions. Yet, Agarwal and Prasad (1997) found that there is no significance relationship between adoption of on line services and its relative advantages. They attribute the desire for adoption of new technologies to the curiosity about the innovation rather than any benefits the innovation might offer.

From the above debate it is apparent that an individual, who perceives online services as a useful innovation, would be likely to adopt the on line service. Thus the following hypothesis is formulated:

H9: *There is a significant relationship between e-service adoption and its relative advantage in Saudi Arabia.*

2.10 Compatibility

According to Rogers (2003) “*compatibility is the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters*”. Compatibility with on line services was found to be highly related to experience

with computers and English language comprehension (Carter, 1997; Kolodinsky & Hogarth, 2001; Thirakanont, 2000).

Most e-services are designed with English interfaces to serve western users. Therefore, language is one of the major obstacles potentially affecting e-service adoption in Saudi Arabia. The Saudis speak Arabic as do many Arab nations in the Middle East and northern Africa. Yet, most software and Internet applications are developed and designed in English. Al-Far (2005) found that "lack of training in using Internet applications as well as the difficulty of dealing with English language were the most common problems encountered when accessing the Internet" (Almobarraz, 2007). For instance, most electronic libraries' have English interfaces which may prevent the Arabic user from utilizing their services. Al-Salih (2004) concluded that the "participants were likely discouraged and limited their research using electronic resources since most resources were available only in English".

Therefore, notable studies (Agarwal & Prasad, 1997; Carter, 1997; Kolodinsky & Hogarth, 2001; Tan & Teo, 2000; Thirakanont, 2000) on e-service, especially in field of e-commerce, have shown that compatibility has a significant influence on the intention to adopt. As a result, it is expected that individuals who perceive e-services to be compatible with their experience, culture and language will be more likely to adopt (Al-Salih, 2004; Tan & Teo, 2000). Therefore the following hypothesis is formulated:

H10: There is a significant relationship between e-service adoption and compatibility in Saudi Arabia.

2.11 Complexity

According to Rogers (2003) "complexity is the degree to which an innovation is perceived as difficult to understand and use". A significant number of studies found that complexity or ease of use has an important effect on users intentions to use or to adopt a new technology (Chau & Lai, 2003; Venkatesh & Davis, 2000; Venkatesh & Morris, 2000). In the on line context perceived ease of use was found to affect e-service adoption significantly, reflecting the importance of the role of the ease of use variable on adoption of e-services (Chau & Lai, 2003; Venkatesh & Davis, 2000; Venkatesh & Morris, 2000).

An exception was found by a study conducted by Agarwal and Prasad (1997). Their study examined the role of innovation characteristics and perceived voluntariness in the acceptance of information technologies. Agarwal and Prasad (1997) found no correlation between ease of use and Internet technology due to the high visibility that the technology has. Likewise Lin (1998), who conducted a study about computer adoption, found that perception of the advantages bought about by the use of computers lead to a decrease in concerns about complexity.

However, complexity was found again to be significantly related to adoption rate in a study about adoption of the Integrated Services Digital Network between American organisations conducted by Lai and Guynes (1994). Therefore the following hypothesis is proposed:

H11: There is a significant relationship between e-service adoption and e-service complexity in Saudi Arabia.

2.12 Trialability

Trialability assumes that individuals who have had a great deal of opportunity to try the innovation are more likely to adopt it rather than those who did not try it, because the trial of the innovation provides a way for the potential adopters to be confident that the results of

using this innovation meet their expectation (Agarwal & Prasad, 1997; Rogers, 2003; Tan and Teo, 2000).

According to Rogers (2003) "Trialability is the degree to which an innovation may be experimented with on a limited basis". However, in the e-service context, trialability can be viewed as the ability to access and surf the Internet and trial its websites services. This will reduce the worries and fears about using or adopting the Internet and its website services as a new technology (Henrichs, 1995). These findings were confirmed by results of a case study conducted by Stevens et al. (2000) who found that trialability and relative advantage had a significant effect on using and adopting the Internet for employees in a non-profit organisation. Thus the following hypothesis is proposed:

H12: *There is a significant relationship between e-service adoption and e-service trialability in Saudi Arabia.*

2.13 Observability

Observability is the degree to which the results of an innovation are visible to others (Rogers, 2003). Rogers (2003) also proposed that innovations with high observability, relative advantages and less complexity will be adopted more quickly than other innovations. Likewise, Henrichs (1995) found that observability and relative advantages were highly related with the early adoption of the technology.

In the e-service context, observability can be viewed by measuring people's knowledge about the e-service and its benefits. This knowledge could be gained by using public media such as newspapers or TV. If this knowledge is easy to gain and share between individuals and e-service benefits are apparent, adoption should follow. Consequently, it is presumed that observability has an effect on the adoption of e-service as a new technology. Thus, the following hypothesis is formulated:

H13: *There is a significant relationship between e-service adoption and e-service observability in Saudi Arabia.*

A discussion on the research methodology follows. This will provide an overview on the methods used and how these methods will test the hypotheses and achieve the study's objectives.

3. RESEARCH METHODOLOGY

3.1 Data Collection

According to Trochim, (2002) stratified random sampling can be applied when the whole population can be divided into subgroups, and then units are randomly selected from each subgroup. The division can be based on some predetermined criteria such as geographic location, size or demographic characteristic. In this study, the population was divided into two stratum; one representing adult females and the other adult males.

This type of sampling technique has been chosen due to the difficulty of drawing an actual representative sample in Saudi Arabia. Most Saudi people do not have their own mail boxes and mail services are not provided for every house. Moreover, it is hard to approach women in Saudi Arabia because of cultural constraints and values. Therefore, stratified samples were drawn from several areas in the country and female relatives were engaged to distribute questionnaires to the female strata besides using electronic means to guarantee reaching females as well as males.

The sample size was calculated to guarantee a sufficient number of respondents in each subgroup. Thus, the following formula has been used to estimate the population sample size (The Survey System, 2007):

$$\text{Minimum Sample Size (n)} = \frac{t^2 * p * (1-p)}{m^2}$$

where:

- n = required sample size (minimum size)
- t = Confidence level at 95% (standard value of 1.96)
- p = Estimated fractional population of subgroup
- m = Margin of error at 5% (standard value of 0.05)

The number of respondents in each subgroup was calculated based upon the data in Table 2a (The Central Intelligence Agency, 2008):

Table 2a: Saudi Population Distribution by Age Structure

POPULATION:	28,161,417 <i>NOTE: INCLUDES 5,576,076 NON-NATIONALS (JULY 2008 EST.)</i>
Age structure:	0-14 years: 38.1% (male 5,469,641/female 5,258,508) 15-64 years: 59.5% (male 9,467,325/female 7,284,077) 65 years and over: 2.4% (male 355,173/female 326,693) (2008 est.)

- Population of Saudi Arabia - 100% = 28,161,417
- Percentage of adults (15 years+) - 61.9% = 17,431,917
- Percentage of adults (15 years+) Male - 34.9% = (**15-64 years** 9,467,325) + (**65 years and over** 355,173) = 9,822,498
- Percentage of adults (15 years+) Female - 27% = (**15-64 years** 7,284,077) + (**65 years and over** 326,693) = 7,610,770

$$\text{Female Minimum Sample Size (n)} = \frac{1.96^2 * 0.27 * (1 - 0.27)}{0.05^2} = 302$$

$$\text{Male Minimum Sample Size (n)} = \frac{(3.8416) * 0.349 * (1 - 0.349)}{0.0025} = 349$$

Data for this study were collected by the means of a survey conducted in Saudi Arabia in 2008. The survey questionnaires were distributed to 1000 participants (520 male and 480 female). 357 responses were received from the male participants and 314 from the female participants. In order to maximise response rates, the questionnaires were distributed both in Arabic and English languages. After checking the validity of the questionnaires, 651 were deemed fit for use in the analysis.

Although the questionnaires were widely distributed (e.g. Jeddah and Dammam) most were distributed in Riyadh, the capital city of the Kingdom of Saudi Arabia. Riyadh is considered the central area for all public and private organisations; besides, Riyadh's population is quite representative of Saudi Arabia's cultural and geographical diversity. According to Menoret (2005) "*as a result of the cumulative processes of urbanization and modernization that have made Riyadh home to representatives from every tribe in Saudi Arabia*" (Menoret, 2005, The Municipal Elections in Saudi Arabia, para. 7).

In broad terms, the questionnaire was designed to collect data related to demographics, internet background/familiarity and possible factors affecting adoption and usage of online services. Five point Likert scales, ranging from "strongly agree" to strongly disagree", were used for data classification to ensure statistical variability among survey responses. Personal data such as age, level of education, income, etc. was also collected.

The questionnaire was initially tested with a focus group including professionals from the IT sector in SA. The focus group was quite helpful and confirmed that the formulated hypotheses were likely to be highly relevant in explaining perceived adoption or usage of e-service. The questionnaire was then tailored and finalized. **4.**

4 RESULTS

The user adoption of online services was selected as the dependent variable in the model. This is consistent with prior studies, in which actual usage has been chosen as the measure of use (Al-Shohaib, 2005; Legris et al., 2003).

Table 2: Summary of Respondents' Demographics

Variables		All respondents	
		Frequency	Percentage
<i>Gender</i>	<i>Male</i>	<i>349</i>	<i>53.6</i>
	<i>Female</i>	<i>302</i>	<i>46.4</i>
<i>Age</i>	<i>15-25</i>	<i>348</i>	<i>53.5</i>
	<i>26-35</i>	<i>168</i>	<i>25.8</i>
	<i>36-45</i>	<i>80</i>	<i>12.3</i>
	<i>46-55</i>	<i>43</i>	<i>6.6</i>
	<i>Over 55</i>	<i>12</i>	<i>1.8</i>
<i>Total</i>		<i>651</i>	<i>100</i>
<i>Income</i>	<i>< 2000 SR</i>	<i>96</i>	<i>14.7</i>
	<i>2000-4999 SR</i>	<i>158</i>	<i>24.3</i>
	<i>5000-8999 SR</i>	<i>249</i>	<i>38.2</i>
	<i>9000-11999SR</i>	<i>94</i>	<i>14.4</i>

	>= 12000 SR	54	8.3
Total		651	100
Education	<= High School	141	21.7
	Bachelor	472	72.5
	Master	29	4.5
	Ph.D. Degree	9	1.4
Total		651	100

Location	Urban	507	77.9
	Rural	144	22.1
Total		651	100

Technical study or work	Yes	382	58.7
	No	269	41.3
Total		651	100

Analysis of the data shows that the number of male respondents is higher than female respondents, with male accounting for 53.6% and female 46.4% of responses. Roughly half of the respondents (49.5%) were e-service adopters (See Figure 1) and approximately half of the respondents (53.5%) were between the ages of 15-25 years (See Figure 2). Per capita income in Saudi Arabia is around \$15,500 (Peskin, 2009, Para. 7) which equals 55125 SR; that means that monthly average of individual income around 4593 SR. Therefore, the majority of the participants belonged to the middle or above income level with 38.2% receiving 5,000SR to 8,999SR, followed by the group whose monthly income was between 2,000SR to 4,999SR (24.3%) as shown in figure 3. For more information about Saudi national norms please see Table 3 below.

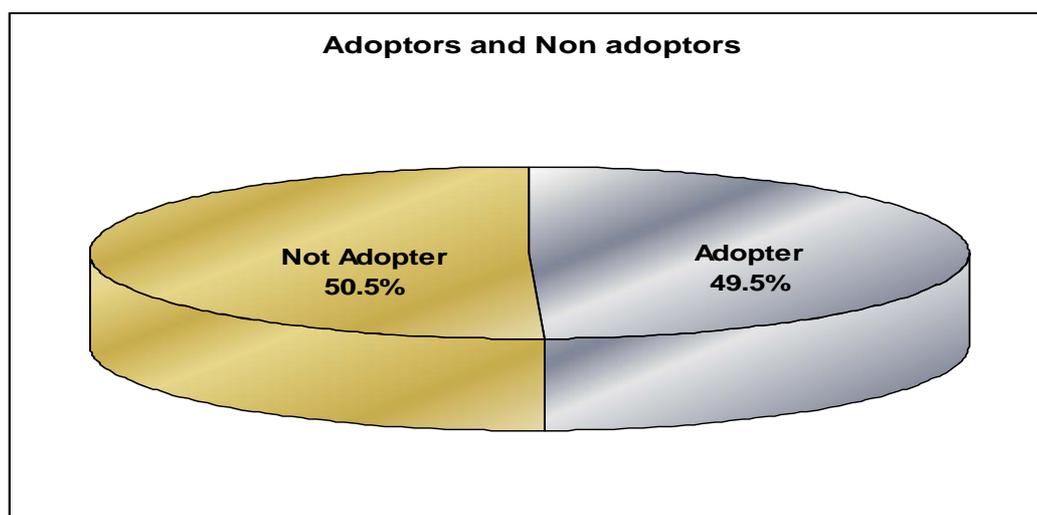


Figure 1: Adopters and Non-adopters.

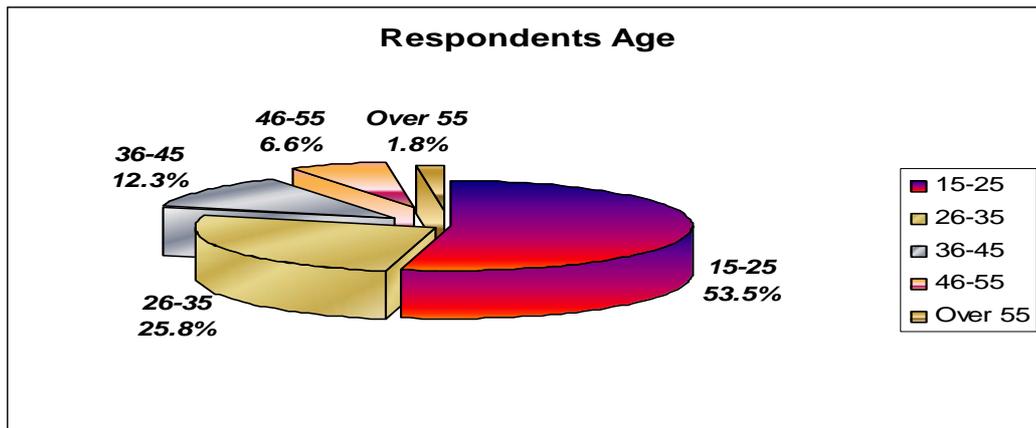


Figure 2: Respondents' Age.

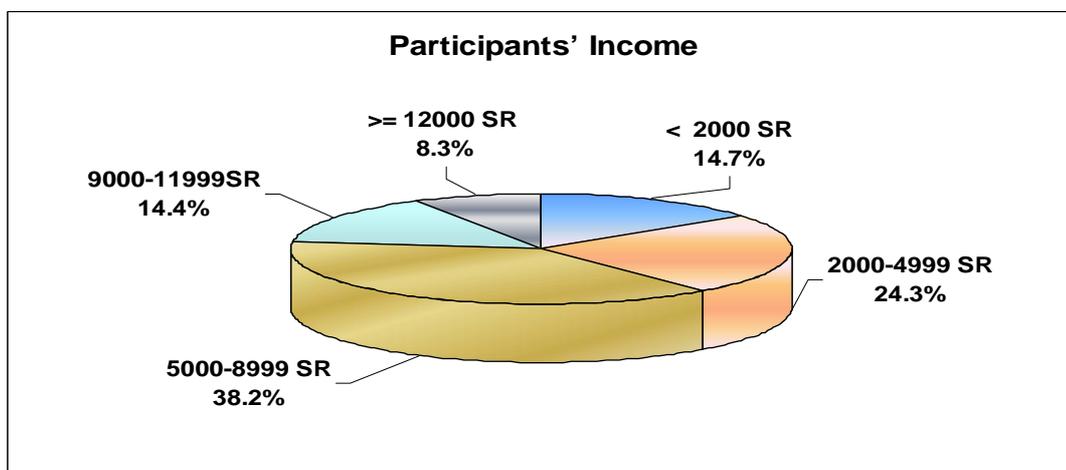


Figure 3: Respondents' Income.

Table 3 Saudi National Norms

Saudi Population by Educational Status
PhD = 17,238 (%0.07) Master/High Dip = 50,667 (%0.22) University = 1,265,718 (%5.6) High School or lower = 5,605,587 (%24.8)
Saudi population and Urban population
Saudi population = 28,161,417 - 5,576,076 NON-NATIONALS = 22,585,341 82% of total population in Saudi Arabia are urban
Per capita income in Saudi Arabia
around \$15,500 equals 55125 SR annually 4593 SR monthly
Age structure
0-14 years: 38.1% (male 5,469,641/female 5,258,508) 15-64 years: 59.5% (male 9,467,325/female 7,284,077) 65 years and over: 2.4% (male 355,173/female 326,693) (2008 est.)

Sources: (Central Department of Statistics & Information, 2007) and (The Central Intelligence Agency, 2008).

The participants were divided into four educational levels. The majority (72.5%) hold a bachelor's degree, followed by those (21.7%) who completed High School or have some formal education. About (4.5%) hold a master's degree and (1.4%) have a PhD (See Figure 4). According to (The Central Intelligence Agency, 2008) 82% of total population in Saudi Arabia are urban. In this study, urban dwellers make up 77.9% of the participants, with 22.1% living in rural areas as illustrated in Figure 5. This rate is somewhat in line with national norms (see Table 3).

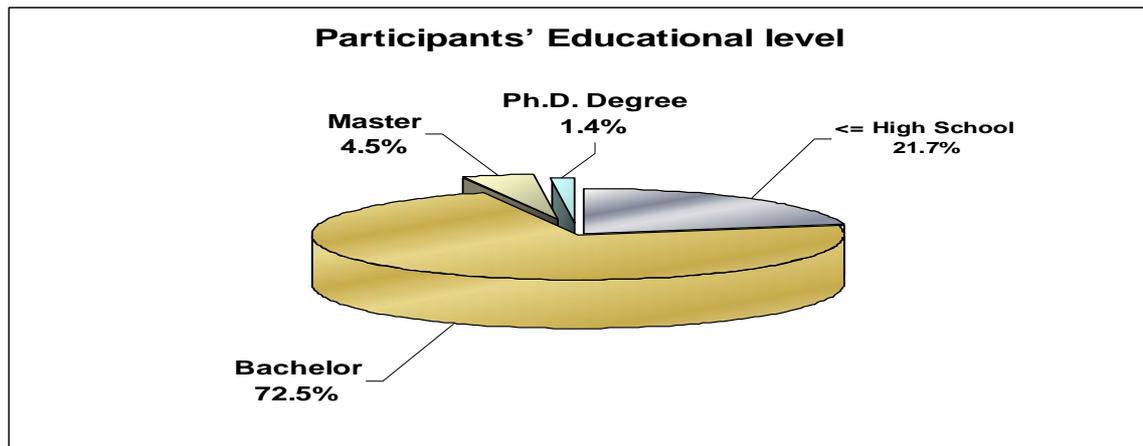


Figure 4: Participants' Educational Level.

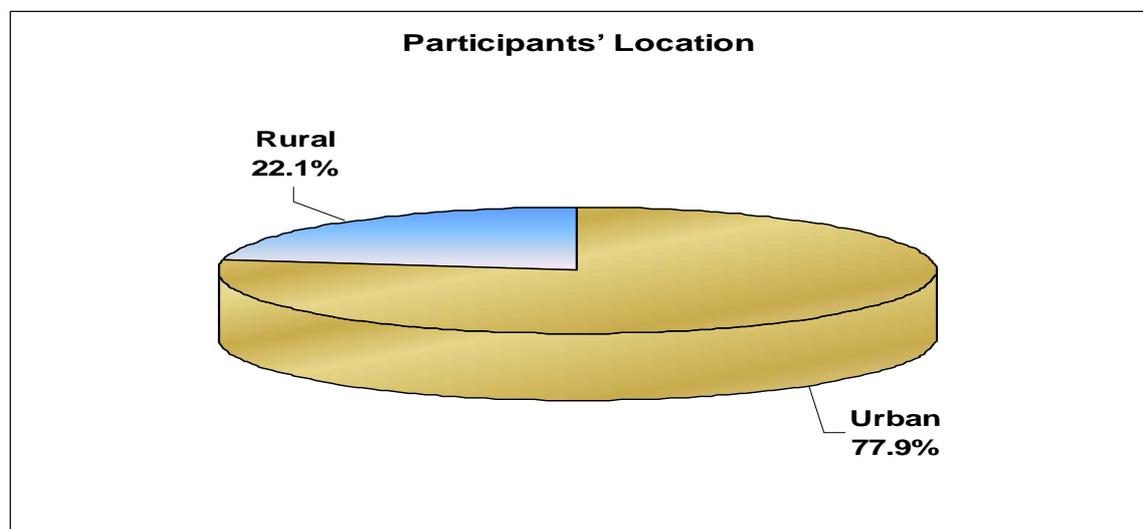


Figure 5: Participants' Location.

4.1 Gender and E-service Adoption

An independent *t*-test was conducted to assess the relationship between gender and attitude towards e-service adoption and to examine the differences in perceptions of e-service adoption between female and male groups. A two-tailed significance level of .05 was specified for the gender *t*-test procedure. Table 4 shows the result of *t*-test of independent samples. The mean difference indicates that females' perception of e-service adoption was higher than males.

**Table 4 Results of Independent Sample T-test
Group Statistics**

Gender	N	Mean	Std. Deviation	Std. Error Mean
Adoption				
1	349	3.19	1.334	.071
2	302	3.39	1.312	.075

Independent Samples Test

	Levene's Test for Equality of Variances		Hest for Equality of Means						
	F	Sig	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Adoption									
Equal variances assumed	.007	.935	-1.938	649	.053	-.202	.104	-.406	.003
Equal variances not assumed			-1.940	638.54	.053	-.202	.104	-.406	.002

As the t-value gets larger (in either the positive or negative direction) the probability that the population means are the same gets smaller. Table 4 shows the t-value does not approach zero ($t = -1.938$), thus t-test indicates to that the means are different.

A chi-square test of independence was performed to examine the relationship between e-service adoption and gender. The analysis indicated that out of 349 males, 157 (45%) were e-service adopters and 192 (55%) were not e-service adopters. From the total numbers of females, 165 (54.6%) participants were e-service adopters, while 137 (45.4%) were not (Please see Table 5).

Table 5 Relationship between Gender and e-service Adoption (% per Gender)

		Gender									
		Male					Female				
		All respondents		Adopter		Not Adopter		Adopter		Not Adopter	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	
Male	349	53.6	157	45%	192	55%	/	/	/	/	
Female	302	46.4	/	/	/	/	165	54.6%	137	45.4%	

Moreover, a chi-square test of independence was performed to examine the relationship between e-service adoption and gender. The relationship between these variables was significant, $X^2= 6.0314837$, $p = 0.0140529 < 0.05$. This indicates that there is a significant difference affect on the e-service adoption by each gender and the females in Saudi Arabia are more likely to adopt the online services rather than the males.

4.2. Research Hypotheses Testing and Finding

Percentaged tables and a chi-square test of independence are also used to examine the relationship between the e-service adoption and the numerous attributes or factors. 10 specific hypotheses have been examined by using the percentaged tables and the chi-square tests of independence, each attribute or factor was independently tested. Other hypotheses were tested by using multi-linear regression analysis.

4.2.1 User Loyalty, E-Service Quality, Privacy, Security and Trust versus E-service Adoption

The result of the chi-square test of independence showed that the relationship between these variables and e-service adoption was significant, $X^2= 508.8262969$, $p = 0.00000 < 0.05$ for user loyalty, $X^2= 367.3244982$, $p = 0.00000 < 0.05$ for E-service Quality, $X^2= 471.5774140$, $p = 0.00000 < 0.05$ for Privacy, $X^2= 375.860305$, $p = 0.00000 < 0.05$ for Security and $X^2= 451.1685398$, $p = 0.00000 < 0.05$ for Trust (Please see Table 6). This also indicates that there is a significant effect on the e-service adoption for each tested factor. Therefore, all related hypotheses were accepted.

Table 6 Chi-square Test

	User loyalty	E-service Quality	Privacy	Security	Trust
X^2	508.8262969	367.3244982	471.5774140	375.860305	451.1685398
<i>Freedom Degrees</i>	4	4	4	4	4
P	0.00000	0.00000	0.00000	0.00000	0.00000

4.2.2 Model Variables and E-service Adoption

The result of the chi-square test of independence showed that the relationship between the innovation attributes (relative advantage, compatibility, complexity, observability, and trialability) and e-service adoption was significant, $X^2= 573.2343950$, $p = 0.00000 < 0.05$ for relative advantage, $X^2= 517.7165853$, $p = 0.00000 < 0.05$ for complexity, $X^2= 479.9870301$, $p = 0.00000 < 0.05$ for trialability, $X^2= 572.5101942$, $p = 0.00000 < 0.05$ for observability, and $X^2= 517.7165853$, $p = 0.00000 < 0.05$ for compatibility (Please see Table 7).

Table 7 Chi-square Test (Model Variables)

	Relative advantage	Complexity	Trialability	Observability	Compatibility
X^2	573.2343950	517.7165853	479.9870301	572.5101942	517.7165853
<i>Freedom Degrees</i>	4	4	4	4	4
p	0.00000	0.00000	0.00000	0.00000	0.00000

By using the innovation attributes (relative advantage, compatibility, complexity, observability, and trialability) as the predictors of e-service adoption; a logistic regression analysis was conducted to test whether complexity and relative advantage are the best

predictors for e-service adoption or not. The results showed that complexity, relative advantage and compatibility significantly predicted e-service adoption. And the complexity is the best predictor for e-service adoption (see Table 8).

Table 8 Logistic Regression Analysis for Innovation Attributes that Best Predict e service Adoption

Predictors	B	S.E.	Sig.
Relative Advantage	.508	.106	.000
Compatibility	-.240	.056	.000
Complexity	.730	.046	.000
Observability	.054	.072	.458
Trialability	-.019	.073	.789

Complexity was the best predictor of e-service adoption; the main reason for e-service adoption in Saudi Arabia is that Saudi people realize that e-service websites are easy to use. Relative advantage was the second predictor of e-service adoption; the advantage people get from using e-service was perhaps one of the main reasons for adopting the Internet and its services. Compatibility was the third predictor of e-service adoption which means that the English language is a problem when Saudi people using the e-service websites. Therefore, all related hypotheses are accepted.

4.2.3 Demographic Variables and E-service Adoption

A logistic regression analysis using demographic characteristics as the predictors of e-service adoption was conducted to examine which variables best predicts e-service adoption. The results showed that income and gender significantly predicted e-service adoption. And the income is the best predictor for e-service adoption (see Table 9).

Table 9 Logistic Regression Analysis for Respondents' Demographic Characteristics that Best Predict E service Adoption

Predictors	B	S.E.	Sig.
Age	-.102	.053	.056
Gender	.254	.107	.018
Income	.420	.051	.000
Education	.125	.104	.229

The main reason for e-service adoption in Saudi Arabia is that Saudi people have a good income level and people with more income are more likely to adopt or use the e-service. Gender was the second predictor of e-service adoption; Saudi females are more likely to adopt e-service rather than males. Therefore, the hypothesis is accepted.

4.3 Most Important Factors

A multiple regression analysis was conducted in order to identify the independent variables that best explain e-service adoption in Saudi Arabia (the dependant variable). The multiple regression technique allows discovering those independent variables or factors that contribute most to the explanation of the variance of a dependent variable. *Cost of the Internet, Quality of the Internet, Quality of e-service websites, e-consumer loyalty, Security of e-service websites, privacy, Trust, Compatibility, Complexity, Observability, Relative advantage* and Trialability were used in the regression with the results presented in tables 10 and 11.

Table 10: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.948 ^a	.899	.897	.426

a Predictors: (Constant), Quality_of_the_internet, E_Service_Quality, Security, Cost_of_the_internet, Loyalty, Complexity, Trialabilitiy, Trust, Observability, Compatibility, Privacy, Relative_advantage

ANOVA(a)

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	1028.382	12	85.699	472.926	.000 ^a
Residual	115.611	638	.181		
Total	1143.994	650			

a. Dependent Variable: Adoption

Table 11: Multiple Regression Analysis for Most Important Factors Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.008	.061		-.130	.896
	E_Service_Quality	.037	.028	.031	1.333	.183
	Cost_of_the_internet	-.050	.026	-.035	-1.888	.059
	Relative_advantage	.172	.088	.150	1.951	.052
	Loyalty	.064	.026	.063	2.441	.015
	Complexity	.547	.040	.496	13.732	.000
	Privacy	.321	.077	.287	4.174	.000
	Security	-.043	.038	-.036	-1.135	.257
	Trust	.027	.076	.022	.354	.723
	Trialabilitiy	.027	.060	.022	.451	.652
	Observability	-.029	.059	-.023	-.486	.627
	Compatibility	-.204	.053	-.172	-3.857	.000
	Quality_of_the_internet	.185	.018	.234	10.404	.000

a Dependent Variable: Adoption

Although the sum of squares (1028.382) is larger than residual sum of squares (115.611), the value of F was found significant at 0.001 level ($p < 0.001$). The analysis shows the independent variables that explain 89.9% (R Square = .899) of the variance in adoption (Luarn & Lin, 2004).

The results of linear regression analysis indicate that **Complexity** was found to be the most significantly related factor affecting the e-service adoption in Saudi Arabia. Privacy was the second important factor followed by Compatibility. Quality of the Internet and its Relative advantage also had a notable affect on the e-service usage and adoption in Saudi Arabia.

The next section presents a discussion of the major results found in this section and how they are related to prior research findings.

5. DISCUSSION

The results of linear regression analysis indicate **Complexity** to be the most significantly factor affecting the e-service adoption in Saudi Arabia. **Privacy** was the second important factor followed by **Compatibility**. **Quality of the Internet** and its *relative advantage* also had a notable affect on the e-service usage and adoption in Saudi Arabia.

These findings mean that respondents who perceived the Internet and its services as easy to use, have no difficulty accessing it from home or work, and have no problem with English when using the Internet were more likely to adopt the e-service.

Complexity is the degree to which the Internet or its services are perceived as relatively difficult to understand and use. The perceived ease of use was found to affect e-service adoption significantly which reflects the importance of the role of ease of use on adoption of e-service in Saudi Arabia. This result concurs with the study of Chau and Lai (2003).

Consumers utilize online services because they offer convenience and save time. However, some researchers have shown that online consumers can shy away from online services because of concerns about privacy (Lessig, 1999; Shapiro, 2000). Therefore, privacy was the second most important factor.

The results also showed that there is a positive correlation between privacy and the e-service adoption in Saudi Arabia. These results were consistent with previous studies mentioned in section 2.

The third factor was compatibility of e-service. Compatibility is defined by Rogers (2003) as "the degree to which an innovation is perceived as being consistent with the existing values, past experiences and needs of potential adopters". This finding concurs with the study of Al-Far (2005) who found that "lack of training in using Internet applications as well as the difficulty of dealing with English language were the most common problems that encountered when accessing the Internet" (Almobarraz, 2007).

The results also show that quality of the Internet was an important factor influencing the adoption and usage of e-service in Saudi Arabia with people more likely to adopt online service of good quality. These results were consistent with previous studies mentioned in section 2.

In addition to the above, the advantage gained from using e-services was perhaps one of the main reasons for adoption. That's why *relative advantage* had a notable affect on the e-service usage and adoption in Saudi Arabia. Although the effects of *relative advantage* concurs with the study of Pons (2004) who considered citizens' awareness of internet benefits as the key condition to adopt online service; it contradicts the findings of other study (Agarwal & Prasad, 1997) which could imply that participants begin using the Internet and its services without estimating its relative benefits.

6. RECOMMENDATIONS AND CONCLUSION

Perceived **Complexity** was found to be the most significantly related factor affecting e-service adoption in Saudi Arabia, followed in turn by **Privacy** and **Compatibility**. Quality of the Internet and its **relative advantage** also had a notable affect on e-service usage and

adoption in Saudi Arabia. Gender also played a significant role among participants regarding the adoption of e-service and it is found that Saudi *women are more likely to adopt the e-service rather than Saudi men.*

Based on these findings this study suggests a number of recommendations for software engineers, online service website designers, Saudi government, and practitioners which might be important in technology acceptance.

6.1 Recommendations for Software Engineers

To reduce the complexity it is recommended that software engineers develop more user friendly software that can be easily used for those who have lack of the Internet expertise and, since Saudis speak Arabic, these software programmes also should contain a bi-language interface (Arabic and English) for both public and private organisations that can be accessed through the Internet.

6.2 Recommendations for Online Service Website Designers

The level of complexity might be reduced by adopting, short of the technical adequacies of the website, architectural designs such as simplicity and appropriateness of information and graphics, in addition to ease of navigation, loading speed, security, and personalization. Web designers should provide sophisticated website content including information, graphics and its appearance with special concern on degree of information accuracy, its usefulness, and proper use of fonts, colours, number of graphics and links, use of animation, length of the home page and its organisation. Availability of important information and attractive graphics on the website has a positive effect on user attitudes and purchase intent. However, too much information and graphics also might have a negative impact on users' attitude toward the home page and usage or purchase intent, "as consumers may feel overwhelmed or lost, which may cause them to lose focus and interest rapidly" (Geissler et al., 2006, p.75). Again it is recommended that web designers develop online service websites in Arabic and English languages to insure that web site is understandable for those who have difficulty of dealing with English language.

6.3 Recommendations for Saudi Government

The result also shows that awareness of e-services benefits or its relative advantages has a significant affect on e-service adoption in Saudi Arabia. Highest rate of adoption were achieved by those who realize that e-services meet their needs. Therefore, raising awareness of e-services benefits or their relative advantages is crucial for increasing engagement. People are more likely to adopt or use such service when they perceive that advantages outweigh disadvantages. Thus, it is recommended that the Saudi government should consider launching campaigns on how to use the online services as well as engage in promoting the Internet and its e-services benefits.

The Saudi government should thus formulate a two pronged strategic plan to achieve a new and high quality infrastructure and raise nationwide awareness of e-services and likely benefits attained through adoption. The Saudi government should enhance Internet quality by increasing investment in ICT infrastructure. Moreover, the Saudi government, via the communications and information technology commission (The ICT Regulator), should issue more licenses for public communications network operators and/or ICT services providers. This would create a competitive business environment which in turn should raise quality and lower costs of offered services. Providing affordable, high quality internet access at reasonable speed will positively influence adoption.

Privacy policies in Saudi Arabia are the whim of Saudi organizations and at times non-existent. Corporations with such policies can easily change them without notice. Saudi Arabia needs to legislate with regard to privacy concerns with a view to ensure that organizations respect and protect their consumers' privacy rights. Privacy seals currently widely applied in the USA (Weber, 2008), are "a readily visible and easy way to assure customers that the business they are dealing with is respectful of individual privacy on the Internet" (Liu & Arnett, 2002, p. 118). The Saudi government could authorize an appropriate company or organization to develop, manage and monitor such a program and establish privacy policy guidelines for member companies.

Although unusual, the study also found that Saudi males were less likely than Saudi females to adopt e-services. As such, the Saudi government should fine tune adoption policies to help increase male participation. In Saudi Arabia, sports and football in particular attract huge male fans. As a way to introduce and increase adoption in the male population the Saudi government should encourage sport clubs to build and communicate through official websites (with forums, blogs, etc.). These websites can be financially supported by groups such as the Youth Welfare and/or the office of the Chairman of the Saudi Arabian Olympic Committee.

The Saudi government could use these websites to convey messages to the Saudi males about e-government and e-services in general to raise awareness about e-services and their relative advantages.

6.4 Recommendations for Organisations

Three of the innovation attributes (Complexity, compatibility and relative advantages) examined in this study were found to be statistically significant predictors of e-service adoption. As such, private and public organisations would do well to concentrate on factors that enhance aspects of each one of the attributes.

Organisations should make every effort to advertise/offer their products and services online via websites that should be easy to use. This should motivate users into adoption. Organisations should organise website contents compatible with the way people manage their needs, i.e in the traditional way, including language and consistency in terms of the users past experiences and beliefs. Above all this experience should be seen as more useful compared with the traditional ways.

Organisations and e-users should cooperate jointly to develop privacy policies, policies guidelines and privacy seal programs. This cooperation can raise consumer awareness about their rights, strengthen existing regulations about compliance and adherence of online service providers to their own privacy policies and give confidence to consumers that their personal information is protected.

Saudi organisations and companies should implement strategies to increase male adoption rates. As mentioned before, targeting areas of males interest (sport events) would be one way of promoting adoption.

As more private and public organisations adopt online services, it becomes important for these organisations to identify factors that influence users' into adoption. The results of the study indicate that Complexity is the most significantly related factor affecting the e-service adoption in Saudi Arabia, followed by privacy and then Compatibility. Quality of the Internet and its relative advantage also had a notable affect on the e-service usage and adoption in Saudi Arabia.

Results were found to be consistent with prior studies with the exception of gender, with the study finding that females in Saudi Arabia were more likely to adopt online services rather than males. This unusual trend is probably due to the nature of the Saudi society which can be described as a conservative society framed within the Arabic culture and Islamic

instructions. In such a society a female tends and prefers to achieve her needs from her home by using the internet.

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