



## **Examining the impact of e-privacy risk concerns on citizens' intentions to use e-government services: An Oman perspective**

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### **Abstract**

E-privacy concerns are among the online transactions risks that influence the use of e-services and e-government services. This study has examined the impact of e-privacy concerns on the acceptance of e-government services in Oman using an integrated model. The model is based on Liu et al.'s privacy-trust-behavioural intention model (2005), the broader technology acceptance literature, and recent work on e-privacy awareness and protection. Data was collected by questionnaire from Omani citizens. The model was then tested using PLS. The study found that e-privacy concerns and perceptions of the protection available against risks influence citizens' intentions to use e-government services via their influence on the perceived trustworthiness of these services. Thus trustworthiness is a factor that could be an obstacle to successful e-government services project implementation.

### **Introduction**

The recent huge expansion in use of the Internet has increased the risk to online information privacy. Protecting individual online privacy is a real challenge. E-privacy and trust issues have been shown to influence citizens' willingness to be involved in Internet transactions relating to money and personal sensitive information (Metzger 2004; Olivero and Lunt 2004). Dinev et al. (2006b) believe that there are two main dimensions of e-privacy concerns among Internet users; these are concerns related to unauthorized access or interception of users' personal information and concerns related to the possible misuse of such information. These two main issues could deter online users from using the services or lead to them not giving complete and accurate personal data.

While electronic government (e-government) has played an important role in the expansion of the Internet across the globe within both the public and

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private sectors, there has been insufficient empirical research concerning its adoption and use by Internet users (Metzger 2004). This study defines e-government, as it is defined by the Omni authorities, to be the use of information technology and communication infrastructure ability by government units to transform relations with citizens, and businesses electronically. The study defines an e-government service as any service that is made available by the government via the Internet to save time and make citizens' lives more convenient, for example in Oman one such service is Higher Education Admissions Online [www.heac.gov.om](http://www.heac.gov.om). Oman has been implementing a plan to establish the Oman e-society vision since 2003 (ITA 2006). This plan includes an e-government project, which is intended to facilitate Omani society by supporting most commercial, political, and social online transactions and services. Acceptance problems have occurred in many commercial and government projects across the world (Lee and Rao 2005; Liu et al. 2005; Metzger 2004; Olivero and Lunt 2004). The research described in this paper assumes that Oman's e-government project will be subject to the e-privacy concerns of citizens and that such issues might discourage citizens from using the e-government services. Little research into the adoption of e-government services has taken place in the Arab world; therefore this implementation provides an excellent opportunity to broaden the contexts in which e-government adoption has been studied. The research uses a model of e-privacy-trustworthiness-usage intention to examine the impact of e-privacy and trust issues on citizens' acceptance of e-government services in Oman.

### **E-privacy in Oman**

Oman is the third largest country in the Arabian Peninsula after the Kingdom of Saudi Arabia and the Republic of Yemen. According to recent government figures, the total estimated population of Oman is 2.341 million people (Ministry of National Economy 2008). The Internet in Oman is relatively new as it was only introduced in 1997; however it has already started impacting most sectors of the economy and society. Nowadays, people are increasingly using online government and business services. The number of Internet users in Oman has been dramatically increasing to reach 112,000 subscribers in 2008 (Oman Daily 2008). According to the information technology authority (ITA) official site, a number of e-services do now exist in Oman and they are listed in Table 1 (ITA 2008).

Traffic Offense Enquiry	Smart Forms
Online Visa Application	Ministry of Regional Municipalities Services Forms
Visa Status Enquiry	Dhofar Municipality Building Permit
Case Enquiry	Monthly Statistical Bulletin
Researcher job / employers	Ministry of Finance Application For Supplier Code
Educational Portal	Muscat Securities Market Watch
Higher Education Admission	Birth Registration
MM Muscat Commercial Directory	Marriage Registration
One-Stop Shop	Omani ID Card
Online Tenders	Resident Card
Muscat Real Estate Directory	Divorce Registration
Lost Documents	Death Registration

**Table 1. Existing e-services in Oman as in November 2008**

In the past the Omani people normally only had to provide their personal information to well known and trusted people. However, today with growing use of the Internet and with government and local companies' online systems becoming accessible by external parties, Omani citizens have started to become concerned about their information. According to Gartner, the national e-society vision consulting firm, "The public must be made aware of the benefits, the fears must be addressed and participation encouraged" (Gartner 2002a). Gartner views the public as the main stakeholder in the country's IT national project and therefore they have encouraged the government to enhance public confidence in the Internet by establishing the required steps toward Internet privacy, security, and confidentiality of information (Gartner 2002a).

Gartner also notes that "Privacy and security are uncomfortable bed fellows – the Internet increases the problem" and assumes that Internet users in Oman are not yet aware of appropriate and inappropriate online usage; nor do they know what to do when they encounter a security problem (Gartner 2002b). Information security and e-privacy is considered to be the second most important concern in adopting e-government services in Oman as 86 out of 91 Omanis think that e-privacy is their

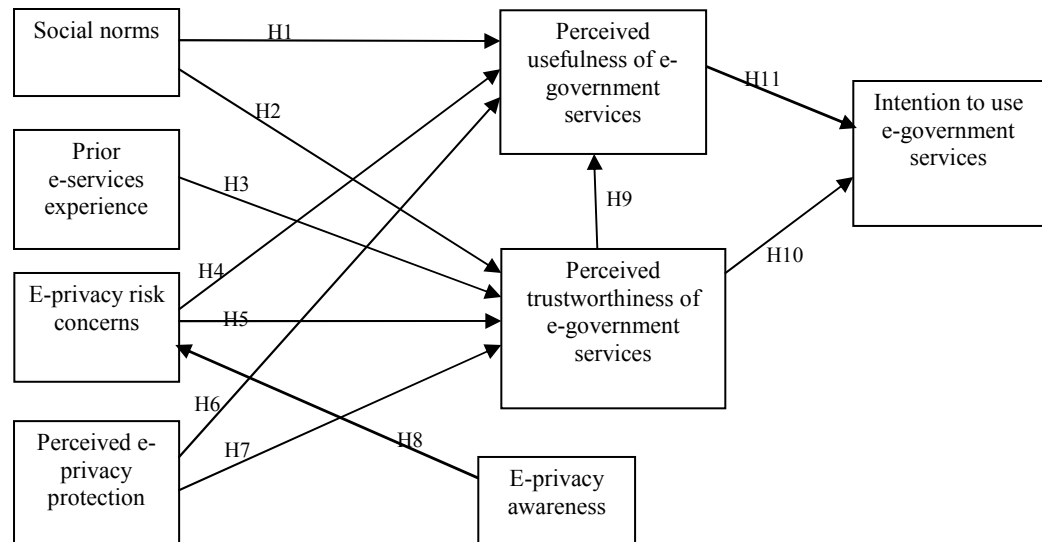
major concern and they are worried about using the Internet for their regular purchasing and other usage (Jabar and Razooki 2005). Also 79 out of 85 people have no trust in general online transactions, and 77 out of 90 people are not willing to disclose their personal information to the websites. These findings suggest that e-privacy could be a major obstacle to e-Oman.

### **Research Model and Hypotheses**

Many researchers have considered e-privacy to be a key factor of concern among online users and many think that it might become one of the most important barriers to e-services development (Dinev et al. 2006; Dinev and Hart 2006b; Liu et al. 2005; McDonagh 2002; Metzger and Docter 2003; Suh and Han 2003; Vijayarathy 2004; Yu 2005).

E-government users, as in any other technology adoption, weigh the perceived benefits and risks before using the technology (Horst et al. 2007). E-privacy risks are considered as an increasingly important hazard associated with using e-government services (Belanger and Carter 2008; Lau 2003; Reilly 2005; Srivastava and Teo 2005; Warkentin et al. 2002). Therefore, citizens' e-privacy risk concerns are a potential obstacle to e-services growth and an important issue to both individuals and government organizations.

The study reported on in this paper examines the impact of online privacy concerns on citizens' acceptance of e-government services in Oman. It also considers the impact of information security and users' ability to trust e-government services, given their privacy concerns. This paper introduces and tests a model of the role of online privacy in the adoption of e-government services. The model uses Liu et al.'s privacy-trust-behavioural intention model (Liu et al. 2005) as a starting point. It also draws on the broader technology acceptance literature and recent work on e-privacy awareness and protection (Hahn 2002; Jho 2005; Lee 2003; Metzger and Docter 2003; Nath 2005; Pfaffenberger 1997; Suh and Han 2003; Venkatesh and Davis 2000). The current level of e-government services use in Oman is low as services are only slowly being introduced, therefore the research uses intention to use as a surrogate for actual use as has been previously done in many studies such as Fishbein and Ajzen (1975), Davis(1989), Horst et al. (2007) and Carter and Belanger (2005). The research model examined in this study is presented in Figure 1, and each of the associated hypotheses is discussed below.



**Figure 1. The model tested**

Social norms refer to users' beliefs as to whether people who are important to them want them to perform a particular behaviour or not. In this case, the behaviour is use of e-government services, and the other people might include family members, friends, co-workers and even supervisors at work (Fishbein and Ajzen 1975; Hsu and Chiu 2004; Vijayasarathy 2004). Social norms have been shown to be an important influence on behaviour, with TAM2 representing this influence as mediated via perceived usefulness of e-government services (Venkatesh and Davis 2000). It has been found that people tend to interpret usefulness through important others as a proof of reality (Schepers and Wetzels 2007; Venkatesh and Davis 2000). Oman is a small society and many people know each other and have strong interrelationships, especially at work. They tend to talk over things that are newly introduced to the society, and thus have many opportunities to influence one another about the benefits of the e-government services project. Therefore it was proposed that:

Hypothesis H1: Social norms will positively influence the level of perceived usefulness of e-government services.

This study defines perceived trustworthiness of e-government services as the citizens' perceptions of the integrity of e-government services and the extent to which they can be trusted. Few previous studies have examined the impact of social norms on perceived trustworthiness with respect to the use of e-government services. In the e-commerce domain, Bolton et al.

(2004) found that social norms is an important factor impacting the level of trustworthiness of using e-services. Horst et al. (2007) recognised that this potential relationship is important however they did not test it. Consistent with Bolton et al.'s (2004) finding the following hypothesis was proposed:

Hypothesis H2: Social norms will positively influence the level of perceived trustworthiness of e-government services.

Prior e-services experience relates to the extent of previous hands on experience with online services that a citizen has had. This study defined prior e-services experience in terms of amount of use rather than the type of use. Previous experience has been considered as a factor influencing behaviour in many previous studies. For example, Taylor et al. (1995) found significant differences in intention to use technology between experienced and inexperienced users. A study by Horst et al. (2007) found that the more previous experience users have, the less risk they perceive, and the more they trust in government e-services. At this stage Omanis do not have much experience with e-services, however it is expected that the more experience they have the more trust they will have E-government services, and therefore the following hypothesis was proposed:

Hypothesis H3: Prior e-services experience will positively influence the level of perceived trustworthiness of e-government services.

In the Internet space individuals seek to know when and how much information about them is communicated to others with and without their prior consent. Conversely, e-government services rely on the collection of citizens' personal information, thus citizens are requested to provide personal information before enjoying the benefits of the services. Consciously and unconsciously citizens perceived risk when evaluating the use of e-government services (Featherman and Pavlou 2003; Horst et al. 2007; Yu 2005). E-privacy risk concerns are citizens' concerns regarding potential loss of control over personal information, such as when information about a citizen, obtained during their use of e-government services, is used without permission. Featherman et al. (2003) found that the more risks of using e-services that users perceive, the less useful they believe the e-services are. Horst et al. (2007) also confirmed the impact of e-privacy concerns on both the perceived usefulness of generic e-services and e-government services. Therefore it was proposed that higher levels of e-privacy risk concerns will be associated with decreases in the perceived usefulness of e-government services:

Hypothesis H4: E-privacy risk concerns will negatively influence the perceived usefulness of e-government services.

It has also been found that e-privacy risk concerns play an essential role in influencing the level of trustworthiness of a specific e-service, such that the higher the perceived risk is, the lower the levels of trust are (Liu et al. 2005; Metzger 2004; Suh and Han 2003). Because such concerns can influence the trust in e-government services, e-privacy risk concerns are considered to be a possible risk factor for the e-government services project in Oman. It was therefore hypothesized that:

Hypothesis H5: E-privacy risk concerns will negatively influence the level of perceived trustworthiness of e-government services.

Many scholars believe that although e-privacy security measures have advanced, users still do not fully trust e-services and are looking forward to having better protection measures (Carter and Bélanger 2005; Jho 2005; Lau 2003; Lee and Rao 2005; McDonagh 2002; Srivastava and Teo 2005; Warkentin et al. 2002; Yu 2005). E-privacy protection is the degree to which a citizen believes that facilitating conditions (technical, organizational) exist that can protect his/her online privacy while using e-government services. It also relates to the assurance that personal information collected from their electronic transactions is protected from disclosure without permission. Lee et al. (2001), Loukides and Shao (2007) and Horst et al. (2007) have all found that risk protection significantly influences the perceived usefulness of e-government services. It has also been found that lack of risk protection ultimately discourages users from e-service utilization (Chen and Rea 2004; Hahn 2002; Jho 2005). Therefore it was hypothesized that:

Hypothesis H6: Perceived e-privacy protection will positively influence the level of perceived usefulness of e-government services.

For many years, the impact of perceived e-privacy protection on the intention to use e-services has been studied from the e-commerce perspective and studies have found that perceived e-privacy protection has a significant impact on trust in e-commerce (Metzger and Docter 2003; Nath 2005; Suh and Han 2003), but fewer studies have considered the e-government perspective. Among those who have studied the subject from an e-government perspective are Lee et al. (2005) and Jho (2005). They have found that security issues and concerns appear when security measures are weak or absent. They also found that the more that users perceive protection is in place for the e-service, the more trust will be

created. As Oman doesn't yet have good levels of e-services protection it is important to examine the impact of protection measures on the level of perceived trustworthiness. Consistent with the previous literature it was hypothesized that:

Hypothesis H7: Perceived e-privacy protection will positively influence level of perceived trustworthiness of e-government services.

E-privacy awareness relates to how much citizens know about online e-privacy risks and about related issues such as how to protect themselves and what protection is provided by the service provider. Previous studies such as Dinev et al. (2006a), Olivero et al. (2004), and Schmid et al. (2001) have found that e-privacy awareness increases concerns about e-privacy risks. Solaru (2005) is among the very few who have studied the impact of awareness in relation to e-government services, but he discussed service awareness and not e-privacy awareness as defined in this study. He found that awareness is the first step of the adoption process, and forms the basis for any further evaluation decision. Because this study targets the success factors for implementing E-government services, and because previous studies have found that awareness can play a critical role it was hypothesized that:

Hypothesis H8: E-privacy awareness will positively influence the level of e-privacy risk concerns.

Intention to use e-government services relates to an individual's willingness to use e-government services sites. Lack of perceived trustworthiness of online partners has excluded a substantial number of users from enjoying the benefits of e-services due to unwillingness to provide online personal information (Belanger et al. 2002; Liu et al. 2005). An even greater number of online users do not give correct personal information because they lack confidence in the web partner. Online users seek more control of their personal information and more perceived protection for it (Chen and Rea 2004; Metzger 2004; Olivero and Lunt 2004). Researchers in the marketing area have verified the relationship between perceived trustworthiness and many factors such as perceived usefulness of e-government services and intention to use the services (Belanger et al. 2002; Reilly 2005; Suh and Han 2003), however there has been little research on these relationships in the e-government services environment. What research there is, has found that unless e-government services are seen as trustworthy, the perceived usefulness of e-government services is very limited (Carter and Bélanger 2005; Lee and Rao 2005;



Reilly 2005). Horst et al. (2007) also found that trust of e-government significantly influenced perceived usefulness of e-government services, but did not explore a direct relationship between trustworthiness and intention to use. In this study it was hypothesized that the perceived trustworthiness of e-government services influences both the perceived usefulness of e-government services and citizens' intentions to use them:

Hypothesis H9: Perceived trustworthiness of e-government services will positively influence the level of perceived usefulness of e-government services.

Hypothesis H10: Perceived trustworthiness of e-government services will positively influence the intention to use e-government services.

Perceived usefulness of e-government services has been shown to be a major factor influencing the decisions of users to use e-services (Pavlou 2003; Venkatesh et al. 2003; Warkentin et al. 2002). There is also some evidence of its role with respect to e-government services (Carter and Bélanger 2005; Lee et al. 2005; Lee and Rao 2005). Therefore consistent with this research it was hypothesized that:

Hypothesis H11: Perceived usefulness of e-government services will positively influence the intention to use e-government services.

## **Methodology**

The methodology for this study was based on a quantitative approach using data collection by questionnaire. The data was collected in Oman over about two months. The data collection process took place in the period December 15, 2007 to March 15, 2008. The sampling frame for this study was civil services government employees in Oman. The employees were asked to express their views as citizens not as government employees. Anonymity was completely guaranteed to all participants and a sealed envelope was supplied for each participant to increase their response's confidentiality. This sector is considered the largest national sector in terms of its number of employees, with more than 110,000 employees (Ministry of Civil Service 2007). Eighteen key contact points (e.g. personnel managers and other senior administrators) were identified within 18 government units selected from the 45 units within the civil service sector. These contact points were responsible for distribution and collection of questionnaires. A total of 700 questionnaires were distributed and 420 were returned, giving a response rate of 60%, however only 402 were usable due to missing data problems.

Construct measurement was based on previous studies with minor rewording to suit the e-government domain. All variables were measured on a 5 point Likert scale labelled from 'strongly disagree' to 'strongly agree'. Perceived usefulness of e-government services was measured using six items from Davis (1989). Social norms was measured using four items from (Hartwick and Barki 1994) that have been adapted by Hsu et al. (2004). Five items from Jarvenpaa, Tractinsky, and Vitale (2000) were used to measure prior e-services experience. E-privacy risk concerns were measured using eight items from an instrument developed by Smith, Milberg, and Burke (1996). As the original items were used to measure e-privacy concerns in the e-commerce domain some items were not suitable for the government environment.

E-privacy awareness was measured using four items. Two of these items were taken from an instrument developed by Olivero and Lunt (2004) and two were developed specifically for the study. Perceived e-privacy protection was measured using five items that were taken from an instrument developed by Liu, Marchewka, Lu, and Yu (2005). Six items were used to measure the level of perceived trustworthiness of e-government services. These were from Carter and Bélanger (2005) and Suh and Han (2003). Intention to use e-government services was measured using five items. Four of these items were from Gefen and Straub (2000) and the fifth item was from Suh and Han (2003).

The relationships in the model were tested using partial least squares (PLS). A two-step approach commonly used in structural equation modelling was used. In this approach, the fit and construct validity of the proposed measurement model are tested first. Once a satisfactory measurement model is obtained, the measurement model is "fixed" when the structural model is estimated. Through this technique overall reliability and validity are usually assured (Hair et al. 2006). SmartPLS version 2.0 was used for this process.

## **Results**

### **The participants**

The participants in the study were 61% male and 39% female. They had relatively little e-government services experience, with 29.1% not having used e-government services at all, and only 12.2% using it regularly for both information and transactions. Thirty eight percent used it to obtain information, but did not use it for transactions.

### Measurement model

The measurement model was assessed in terms of: individual item loadings, convergent validity and discriminant validity. Items which did not load satisfactorily on their constructs ( $>0.7$ ) (Hair et al. 2006), were dropped. All remaining items loaded significantly on their latent construct ( $p < 0.05$ ). Convergent validity was assessed using composite reliability, Cronbach's alpha, and average variance extracted. All constructs met the guidelines for composite reliability greater than 0.70 (Hair et al. 2006) and Cronbach's alpha greater than 0.70 (Nunnally and Bernstein 1994). All values of average variance extracted were more than 0.5 which is considered to be satisfactory (Fornell and Bookstein 1982; Hair et al. 2006). Table 2 provides a summary of convergent validity of the final scales used in the study.

Construct	Average Variance Extracted	Composite Reliability	Cronbach's Alpha
E-privacy awareness	0.66	0.85	0.74
E-privacy risk concerns	0.69	0.87	0.77
Prior e-services experience	0.65	0.88	0.82
Intention to use e-government services	0.71	0.88	0.80
Perceived e-privacy protection	0.57	0.87	0.81
Social norms	0.67	0.89	0.83
Perceived trustworthiness of e-government services	0.63	0.90	0.85
Perceived usefulness of e-government services	0.72	0.89	0.81

**Table 2 Convergent validity measures**

For satisfactory discriminant validity each item should load more highly on its own construct than on other constructs. In addition, the average variance shared between a construct and its measures should be greater than the variance shared by the construct and any other constructs in the model (Hair et al. 2006; Hulland 1999). Both conditions were met.

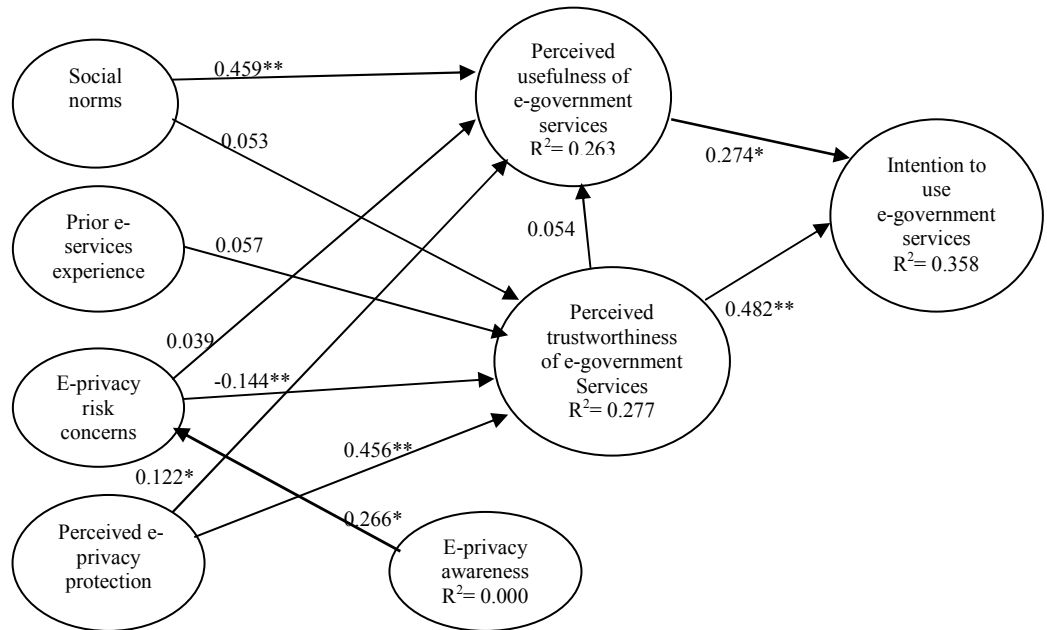
## **Structural model**

Two criteria were used to assess structural model quality: the statistical significance of the estimated path coefficients and the ability of the model to explain the variance in the dependent variables. Figure 2 and Table 3 show the standardized coefficients for each hypothesized path in the model and the R<sup>2</sup> for each dependent variable.

Only seven of the 11 hypotheses were supported. Social norms demonstrated a significant positive influence on the level of perceived usefulness of e-government services, therefore hypothesis H1 was supported. However, social norms did not demonstrate a significant influence on the level of perceived trustworthiness of e-government services. Therefore, hypothesis H2 was not supported. Prior e-services experience did not significantly influence perceived trustworthiness of e-government services, so hypothesis H3 was also not supported.

Contrary to expectations, e-privacy risk concerns were not found to significantly influence either perceived usefulness of e-government services or perceived trustworthiness of e-government services. Therefore, hypotheses H4 and H5 were not supported. Perceived e-privacy protection also did not demonstrate a significant influence on perceived usefulness of e-government services so hypothesis H6 was not supported. Perceived e-privacy protection demonstrated a significant positive influence on the level of perceived trustworthiness of e-government services. Therefore, hypothesis H7 was supported.

E-privacy awareness significantly influenced the level of e-privacy risk concerns. Therefore, this hypothesis was supported. Perceived trustworthiness of e-government services did not however have a significant influence on perceived usefulness of e-government services; therefore, hypothesis H9 was not supported.



**Figure 2. Structural model**

Both perceived trustworthiness of e-government services and perceived usefulness of e-government services demonstrated significant positive influences on the intention to use e-government services. Therefore, hypotheses H10 and H11 were supported.

Path	Path Coefficient	Sample Mean	Standard Deviation	T value
E-privacy awareness -> e-privacy risk concerns	0.27	0.28	0.05	5.41 ***
E-privacy risk concerns -> perceived trustworthiness of e-government services	-0.14	-0.14	0.05	3.11 **
E-privacy risk concerns -> perceived usefulness of e-government services	0.04	0.04	0.05	0.87
Prior e-services experience -> perceived trustworthiness of e-government services	0.06	0.07	0.05	1.23
Perceived e-privacy protection -> perceived trustworthiness of e-government services	0.46	0.46	0.04	10.47 ***
Perceived e-privacy protection -> perceived usefulness of e-government services	0.12	0.12	0.05	2.58 *
Social norms -> perceived trustworthiness of e-government services	0.05	0.05	0.05	1.09
Social norms -> perceived usefulness of e-government services	0.46	0.46	0.05	9.64 ***
Perceived trustworthiness of e-government services -> intention to use e-government services	0.48	0.48	0.04	11.49 ***
Perceived trustworthiness of e-government services -> perceived usefulness of e-government services	0.05	0.06	0.06	0.97
Perceived usefulness of e-government services -> intention to use e-government services	0.27	0.28	0.05	6.05 ***

**Table 3. Significance of path coefficients**

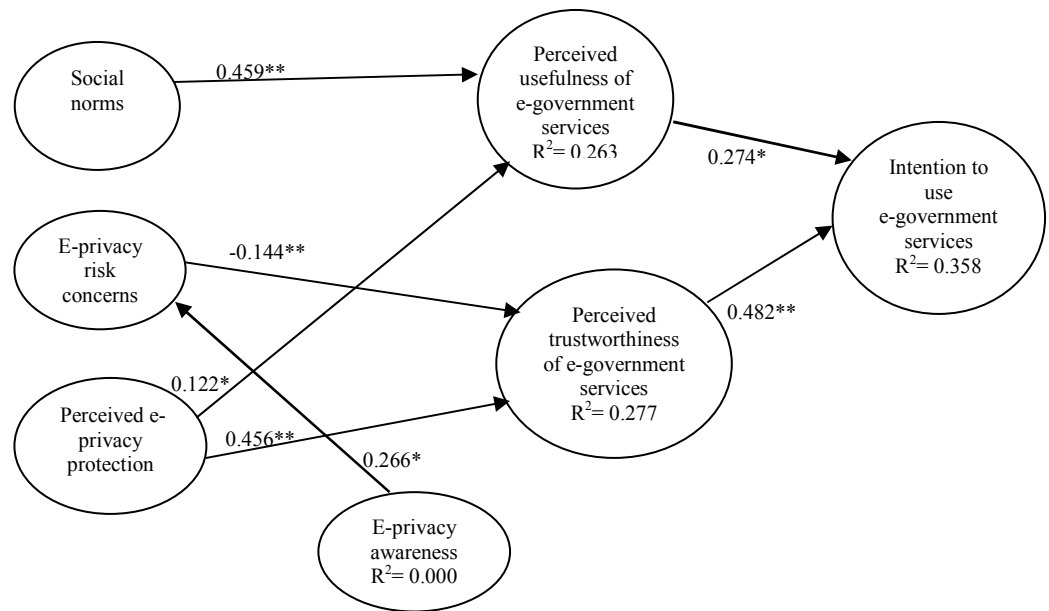
The second aspect of model quality examined was the ability of the model to explain the variance in the dependent variables. The model explained 35.8% of the variability in intention to use e-government services and 27.7% of the variability in perceived trustworthiness of e-government services. It also accounted for 26.3% of the variability in perceived usefulness of e-government services. Only 7.1% of the variance in e-privacy risk concerns was explained by e-privacy awareness.

## **Discussion**

The study described in this paper investigated the role of e-privacy in e-government services adoption. The proposed model was tested and seven out of the 11 hypotheses were supported. Figure 3 shows the supported paths for the model. As can be seen, perceived usefulness of e-government services was influenced by social norms and perceived e-privacy protection, and it significantly influenced the intention to use e-government services. The results also suggest that when citizens believe that the services are of value they are more likely to use them. The perceived trustworthiness of e-government services was also found to play an important role. It was influenced by citizens' concerns about risk and perceptions of protection, and in turn influenced intention to use e-government services. The following discussion highlights the roles of each of the proposed factors in influencing the intention to use e-government services.

### **Role of social norms**

As proposed, and consistent with TAM2 and previous research such as Hsu and Chiu (2004), social norms played big role in influencing citizens' perceptions of the usefulness of e-government services. The results suggest the citizens of Oman are very influenced by whether people who are important to them want them to use e-government. Social norms did not however influence perceived trustworthiness of e-government services. This result is inconsistent with Bolton et al. (2004), who found that social norms is an important factor impacting the level of trustworthiness of e-services. Further research is required to investigate this issue.



**Figure 3. Supported paths**

### **Role of perceived e-privacy protection**

As proposed in the model, perceived e-privacy protection influenced both perceived usefulness of e-government services and perceived trustworthiness of e-government services. These results are consistent with the findings of Lee et al. (2001) and Loukides and Shao (2007) with respect to perceived usefulness of e-government services, and those of Carter and Bélanger (2005), Lee et al. (2005), McDonagh (2002), and Suh et al. (2003) with respect to perceived trustworthiness. When citizens believe that e-government services sites are protected they are more likely to trust these services and perceive them as more useful. It was interesting to note that perceived e-privacy protection had a much stronger influence on perceived trustworthiness than it did on perceived usefulness of e-government services.

### **Role of e-privacy awareness**

As proposed, e-privacy awareness significantly influenced e-privacy risk concerns. The more aware that citizens were of e-privacy issues, the more concerns they had. This result is consistent with that of Olivero et al. (2004) in the e-commerce environment.



### **Role of e-privacy risk concerns**

The model proposed that e-privacy risk concerns negatively influence both the perceived usefulness of e-government services and the perceived trustworthiness of e-government services. E-privacy risk concerns were found to influence perceived trustworthiness but not perceived usefulness of e-government services. That is, citizens with higher levels of concerns had less trust in e-government services, but their opinions about usefulness were not influenced. The influence on trustworthiness is consistent with Horst et al.'s (2007) findings. Horst et al. (2007) had mixed findings with respect to the influence of e-privacy risk concerns on perceived usefulness of e-government services. It was found to have an influence in one of the two samples they considered, but not the other. Other factors may play a role in this relationship.

### **Role of prior e-services experience**

Contrary to expectations, prior e-services experience did not influence the perceived trustworthiness of e-government services. This result is inconsistent with the results of studies such as Horst et al. (2007), Metzger (2004) and Nath (2005) that found that the more prior e-services experience users had, the more trust they had in e-government services. As e-services are relatively new in Oman, it may be that experience levels were too low to be able to detect an effect. Further research is required on this issue.

### **Role of perceived trustworthiness of e-government services**

The model proposed that perceived trustworthiness influences intention to use e-government services both directly and indirectly via perceived usefulness of e-government services. As proposed, perceived trustworthiness of e-government services was found to have a significant direct influence on intention to use e-government services, however it did not have an influence on perceived usefulness of e-government services. The direct relationship is consistent with Suh et al. (2003) and with Pavlou (2003). Suh et al. (2003) did not propose that trustworthiness also influenced perceived usefulness of e-government services, so did not test that relationship, but Pavlou (2003) did propose it and found that trustworthiness influenced perceived usefulness of e-services in the e-commerce domain.

### **Role of perceived usefulness of e-government services**

As proposed, and consistent with TAM2 and many studies in the e-commerce and e-government domains (e.g. Horst et al. 2007; Pavlou 2003) perceived usefulness of e-government services had a positive influence on intention to use e-government services. It was interesting to note however, that the influence of perceived usefulness of e-government services was only about half as strong as that of perceived trustworthiness. Whilst the intentions of the citizens of Oman to use e-government service are influenced by how useful they believe these services are, the trustworthiness of the services appears to be an even more important issue to them.

### **Limitations**

There are few limitations of the study that need to be considered. The first is that the study took place during the early stages of e-government implementation in Oman and therefore another study during the next 5 years would be of great value as more e-government services are expected to be in place. The second is that the study only took place in Oman and it would be useful to compare the results with similar studies done in other countries.

### **Implications for practice**

This study examined the role of e-privacy concerns in influencing citizens' intentions to use e-government services. The study has highlighted the influence of several factors on the level of trust that citizens have in e-government services, and it has shown how perceived trustworthiness and perceived usefulness of e-government services influence citizens' intentions to use e-government services. Whilst perceived usefulness of e-government services is important, the perceived trustworthiness of e-government services was found to play a more important role in citizens' intentions to use e-government services. Therefore it is important that governments encourage citizens' to trust e-government services by boosting their confidence levels before asking them to use the services. The study therefore recommends that governments put strong protection measures in place and ensure that citizens are well informed about them. The study also highlighted the importance of e-privacy awareness in the success of e-government services projects. Increased awareness of risks leads to increased concerns and decreased trust in e-government services. Therefore it is important that there should be comprehensive awareness efforts that counter possible concerns with evidence about the protections

that have been put in place. These awareness efforts should reach all citizens and not only promote the new services but also to help citizens to be proactive in adopting e-government services efficiently and safely. This will enhance the chance of implementation success. Protection measures such as modification of the existing laws and legislation to cater for the new e-services and adopting security technologies (e.g. encryption, smart cards, and other security solutions) are a way to boost e-government services trustworthiness and increase the use of these services. These recommendations are consistent with those of Gartner (2002b).

### **Conclusion**

The study described in this paper was designed to investigate the role of e-privacy in the adoption of e-government services in Oman. It tested a model that represents the influences of e-privacy concerns, perceived protection from e-privacy risks, trustworthiness of e-government services, and perceived usefulness on citizens' intentions to use e-government services. Seven of the 11 proposed hypotheses were supported. The study found that e-privacy concerns and perceptions of the protection available against risks do influence citizens' intentions to use e-government services via their influence on the perceived trustworthiness of these services. Thus trustworthiness is a factor that could be an obstacle to successful e-government services project implementation. Therefore the study recommends that governments pay greater attention to the role of e-privacy concerns and put in place security and e-privacy controls. Citizens should then be made aware of these in order to build the required level of trust and confidence in these services.

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## **Appendix**

Final items used to measure constructs

Perceived usefulness of e-government services

Using e-government services would improve my government transaction performance.

Using e-government services would increase my overall productivity.

Using e-government services would make it easier to interact with the government.

**Social norms**

My family think I should use the e-government services.

My colleagues think I should use the e-government services.

My friends think I should use the e-government services.

People I know think that using the e-government services is a good idea.

Prior e-services experience

I frequently use the Internet to find information about services and products

I frequently pay for products or services on the Internet using e-services sites

Many times I have requested further information about certain products or services on the Internet

So far, I have conducted many e-services through the available websites

### **E-privacy risk concerns**

I'm concerned that e-government sites will collect too much personal information about me.

It would bother me if e-government sites ask for personal information.

If e-government sites ask me for personal information, I would think twice before providing it.

### **E-privacy awareness**

I am aware that whenever I give my personal information to any e-government site it could be accessed by many others.

I am aware that my personal information could be transmitted to other government units.

I am aware that my personal information given to e-government sites could be used to track my online behaviour.

### **Perceived e-privacy protection**

E-government sites will devote time and effort to preventing unauthorized access to my personal information.

I feel that e-government sites will not release personal information about me without my express permission.



I feel that e-government sites would make a reasonable effort to ensure that the information collected about me is accurate.

E-government sites would give me a clear choice before disclosing personal information about me to third parties

### **E-government services perceived trustworthiness**

The Internet has enough safeguards to make me feel comfortable using it to interact with the government.

I think I trust Omani e-government services sites.

I think Omani e-government sites will be trustworthy.

Omani e-government sites will keep citizens' best interests in mind.

E-privacy security policies and precautions of Omani e-government sites will make me feel that the services are trustworthy.

### **Intention to use e-government services**

Interacting with the government over the web is something that I would do.

I would be willing to provide personal information to e-government sites.

I would be willing to recommend others to use and disclose their personal information to e-government sites to interact with government through the e-government sites.