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## The trust in the intermediaries and the intention to use electronic government services: a case of a developing country

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**Abstract:** This study aimed to investigate the direct and the intervening effects of trust in the intermediaries on the citizens' intention to use electronic government services in a developing country, Saudi Arabia, from the perspective of employees in higher education institutions. In the view of the theory of planned behaviour (TPB), this study examined the hypothesised model using the structural equations modelling approach to analyse the data collected from 546 employees at public universities in Saudi. The findings of the study confirmed the influences of social influence, e-government awareness and trust in intermediary on intention to use e-government. Importantly, trust in the intermediaries was found to partially mediate the effect of social influence on and the intention to use e-government. Other theoretical and practical values were reported.

**Keywords:** electronic government; eG; services; usage intention; perceived risk; awareness; social influence; trust in intermediaries.

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## 1 Introduction

E-government initiatives can be traced back to the 1990s, when the governments of the USA, UK, Canada and other Western countries led the other governments by providing government services online (Lee et al., 2011). Since then, several nations have conducted different researches and developed diverse e-government concepts, models and theories, taking into account changes in social, economical and technical environments. By 2005, majority of governments in developed and developing nations have created web portals to provide citizens with e-services (Al-Swidi and Faaeq, 2019; Lee et al., 2011). Among 191 UN members' states, 179 countries were online. Currently, all 193 UN member states have national websites and employ contemporary ICT to deliver citizens government services. To this end, the government of Korea has maintained its spot at the top in 2014, owing to its continued leadership and focus on e-government innovation. Korea is followed by Australia in second place and Singapore in the third place that have both moved up the ranks since their performance.

As the largest developing country in the Arab Region, Saudi Arabia continues to show progress in terms of its economy and technology owing to its oil revenues (UN World Economic Situation and Prospects Report, 2015). According to Saudi Arabian General Investment Authority (SAGIA) (2016a, 2016b), the Kingdom is one of the world's fastest growing countries worldwide, with per-capita income forecast to rise from USD\$25,000 in 2012 to USD\$33,500 by 2020. Over the last two decades or so, Saudi has been undergoing a transformation from a centrally planned economy into a knowledge-based one to ensure sustainability of its development process and building of a modern, competitive economy (Al-Jasser, 2014).

In attempting to respond to this transformation, Saudi Arabia implemented an e-government programme in 2005 to enhance the performance of the public sector by utilising the possible benefits of ICT and innovative technological advances. The Saudi e-government comprises various initiatives, such as Saudi e-government portal, Almadinah e-government portal, e-Umrah project, smart card project, and electronic data interchange project.

In developing countries, including Saudi Arabia, although significant investment has been made for the implementation of government online systems, only 15% of the e-government projects have been successful (Heeks and Bailur, 2007). Further, in an e-service delivery context, most studies have focused on issues related to the ICT technical and functionality aspects. Online government usage not only depends on the technical side of such services, but also the impact of several aspects, such as social and human issues, on these services. Further, organisational and cultural concerns have an influence on the usage rate (Belanger and Carter, 2012).

According to a study, an efficient infrastructure might not lead to a high level of usage of online government services. However, comparatively little attention has been paid to issues relating to usability and accessibility of e-government services from the

perspective of the citizens (Al-Swidi and Faaeq, 2019; Belanger and Carter, 2012; Carter and Belanger, 2005; UNDESA, 2014).

Contrary to traditional methods of government interaction that citizens are more inclined to use (Accenture, 2005), online government services are distinct owing to the internet's characteristics of distance and impersonality (Pavlou, 2003). Further, with the diffusion of technological developments across society and the growth of global cybercrimes, fraud and loss of privacy occur; this in turn, has led to users' perceptions of risk (Akkaya et al., 2013; Belanger and Carter, 2008).

In the literature, what drives the usage of government websites is still not well understood (Al-Swidi and Faaeq, 2019; Belanger and Carter, 2012). Venkatesh et al. (2012) argue that there is lack on understanding of the factors contributing to the use of such portals and the extent of its usage. Thus, this situation has led several researchers to suggest the need for more research in the area of e-government to help governments to improve their understanding of the issues that influence citizens' usage of e-government services (Belanger and Carter, 2012; Venkatesh et al., 2012). In this regard, managing citizens' e-government service by narrowing the gap between e-government readiness and citizens' ability has become a serious issue for the providers of e-government services.

Research on e-government services usage has mainly focused on developed countries; relatively little attention has been given to the citizens' usage of the e-government portal in developing countries (Belanger and Carter, 2012). Specifically, Alshawi and Alalwany (2009) and Al-Swidi and Faaeq (2019) highlight the necessity to tackle the lack of effective usage of online government services among public users, specifically in developing nations.

Therefore, this study takes a step further towards understanding the influence of awareness of e-services, trust in these factors in enhancing citizens' e-government usage, which in turn, have research value and implications for strategy makers and researchers. Subsequently, this study focuses on understanding the mediating influence of e-government services awareness on the relationship between trust of internet, trust of e-government intermediaries and social influence on the use of e-government services. It also examines the mediating influence of perceived risks on the relationship between trust of internet and trust of e-government intermediaries on the use of e-government services.

## **2 Hypotheses development**

To address the aforementioned identified problems, Ajzen's (1991) theory of planned behaviour (TPB) is utilised as the theoretical foundation as an appropriate tool to understanding factors that may influence e-government usage at an individual level.

Social influence refers to the normative pressure of relatives (e.g., family or friends) that affects the individual's e-government usage in this study. While the theory of behavioural planned, as the base theory of this study, uses the subjective norm construct, the present study takes an alternative path by investigating the effect the social influence construct on intention as discussed above section. Prior studies' findings (Taylor and Todd, 1995; Pavlou and Fygenson, 2006) have reported that social influences are crucial behaviour determinants.

Social influences have been investigated an important predictors of technology usage (Venkatesh and Davis, 2000). Whether or not the relationship between them is positive or

negative, it is evident that it is a crucial factor in the citizens' lives and it is potentially influential (Venkatesh et al., 2003). According to the TBP, the behaviour of individuals is influenced by the manner in which they are convinced that others who are important to them perceive that they should or should not go through a specific behaviour. Loch et al. (2003) claim that the closer the affinity of the individuals with their reference group, the more likely the individuals are to perform according to the reference group's expectations. Therefore, it is expected that such social influence would be especially higher in a collective society.

The Saudi society has a collectivist culture where individuals affect the opinions of others; citizens, therefore, might influence others when relating to technology acceptance (Al-Gahtani et al., 2007). Influential persons could force people to make use of e-services and that may add to its increased usage. Additionally, several scholars in the field of information systems have highlighted the impact of social influence from friends, family, peers and colleagues on the individual's behaviour adoption (Irani et al., 2008; Venkatesh and Brown, 2001).

Social influence of an environmentally aware user is recognised by way of spillover influences on the role models. The social learning theory also confirms that direct role models, like family, have a great influence on users' market-place awareness and buying decisions (Bush et al., 2001). Consequently, social influence could lead to growing awareness in addition to developing social marketing to use the online portal of government systems (Al-Sobhi et al., 2010; Dombrowski et al., 2014; Chen et al., 2007; Sorrentino and Niehaves, 2010; Sein, 2011). Hence, the following hypotheses were proposed for empirical test:

- H<sub>1</sub> Social influence has a positive influence on trust in internet.
- H<sub>2</sub> Social influence has a positive influence on trust in intermediaries.
- H<sub>3</sub> Social influence has a positive influence on e-government services awareness.
- H<sub>4</sub> Social influence positively influences usage of e-government services.

Awareness is described as the level to which citizens are aware of the presence of e-government technology (Charbaji and Mikdashi, 2003). Various studies have been carried out concerning the factors and issues influencing the citizens' awareness about public websites, while other researchers have suggested several strategies to maximise such awareness. While citizens' awareness of the existing e-government services portal is a high priority (Jaeger and Thompson, 2003; Khan et al., 2010, 2012; Van der Meer and Van Winden, 2003), not all citizens are aware of the existence of e-services provided by the government. Thus, the current study explores the level of awareness of citizens' usage of online government portal services in the Kingdom of Saudi Arabia. Alshehri and Drew (2010) found that one of the barriers to e-government service awareness in Saudi stems from the lack of initiatives that promote such services and their advantages. A survey conducted by Alghamdi et al. (2014) shows that Saudi e-government lacks awareness.

The government also has a responsibility to promote awareness and attract the citizens to use e-government services available on the government portal. Therefore, several strategies have been proposed by the researchers to maximise the citizens' awareness via cross-media marketing comprising intermediaries that would also lead to increased e-government user population.

Past studies have shown that awareness among users is important to develop their attitude towards IT innovation usage (Sia et al., 2001); and e-government usage (Charbaji and Mikdashi, 2003; Jaeger and Thompson, 2003). Familiarity of the services provided by e-government significantly correlates with the attitude towards e-government services usage; however, most of the citizens are not aware of the e-government service types that are offered in different countries around the world.

In their study, Sharma and Mishra (2017) investigate the role of intermediaries in influencing the adoption of e-government services in Indian rural areas. To identify the factors influencing the adoption of the e-government services. A sample with size of 328 respondents was used to test the model. The study concluded that service quality of the e-government services, ease of obtaining the services, and the word of mouth among the community have significant influence on the willingness of the citizens to adopt the e-government services.

Carter and Weerakkody (2008) show that governments may have high expectations for e-government, and they may have invested significant amounts but have failed to make citizens aware of them. Moreover, the results of Meftah et al. (2015) show a significant association between awareness and e-government usage. Rehman et al. (2012) demonstrate that awareness is an important variable that affects the usage of e-government services. Khan et al. (2012) and Carter and Belanger (2008) note that making government portal well-known can raise the awareness of the users. Hence, the following hypothesis is proposed:

H<sub>5</sub> E-government awareness has a positive influence on the usage of e-government services.

Perceived risk refers to the subjective expectation of the citizens concerning the loss of pursuit of the expected result (Warkentin et al., 2002). Perceived risk that citizens face vis-à-vis e-government systems adoption has been examined by several researchers in both developing and developed countries. Several studies have revealed that perceived risk impacts the intention to use and the actual usage of e-government (Akkaya et al., 2011; Carter and Belanger, 2005; Schaupp et al., 2010; Warkentin et al., 2002). The existence of risk calls for the mandatory presence of trust (Pavlou, 2003).

Moreover, perceived risk consists of environmental uncertainty, where the presence of perceived risk is attributed to online service providers' opportunistic behaviour in that they may take benefits of the nature of e-environment, whereas the latter is attributed to the unpredictable nature of the internet-based technology that cannot be controlled by the consumer (Pavlou, 2003).

The perceived risk variable has been included in various research models in literature (Akkaya et al., 2013; Gallant et al., 2007; Hsu et al., 2006). In the above studies, perceived risk has been found to significantly affect the intention, current usage and the future usage of e-service. Along the same line of contention, Akkaya et al. (2011) and Alsaghier et al. (2009) show that perceived risk negatively impacts the intention and actual use of e-government.

In a similar study, Al-Atayah et al. (2013) stress on the sensitivity of citizens towards storing their personal data and this aspect negatively impacts their inclination to public website usage. Similarly, Akkaya et al. (2013) conducted a study dedicated to the usage of e-government among German citizens, and reveal that perceived risk reduces citizens' actual usage of online government services. Accordingly, the following hypothesis is proposed:

H<sub>6</sub> Perceived risk has a negative influence on the usage of e-government services.

Trust has been frequently posited as improving online services adoption such as e-government services usage (Belanger and Carter, 2008; Pavlou and Gefen, 2004; Schaupp et al., 2010; Meftah et al., 2015). Trust in the internet has been constantly described in literature as a major online website usage construct (Carter and Belanger, 2005; Al-Sobhi et al., 2010; Warkentin et al., 2002; Al-Hujran et al., 2013). The argument is that with low trust, citizens will need additional focus to complete their website transactions. Added to this, trust would minimise the needs of the citizens to monitor, oversee and comprehend online task instructions, thus, making online tasks easier to complete, and in turn, improving e-services adoption.

In e-government literature, among the crucial topics of discussion concerning e-government challenges and issues, are perceived risk and trust (Akkaya et al., 2013; Belanger and Carter, 2008, 2012; Gallant et al., 2007). This underlies both constructs' significance in the usage of electronic government (eG) and the importance of these constructs in online technologies adoption. The online government services may be perceived as unsafe and risky, which in turn can inhibit citizens' adoption. This fear presents the need to establish a safe and secure environment. Trust arises in environments that are characterised by uncertainty and risk (Lewis and Weigert, 1985). Therefore, the risk perception factor, in addition to trust, are two of the crucial constructs that need analysis to comprehend the usage of online government services (Alateyah et al., 2014; Akkaya et al., 2013; Rehman et al., 2012).

Empirical studies have supported the effect of trust with respect to the internet in terms of the use of online services. Carter and Belanger (2005) studied the main antecedents of citizens' e-government services adoption and reveal that in effect, trust of citizens on government and the internet are essential elements to engender trust in citizens in order to accept the technology. Another study by Belanger and Carter (2008) confirms that the citizens' trust in both the internet and their government are vital elements of citizens' willingness to utilise e-government services as well as reducing perceived risk.

Another study by El-Haddadeh et al. (2011) used the unified theory of acceptance and use of technology (UTAUT) to examine the influence of intermediaries on citizens' adoption of e-government services in Saudi Arabia. The results indicated that some variables such as the trust of the internet and the trust of intermediary have a great influence on citizens' behaviour towards e-government services. Moreover, the facilitating conditions the intermediary organisations have impacts on the using of e-government services.

Finally, Schaupp et al. (2010) studied e-file adoption and asserted that trust in the internet and the service provider significantly influence perceived risk, which affects taxpayers' intention and actual usage of the system. In the light of this discussion, it is anticipated that citizens with higher levels of trust in e-services media will have high level of the usage of e-government services. Based on the above discussion, the following hypothesis is proposed to be tested.

H<sub>7</sub> Trust in internet has a positive effect on the usage of e-government services.

Several researchers have indicated the way intermediaries enhance the importance of both service suppliers and demand to promote trust among them (Al-Sobhi et al., 2010; Janssen and Kilevink, 2009; Howells, 2006; Bailey and Bakos, 1997). Bailey and Bakos

(1997) also stated that the key intermediary functions are to improve promote the trust and minimise the online environmental threats.

Trust of the intermediary is referred to as an individual belief upon that the intermediary drives applying and implementing right rules and processes that results in a competent, reliable, and integral way, and if required, will offer the buyers an opportunity to handle the opportunistic behaviour of the providers (Pavlou and Gefen, 2004). Further, e-government intermediaries are the media to develop the trust of possible users (Al-Sobhi et al., 2010). Considering the above, examining the intermediary's role could assist in understanding the behaviour of citizens towards e-service usage (Pavlou and Gefen, 2004; Chircu et al., 2000); and public website systems usage (Janssen and Klievink, 2009; Al-Sobhi et al., 2010).

In the case of Saudi Arabia, developing trust in the intermediary is deemed to be crucial for the usage of online services of the government, as the citizens have to provide their private data to the government online website via intermediaries as third party entities (Al-Sobhi et al., 2010). Thus, trust in intermediaries has been shown to have an effect on the citizens' use of e-government services (Al-Sobhi et al., 2010; El-Haddadeh et al., 2011; Janssen and Klievink, 2009; Dombrowski et al., 2014; Sorrentino and Niehaves, 2010; Sein, 2011). Hence, the following hypothesis is developed:

H<sub>8</sub> Trust in the e-government intermediaries has a positive influence on the use of e-government services.

Researchers have noted that governments have a responsibility to publish the information about the online website availability and the launching of the public sector portal by various media and information channels (intermediaries) (Jaeger and Thompson, 2003). The possibility of intermediaries developing social awareness of e-government, is high (Bhatnagar, 2004). Thus, it is important for governments to concentrate on creating higher levels of social influences and citizens' awareness in an attempt to motivate the use of technology among citizens.

As a social phenomenon, trust influences the awareness of users directly in addition to influencing their decision-making indirectly. Nevertheless, only a few awareness computational models address interpersonal trust (Aydođan et al., 2014). Thus, the current study examines the role of trust in internet in facilitating e-government services awareness and its influences toward citizens' use of e-government services.

In this respect, Christianson et al. (2014) suggest that trust of the internet is associated with a higher possibility of being physician quality information awareness. Furthermore, Daassi et al. (2006) concluded that the greater trust levels linked to greater awareness levels. Correspondingly, this means lesser levels of trust linked to lesser levels of awareness. In the same line, Aydođan et al. (2014) support that the sources information trustworthiness found significantly to impacts on awareness of decision maker.

According to Wahid et al.'s (2011) study, the intermediaries may have a transforming role in raising awareness. Moreover, the key roles for intermediaries are to develop awareness; improve accessibility; and ensure quality (Adams and Blandford, 2006). By being empowered through awareness, intermediaries emphasise building the capabilities of the people rather than simply facilitating access (Sein, 2011).

Sorrentino and Niehaves (2010) explain that new intermediaries play a crucial role in inclusive strategies of e-government in developing as well as developed nations. They identify that the promotion of social awareness of e-government strategies call for the employment of various delivery channels to provide the different kinds of users an

alternative as to which service access they can use at any time. Accordingly, e-government intermediaries maximise the availability service points for citizens especially in rural areas.

E-government intermediaries allow governments to minimise the digital divide and assist citizens in using new technology, as this would increase the awareness of such services. Intermediaries could educate individuals on the way online services are used, and in effect, heighten their awareness of their benefits and advantages of its adoption, including time saving, cost saving and minimising the physical contact with government employees (Al-Sobhi et al., 2010; Sorrentino and Niehaves, 2010).

In an e-market, intermediaries are increasingly being introduced due to the drawbacks of e-service mechanisms in the proliferation of required services as explained by Datta and Chatterjee (2008). They add that this influences consumers' behaviour towards trusting a third party that facilitates the link between the requester and the service provider. Intermediary functions that benefit producers include creating service and product awareness (Sarkar et al., 1998).

As a consequence, increased awareness of citizens through the use of intermediaries and various media could convince the important others that the individual should employ e-government services via intermediaries (Brown et al., 2005; Venkatesh and Brown, 2001). For instance, in the case of India, the government expects the strategic potential of the intermediaries, particularly in rural areas (Bhatnagar, 2004). Further, trust in e-government intermediary has been shown to have an influence on awareness towards e-government services usage (Al-Sobhi et al., 2010; Dombrowski et al., 2014; El-Haddadeh et al., 2011; Sorrentino and Niehaves, 2010; Sein, 2011).

The facilitation of socially aware e-government strategies call for multiple delivery channels to provide alternatives to the users as to which service access he or she prefers (Sorrentino and Niehaves, 2010). Therefore, trust in intermediaries besides social influence, affects awareness of government online services. In addition, this awareness mediates the relationship between trust in the intermediaries and social influence and usage of e-government services (Al-Sobih et al., 2010; Al-Shafi and Weerakkody, 2007; Adams and Blandford, 2006; Dombrowski et al., 2014; Sorrentino and Niehaves, 2010; Sein, 2011). Accordingly, the following hypotheses are developed:

H<sub>9</sub> Trust in the internet has a positive influence on trust in intermediaries.

H<sub>10</sub> Trust in the internet has a positive influence on e-government services awareness.

Considering the nature of the risks involved in an open technology infrastructure, such as the internet, citizens naturally look for reassurance when interacting with the government online (Pavlou, 2003). Implementation of secure technologies is deemed the top factor that influences the risk perception among citizens when it comes to e-service adoption. With the transformation of society through technology, governments will be urged to keep abreast of the new changes (Thomas and Streib, 2003).

Interacting with the government via internet greatly hinges on trust level of the citizens and this interaction is always related to risk issues. Hence, shedding light on mechanisms that decrease risk and increase adoption of e-services among citizens is necessary. Thus, in terms of the reluctance of citizens to leave traditional means of government interaction, a better understanding is needed to explain the relationships of the following constructs: trust in internet, trust in intermediaries, perceptions of risk and adoption of e-government.

A thorough literature review reveals that researchers are of the consensus of the position of trust as a crucial element in a relationship riddled by unexpected risks or uncertainty (Pavlou, 2003; Warkentin et al., 2002). Additionally, some researchers have concentrated on the role of trust, specifically in e-commerce context, such as Belanger and Carter (2012), Gefen (2002) and Gefen et al. (2003). Pavlou (2003) reports that trust significantly antecedes perceived risk.

The scenario is such that with a decrease in perceived risk, trust increases (Featherman and Pavlou, 2003). Moreover, literature dedicated to the adoption of electronic services suggests the development of users' trust in order to minimise their risk perceptions and encourage adoption (Belanger and Carter, 2008, 2012; Khasawneh et al., 2013).

According to Akkaya et al. (2013), both risk perceptions and trust are included in the many significant variables that require exploration when understanding e-government implementation. Furthermore, Carter and Weerakkody (2008) highlight two crucial factors influencing the government provided e-services adoption, namely relative advantage and trust on the internet. Their study reveals that disclosure of personal data may influence the users' trust in services, which in turn, may lead to preventing e-government implementation.

Similarly, Chang and Chen (2008) contend that trust and perceived risk relationship is a two way street and as such, both are vital when implementing e-government systems (Khasawneh et al., 2013). In Saudi Arabia, the deficiency in information security and privacy when it comes to government sites are primary barriers to e-government initiatives implementation (Alfarraj et al., 2013; Alateyah et al., 2014).

Through these online interactions, the government can enhance government services only when the citizens adopt e-services and to achieve this, such e-services should be trustworthy. Therefore, in the hopes of decreasing the negative outcome of the deficiency of security of e-governments initiatives, intermediaries are used and through these intermediaries, an environment that is conducive to trust is achieved (Sarkar et al., 1998). In fact, several intermediaries' functions benefiting consumers are enumerated upon by Sarkar et al. (1998) and these include the reduction of perceived risks of e-services and the facilitation of an environment conducive to trust.

Considering the above discussion, it can be stated that trust of citizens on the internet and their trust in e-government intermediaries could influence the citizens' usage of e-government services usage (Al-Sobhi et al., 2010; Janssen and Klievink, 2009). Thus, trust influences perceived risk (Akkaya et al., 2013; Belanger and Carter, 2008; Pavlou, 2003; Gefen et al., 2003). Accordingly, the following hypotheses are developed:

H<sub>11</sub> Trust in the internet has a negative influence on perceived risk of using an e-government service.

H<sub>12</sub> Trust in the e-government intermediaries has a negative influence on perceived risk of using an e-government service.

As a social phenomenon, trust influences the awareness of users directly in addition to influencing their decision-making indirectly. Nevertheless, only a few of the current awareness computational models address interpersonal trust (Aydoğan et al., 2014). Hence, the current study presents a framework integrating the factor of trust in internet to facilitate developing citizens' e-government usage.

In addition, trust in e-government intermediaries has been shown to include influence on website usage of public services (Al-Sobhi et al., 2010; Dombrowski et al., 2014; Sorrentino and Niehaves, 2010). Therefore, intermediary organisations may have a significant impact on citizens' e-government services adoption behaviour by promoting citizens' awareness of e-government services.

Further, normative pressure has impacted the promotion of awareness of public websites and creating social marketing to make use of such services (Al-Sobhi et al., 2010). Chen et al. (2007) claim that government online portal awareness directly impacts social influence on government portal usage. They find that awareness is a significant determinant of social influence.

Building on the previous studies, perceived risk impacts negatively the citizens' usage of e-government (Akkaya et al., 2011; Carter and Belanger, 2005; Schaupp et al., 2010; Warkentin et al., 2002). Perceived risk also has a directly negative effect by stressing the mediating role of uncertainty and potential negative outcomes (Gefen, 2002). Further, the literature generally suggests that trust is interwoven with risk. Several studies have revealed that perceived risk and trust are important constructs (Akkaya et al., 2013; Belanger and Carter, 2012, 2008; Gallant et al., 2007).

Further, Akkaya et al. (2013) argue that perceived risk and trust are among the essential constructs that need to be analysed to understand e-government adoption. Therefore, the impact of trust in internet and in e-government intermediaries and the perception of risks related to e-government adoption should be examined in-depth. It indicates trust of internet and government and perceived risk have a major impact on citizens' actual usage of online government systems (Carter and Belanger, 2005).

Alsaghier et al. (2009) also find perceived risk on e-government reduces trust on the same. Additionally, Suryaningsih et al. (2014) find a reciprocal relationship between trust and perceived risk. Similarly, Chang and Chen (2008) contend that trust-perceived risk relationship is a two way street and as such, both are significant in e-government implementation (Khasawneh et al., 2013).

Additionally, future research on the possible role intermediaries must improve understanding of e-government (Centeno et al., 2005; Sorrentino and Niehaves, 2010). While Sarkar et al. (1998) stress on examining the intermediary's role in more detail, very few studies thus far has combined the interplay between e-government intermediary roles and awareness of e-services as factors that impact e-government usage (Al-Sobhi et al., 2010). Additionally, researchers on intermediaries, have likewise emphasised the need to investigate the online services usage at users' level prompted through the role of intermediaries (Centeno et al., 2005; Howells, 2006; Dombrowski et al., 2014; Weerakkody et al., 2013; Sorrentino and Niehaves, 2010).

Additionally, understanding the complex social and institutional contexts of how government online systems are delivered is a significant research gap in literature (Yildiz, 2007). Dombrowski et al. (2014) recommend that future research explores how information does and does not propagate within the society. While social influence has a strong influence on citizens' usage of e-government (Meftah et al., 2015), however, it is rarely associated with e-government services awareness. Hence, the market for e-government could be exploited more within the social influence of related groups, like family, friends or intermediates that impact on the use of online government services.

Based on the aforementioned discussion, trust in internet and trust in e-government intermediary organisations could build the citizens' actual usage of e-government services (Al-Sobhi et al., 2010; Janssen and Klievink, 2009). Further, Sarkar et al. (1998),

Carter and Weerakkody (2008) and Akkaya et al. (2013) argue that trust in internet could influence citizens' perceived risk to use e-government services and that risk perceptions may mediate the relationship between trust and citizens' usage of online government services (Akkaya et al., 2013; Pavlou, 2003; Gefen et al., 2003).

With regards to intermediaries, a trusted intermediary can be expected to take steps to reduce related risks associated with the internet infrastructure (Pavlou, 2003). Thus, trust in the internet and trust in intermediaries improves the citizens' beliefs about intent to use e-government and the associated infrastructure, which in turn, leads to decreased risk perceptions (Weerakkody et al., 2013). The present study therefore investigates the mediation influence of trust in the internet and trust in intermediaries on the relationship between social influence and trust of internet and citizens' use of these systems of e-government services. Accordingly, the following hypotheses are proposed:

H<sub>13</sub> Trust in the internet mediates the relationship between social influence and the use of e-government services.

H<sub>14</sub> Trust in intermediaries mediates the relationship trust in internet and perceived risk.

H<sub>15</sub> Trust in intermediaries mediates the relationship social influence and the use of e-government services.

### 3 Research methods

#### 3.1 Measurement of the variables

All the variables of the study were measured based on the previous studies using a five-point Likert with '1' = strongly disagree to '5' = strongly agree. Table 1 shows the items used to measure all the variables and the sources from which they were adapted.

**Table 1** Measurements of the variables

<i>Construct</i>	<i># items</i>	<i>Sources</i>
The usage of e-government services	4	Ajzen (1991), Venkatesh et al. (2003), Belanger and Carter (2008) and Al-Sobhi et al. (2009)
Awareness about e-government services	6	Khan et al. (2012), Al-Majali (2011) and Al-Sobhi et al. (2009)
Perceived risk to using e-government services	5	Belanger and Carter (2008) and Pavlou (2003)
Social influence to use e-government services	5	Ajzen (1991) and Venkatesh et al. (2003)
Trust in internet to use e-government services	4	Belanger and Carter (2008) and Carter and Belanger (2005)
Trust in intermediary to use e-government services	4	Al-Sobhi et al. (2009)

### 3.2 Population and sample

The population of the study was the academic staff of Saudi public universities. A total number of 760 questionnaires were distributed. The number of 546 complete questionnaires were returned and used in the study.

## 4 Data analysis and results

To test the hypothesised model of this study, the structural equation modelling (SEM) approach was followed using AMOS 21. To follow the streamline of the SEM analysis reporting literature. This study followed the two-step approach suggested by Anderson and Gerbing (1988). The first step was to perform confirmatory factor analysis (CFA) to confirm the construct validity of the measurement model. The second step was to examine the hypotheses of the study.

### 4.1 Demographic characteristics of the respondents

Table 2 provides the background information of the survey respondents, such as, gender, marital status, education and income.

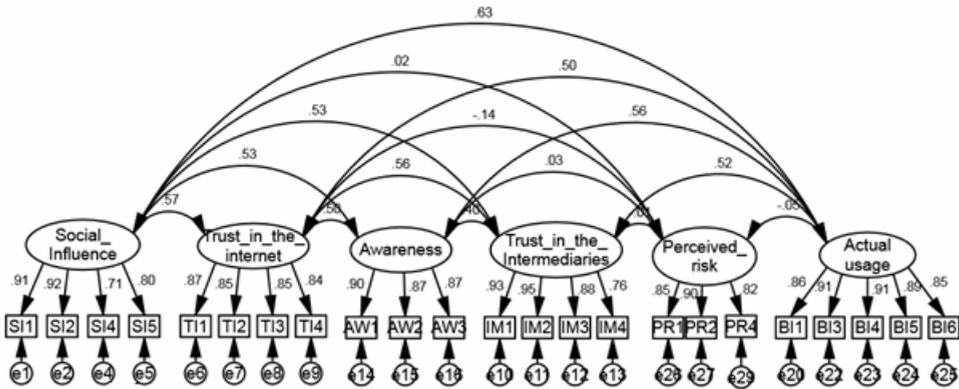
**Table 2** Respondents' demographic information

<i>Gender</i>	<i>Frequency</i>	<i>Percent</i>
Male	348	63.7
Female	198	36.3
Total	546	100
<i>Marital status</i>	<i>Frequency</i>	<i>Percent</i>
Single	111	20.3
Married	435	79.7
Total	546	100
<i>Education</i>	<i>Frequency</i>	<i>Percent</i>
Bachelors	124	22.7
Masters	158	28.9
PhD	220	40.3
Prof. PhD	44	8.1
Total	546	100
<i>Income</i>	<i>Frequency</i>	<i>Percent</i>
Less than \$3,000	128	23.4
\$3,000–\$4,500	170	31.1
\$4,500–\$6,000	114	20.9
\$6,000–\$8,000	70	12.8
More than \$8,000	64	11.7
Total	546	100

### 4.2 The measurement model results

Initially, the construct validity of measurement model was evaluated using the CFA. Following the literature of SEM methodology, the construct validity was determined using the factor loadings, composite reliability (CR) and the average variance extracted (AVE). After the construct validity has been confirmed, discriminant validity was determined employing the Fornell-Larcker’s (1981) criterion. Figure 1 shows the measurement model analysis.

**Figure 1** The measurement model analysis



Notes: Fit values  $\chi^2 = 651.848$ ; ratio = 2.691; p-value = 0.000; GFI = 0.916; CFI = 0.964; TLI = 0.959; RMSEA = 0.055.

### 4.3 Goodness of fit indicators

Various measures were utilised to assess the goodness of fit of the model. The normed  $\chi^2$  for the measurement model was 2.705 which is less than 3.0 as suggested by Bagozzi and Yi (1988). In addition to that, the assessment of some other fit indexes also indicated a good fit. For example, the comparative fit index (CFI) were 0.964 higher than the 0.95 suggested by Bagozzi and Yi (1988) and so as the non-normed fit index (NNFI or TLI) which was 0.959 indicating that the model fits the data well. Moreover, the root mean square error of approximation (RMSEA) was 0.056, which is lower than 0.08 proposed by Browne and Cudeck (1993). These indicators, therefore, confirms the goodness of fit of the measurement model.

The next step was the establishment of the confirmatory analysis to confirm the content and the construct validity as reported in the following:

#### 4.3.1 Content validity

The content validity was confirmed through the assessment of the factor loadings. Based on CFA analysis illustrated in Figure 1 and Table 4, all the variables of this study were correctly assigned to their latent constructs. That is to say, all the variables showed high and significant loadings on their respective constructs compared to their loadings on other constructs in the model. These results confirmed the content validity of the measurement model (Chin, 1998; Hair et al., 2010).

### 4.3.2 Construct validity

According to Hair et al. (2010), construct validity refers to the degree to which the items generated to measure a construct can appropriately measure the concept it was designed to measure. The construct validity can be established through convergent and discriminant validity as follows:

**Table 3** Convergence validity analysis

<i>Construct</i>	<i>Items</i>	<i>Loadings</i>	<i>Composite reliability (CR)<sup>a</sup></i>	<i>Average variance extracted (AVE)<sup>b</sup></i>
Social influence	SI5	0.8	0.902	0.700
	SI4	0.706		
	SI2	0.915		
	SI1	0.907		
Trust in internet	TI4	0.842	0.913	0.724
	TI3	0.848		
	TI2	0.847		
	TI1	0.867		
Trust in eG intermediaries	IM4	0.756	0.934	0.781
	IM3	0.883		
	IM2	0.951		
	IM1	0.931		
Awareness	AW3	0.868	0.911	0.774
	AW2	0.867		
	AW1	0.903		
Usage behaviour	UB6	0.848	0.946	0.778
	UB5	0.886		
	UB4	0.907		
	UB3	0.908		
	UB1	0.86		
Perceived risk	PR4	0.817	0.891	0.733
	PR2	0.896		
	PR1	0.853		

Notes: <sup>a</sup>CR =  $(\sum \text{factor loading})^2 / \{(\sum \text{factor loading})^2 + \sum (\text{variance of error})\}$ .

<sup>b</sup>AVE =  $\sum (\text{factor loading})^2 / (\sum (\text{factor loading})^2 + \sum (\text{variance of error})\}$ .

All the factor loadings are significant at the 0.001 level of significance.

#### 4.3.2.1 Convergent validity

According to the SEM literature, the convergent validity indicates the degree to which a set of items converges in measuring the concept of construct (Bagozzi and Yi, 1988; Hair et al., 2010). According to the CFA results reported in Table 3, the factor loadings for all the items were significant and exceeded the recommended value of 0.7 (Chin, 1998). The values of CR in Table 4 range between 0.959 and 0.917. These values are higher than that of Fornell and Larcker (1981) and Hair et al. (2010) of 0.7. Based on Barclay et al.

(1995), the values of the average variances extracted (AVE) in this study show a good level of construct validity, ranging from 0.64 to 0.83. These results confirm the convergent validity of the measurement model.

#### 4.3.2.2 Discriminant validity analysis

To confirm the construct validity of the outer model, it was necessary to establish the discriminant validity. This step was mandatory prior to testing the hypotheses through the path analysis. The discriminant validity of the measures shows the degree to which a set of items differentiates their respective construct from other constructs in the model. It shows that the items used by different constructs do not overlap. Therefore, constructs although correlated, yet measure distinct concepts. This meaning was clearly explained by Compeau et al. (1999). They concluded that if the discriminant validity of the measures was established, it means that the shared variance between each construct and its measures should be greater than the variance shared among distinct constructs. For this study, the discriminant validity of the measures was confirmed employing the method of Fornell and Larcker (1981). As illustrated in Table 4, the square root of AVE for all the constructs were placed at the diagonal elements of the correlation matrix. As the diagonal elements were higher than the other element of the row and column in which they are located. Thus, this confirms the discriminant validity of the measurement model.

**Table 4** Analysis of discriminant validity

<i>Construct</i>	<i>Min</i>	<i>Max</i>	<i>Mean</i>	<i>Std dev.</i>	(1)	(2)	(3)	(4)	(5)	(6)
(1) Usage behaviours	1	5	3.55	0.86	0.882					
(2) Perceived risk	1	5	4.30	0.93	-0.047	0.856				
(3) Trust in eG intermediaries	1	5	3.36	1.01	0.520	-0.008	0.884			
(4) Awareness	1	5	2.49	0.86	0.565	0.030	0.397	0.879		
(5) Trust in internet	1	5	3.50	1.01	0.498	-0.138	0.564	0.500	0.851	
(6) Social influence	1	5	3.72	0.89	0.633	0.017	0.527	0.526	0.570	0.836

Having established the construct validity of the measurement model, it is, therefore, concluded that the model has an adequate level of validity and reliability required to guarantee that the obtained results pertaining to the hypotheses testing will be valid and reliable.

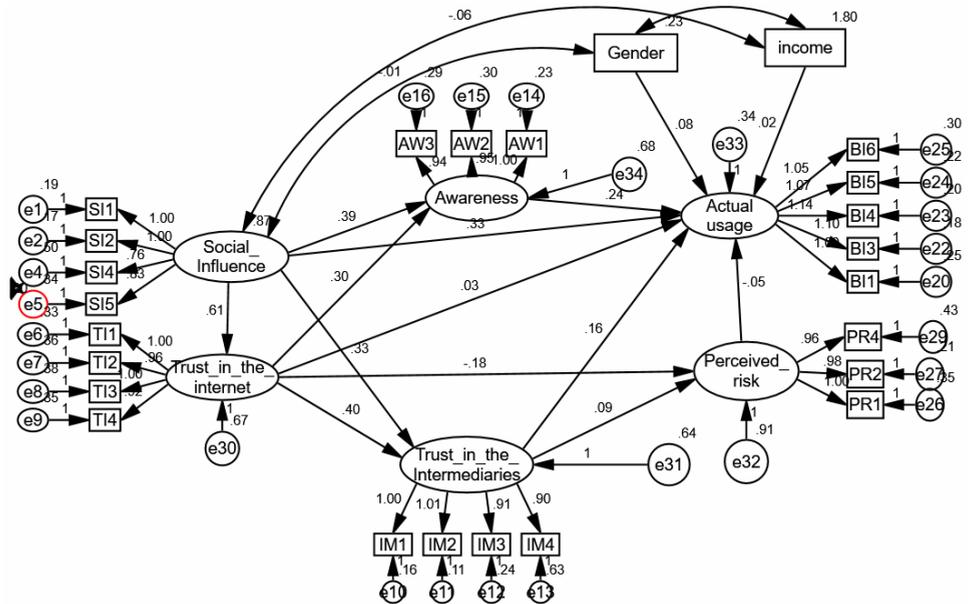
#### 4.4 Structural model and hypotheses testing

After the validity and reliability of the measurement model have been established, the next step was to examine the structural model and test the hypothesised relationships as illustrated in Figure 2. The goodness fit of the model was an adequate when compared to the threshold values suggested by the SEM literature. The normed  $\chi^2$  was 2.692 which is less than 3.0; the GFI was 0.915, higher than the threshold value of 0.90; the TLI was 0.961 and CFI was 0.967, higher than the 0.95; and RMSEA was 0.055, which is lower

than 0.08. Hence, the model has a good fit according to Bagozzi and Yi (1988), Browne and Cudeck (1993) and Chau and Hu (2001).

Once the goodness of the model was established, the hypothesised relationships were tested. As a result of that, the study path coefficients were produced, as demonstrated in Figure 2.

Figure 2 Path model results (see online version for colours)



Notes: Fit values  $\chi^2 = 659.972$ ; ratio = 2.548; p-value = 0.000; GFI = 0.913; CFI = 0.964; TLI = 0.958; RMSEA = 0.053.

To control for the effect of income and gender on the actual usage of e-government services, the path coefficient were examined. The results show that the two variables have no significant impact on the actual behaviour related to the use of e-government services with coefficients ( $\beta = 0.021$ ,  $t = 1.058$ ,  $p > 0.05$ ) and ( $\beta = 0.084$ ,  $t = 1.481$ ,  $p > 0.05$ ) respectively. This findings imply that the actual behaviour with regards to the use of e-government of the employees in Saudi universities is not influenced by the gender and the income of the individuals surveyed.

In addition, the findings of this study support that the social influence has a positive and significant impact on trust in internet, trust in intermediaries, awareness of e-government services and the use of e-government services with path coefficients ( $\beta = 0.605$ ,  $t = 13.264$ ,  $p < 0.001$ ), ( $\beta = 0.335$ ,  $t = 6.526$ ,  $p < 0.001$ ), ( $\beta = 0.389$ ,  $t = 7.163$ ,  $p < 0.001$ ) and ( $\beta = 0.328$ ,  $t = 7.512$ ,  $p < 0.001$ ) respectively. Therefore, these results supported the articulated hypotheses H<sub>1</sub> through H<sub>4</sub> of the study. Similarly, the results confirmed that the awareness of e-government services awareness has a positive and significant impact on e-government usage ( $\beta = 0.273$ ,  $t = 6.553$ ,  $p < 0.001$ ) which supported the hypothesis H<sub>5</sub>.

The statistical results confirm the crucial role of trust in the internet in predicting the antecedents of the use of e-government services. Unexpectedly, the trust in the internet was found not to have a direct effect on the actual use of e-government services

( $\beta = 0.027$ ,  $t = 0.657$ ,  $p = 0.511$ ). These results did not support the hypothesis H<sub>7</sub>. However, trust in the internet was found to have a significant negative impact on perceived risk ( $\beta = -0.181$ ,  $t = -3.191$ ,  $p < 0.01$ ); a positive and significant effect on trust in intermediaries ( $\beta = 0.402$ ,  $t = 8.171$ ,  $p < 0.001$ ); a positive significant effect on awareness of e-government services ( $\beta = 0.301$ ,  $t = 5.883$ ,  $p < 0.001$ ). Hence the hypotheses H<sub>9</sub>, H<sub>10</sub> and H<sub>11</sub> are supported.

**Table 5** Structural relationship results

<i>Hyp</i>	<i>Hypothesis</i>	<i>Path coefficient</i>	<i>Std error</i>	<i>t value</i>	<i>P value</i>	<i>Decision</i>
H <sub>1</sub>	Social influence --> trust in internet	0.605***	0.046	13.264	0.000	Supported
H <sub>2</sub>	Social influence --> trust in the intermediaries	0.335***	0.051	6.526	0.000	Supported
H <sub>3</sub>	Social influence --> awareness of eG service	0.389***	0.054	7.163	0.000	Supported
H <sub>4</sub>	Social influence --> actual usage of eG services	0.328***	0.044	7.512	0.000	Supported
H <sub>5</sub>	Awareness of eG services --> actual usage of eG services	0.237***	0.036	6.553	0.000	Supported
H <sub>6</sub>	Perceived risk--> actual usage of eG services	-0.050*	0.03	-1.681	0.093	Not supported
H <sub>7</sub>	Trust in internet --> actual usage of eG services	0.027	0.041	0.657	0.511	Not supported
H <sub>8</sub>	Trust in intermediaries --> actual usage of eG services	0.163***	0.036	4.553	0.000	Supported
H <sub>9</sub>	Trust in internet --> trust in intermediaries	0.402***	0.049	8.171	0.000	Supported
H <sub>10</sub>	Trust in internet --> awareness of eG services	0.301***	0.051	5.883	0.000	Supported
H <sub>11</sub>	Trust in internet --> perceived risk	-0.181**	0.057	-3.191	0.001	Supported
H <sub>12</sub>	Trust in intermediaries --> perceived risk	0.094	0.054	1.739	0.082	Not supported

Notes: \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

Unexpectedly, the effect of perceived risk on the actual usage of e-government services was not found to be significant ( $\beta = -0.050$ ,  $t = -1.681$ ,  $p > 0.05$ ) and this did not supports the hypothesis H<sub>6</sub>.

Importantly, the trust in intermediaries was deemed as important factor in shaping the usage behaviour related to e-government services with a positive and significant effect ( $\beta = 0.163$ ,  $t = 4.553$ ,  $p < 0.001$ ) and this supports H<sub>8</sub>. On the other hand, however, there was no support for the effect of trust in intermediaries on the perceived risk which go against the hypothesised relationship in H<sub>12</sub>.

#### 4.5 Analysis of mediation effects of trust in the internet and trust in intermediaries

One of the objectives of this study is to examine the mediating effect of awareness of e-government services and the trust in intermediaries. Specifically, this study examined

the mediating effect of trust in the internet between social influence and trust in intermediaries. In addition, it investigates the mediating effect of trust in intermediaries between trust in internet and social influence from one hand and the use of e-government services from the other.

To perform the mediation analysis, the bootstrapping methodology as suggested by many researcher such as Hayes and Preacher (2014) was utilised using 5,000 samples. The indirect effects were estimated and the confidence intervals were calculated as in Table 6. The indirect effect was found to be significant as the interval does not included in the confidence interval. This results illustrated that trust in the internet has a partial mediation role between social influence and trust in intermediaries with VAF of 42% (indirect  $\beta = 0.243$ ,  $p < 0.001$ ). This result suggested that social influence has a significant effect on the trust in intermediaries through the trust in the internet. This result support the hypothesis as in H<sub>13</sub>.

**Table 6** The mediation analysis results

<i>Hyp no.</i>	<i>Indirect path hypothesis</i>	<i>Confidence interval for the indirect effect</i>				<i>Variance accounted for (VAF)</i>	<i>Decision</i>
		<i>Indirect path coefficient</i>	<i>Direct path coefficient</i>	<i>Lower bound</i>	<i>Upper bound</i>		
H <sub>13</sub>	Social influence --> trust in the internet → trust in intermediaries	0.243***	0.335***	0.181	0.316	42%	Partial mediation
H <sub>14</sub>	Trust in internet --> trust in intermediaries → actual usage of eG services	0.066***	0.027	0.036	0.105	-	Full mediation
H <sub>15</sub>	Social influence --> trust in intermediaries → actual usage of eG services	0.055***	0.328***	0.033	0.086	17%	Partial mediation

Notes: \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

However, although the mediating role of trust in intermediaries between trust in the internet and the actual usage of e-government services was confirmed, trust in internet has a significant positive indirect effect on the actual use of e-government services through trust in intermediaries. That is to say, despite the direct effect of trust in the internet on the actual use of e-government services was not confirmed, the indirect effect through trust in the intermediaries was found to be significant (indirect  $\beta = 0.169$ ,  $p < 0.001$ ) which supports hypothesis H<sub>14</sub> as shown in Table 6.

Similarly, the results confirmed the importance of trust in intermediaries towards the usage of e-government services. Specifically, the mediating effect of trust in intermediaries between social influence and the use of e-government services was confirmed to be partial due to its capability to transform 43% of the effect of social influence on the actual usage of e-government services (indirect  $\beta = 0.274$ ,  $p < 0.001$ ) which supporting hypothesis H<sub>15</sub>.

## **5 Discussion and conclusions**

This study attempted to examine the influence of the major antecedent factors on the actual behaviour related to the use of e-government services with a special focus on the trust in intermediaries and its implied effect on e-government service usage behaviour.

The findings of this study confirm the importance of social influence which has a positive and significant effect on the citizens' usage of online government services. This social influence stems from messages as well as signals that assist in the formation of perceptions concerning the product, services or activity (Venkatesh and Brown, 2001). This means the greater the social influence, represented by friends and families, the more positive the pressures will be in furthering the actual usage of online government services. This explains the positive effects of social influence on the trust on the internet, intermediaries and the awareness of e-government services. Based on the social learning theory, the direct role models, such as friends and family, have the greatest impact on consumers' purchase decisions (Bush et al., 2001). Additionally, the differences in behaviours may occur because of social group memberships and associations as recommended by Grob (1995). This probably happens through role modelling effect, where friends and families are instrumentally involved in shaping and reinforcing the behaviour of each other through communication of certain guidelines and contributions from each other (Bush et al., 2001). Accordingly, the practice and development of these social influences could be achieved through the acts of reciprocity and social exchange, as well as through modelling or imitation (Bandura, 1977).

This finding validates the work of earlier studies on the important role of social influence in prompting attitudes of others in the direction of new e-services usage (Al-Shafi and Weerakkody, 2010; Venkatesh et al., 2003). They conclude that citizens would use online services of the government when others who are important to them use and recommend them.

The significant influence of e-government awareness on the actual use of online services provided to the citizens by government happens due to the presence of online services of government through building awareness about benefits and availability of online government services which in turn leading to use these online government systems (Phang et al., 2006). On the other hand, the absence of awareness about the availability and benefits of e-government services along with the limited promotion, are among the common reasons reported for the low rate of e-government adoption (Khan et al., 2012; Rehman et al., 2012; Sipiior et al., 2011). A substantial number of studies (such as Khan et al., 2012; Phang et al., 2006; Al Athmay, 2013; Alateyah et al., 2014; Rehman et al., 2012) have investigated potential antecedents of e-government services usage and have demonstrated a significant influence of e-government awareness on e-government usage.

Despite limited evidences which shows the relationship between the e-government intermediaries and the usage of e-government services in the literature on e-government (Al-Sobhi et al., 2010), the present study finds that trust in e-government intermediaries significantly influences the actual usage behaviour of online government services. The positive relationship between role of trust of intermediaries and intention to use online services of the government indicates that the more the trust of intermediaries' role as perceived by the academic staff, the more likely they are going to be to use e-services of the government. Hence, the resulting implication is that having this construct is significant to policy-makers in determining the actual usage behaviour of e-services of the government in Saudi setting. The finding of this study indicates that the online

government intermediary is a valuable gateway for successful building of trust and assisting citizens to use e-government services. Additionally, this study enhances our understanding of the role of trust in e-government intermediaries as a factor that promotes the use of e-government services (Bailey and Bakos, 1997; Datta and Chatterjee, 2008; Weerakkody et al., 2013).

Theoretically, this study supports assertions of the intermediary theory (Bailey and Bakos, 1997), which states that the role of intermediaries enhances trust among parties. Consistent with prior studies in the intermediary setting, the current research indicates that the online government intermediaries are an essential channel to encourage trust in e-government services (Bailey and Bakos, 1997; Howells, 2006). Dombrowski et al. (2014) and Weerakkody et al. (2013) show how these intermediaries can foster trust with their customers and accordingly the effect of this trust on the use of e-government applications.

Unexpectedly, the current study shows that perceived risk was found to have no significant influence on academic staff usage of e-government systems. This findings are in contradiction to the negative relationship confirmed in the literature by some researchers (Ablon and Libicki, 2015; Pascual and Miller, 2014). These results could be explained in the view of the fact that the e-government system is getting more advanced and becoming more reliable that encourages users to incorporate the e-government usage as a life style (Akkaya et al., 2013; Rehman et al., 2012).

Unexpectedly and in contrary to what was hypothesised, the study's findings demonstrate that trust of internet and perceived risk are insignificantly associated with the academic staff members' usage of online systems of the government. However, the findings of this study revealed that the indirect effect between trust in internet and e-government usage through trust in intermediaries has been confirmed. These findings strengthening the assertion by Weerakkody et al. (2013), when trust in the intermediary contributes significantly, trust of the internet has insignificant impact in influencing the use of e-government. From these results, we can conclude that trust in the intermediary is a major driver to develop a trustworthy setting for citizens' actual usage of e-government.

The contribution of the intermediaries is crucial in the development of trust that links the government to its people by enhancing them to be smart citizens (Bailey and Bakos, 1997; Dombrowski et al., 2014; Sorrentino and Niehaves, 2010; Weerakkody et al., 2013).

This study, also, found a positive relationship between social influence and awareness is that the signals and messages of social influence regard e-services usage assist to form e-government services perceptions (Venkatesh and Brown, 2001). These findings are consistent with Pickett-Baker and Ozaki (2008), social influence can increase awareness by effects of spillover on the main correlation leading to form attitudes towards purchases behaviour.

Despite the limited evidence on the association between perceived risk and trust of the intermediary in the e-government literature (Weerakkody et al., 2013), this research suggests that trust in the e-government intermediary has an influence on the perceived risk. Surprisingly, this research's findings demonstrate that trust in the e-government intermediary, contrary to the hypothesised expectation, does not reduce perceived risk about using government websites. In effect, a great level of trust in the intermediary is not a predictor of lower academic staff's perceived risk towards government website usage.

These results indicate that high level of social influence affects directly the actual usage of e-government in addition to indirectly enhancing the level of e-services awareness. Hence, the e-government awareness could be exploited more within the social influence of related members, such as friends, that encourages e-government usage. These two factors, namely social influence and e-government usage, have been examined in the setting of information system. However, these scholars provide no empirical evidence on how social influence acts to influence the citizens' actual usage of use e-government systems. This is why some researchers have suggested that social influence has significant impact on the citizens' usage of e-government applications through the mediation of other factors, for example, e-services awareness (Dombrowski et al., 2014).

In the view of the social learning theory (Bandura, 1977) and as argued by Bush et al. (2001) that consumer's socialisation is the process through which consumers gain knowledge, skills and form attitudes towards purchases in the marketplace could also offer another possibly reason (Anvar and Venter, 2014; Bush et al., 2001). Thus, social influence can increase e-government awareness stemming from messages that assist in the formation of perceptions concerning e-services and this can increase e-government services usage.

Moreover, the results indicate that high level of trust of internet indirectly increases the actual usage of e-government applications through the enhancement of their level of awareness. Thus, the degree of trust in the internet directly benefits e-government systems usage by academic staff. This implies that the level of trust in internet can affect indirectly citizens' awareness of the e-government agencies' websites. Thus, including the factor of trust of internet leads to e-services' awareness, showing trust of internet may possibly form awareness for online service providers in the context of the Saudi government. The marketing of e-government systems by improving trust in the internet would, in turn, lead to diffusing these online websites of e-government and e-services throughout society. These results are consistent with prior studies by Aydoğan et al. (2014) who find that the motivated users will have higher certainty to evaluate trustworthiness of information on the website; consequently, they might place higher trust in such information. Further, this finding validates the work of earlier studies by Christianson et al. (2014) and Daassi et al. (2006) who indicate that greater trust in the internet is linked to higher levels of awareness; it also validates the studies by Phang et al. (2006), Al-Hujran et al. (2013) and Meftah et al. (2015) who find that citizens with the knowledge and awareness about benefits and availability of e-government services have greater tendency to use e-government systems in a positive way; hence, the positive mediation effect of e-services awareness on the association between trust in the internet and the actual usage of e-government systems.

Further, these findings are in line with studies done by Sorrentino and Niehaves (2010) that suggest the intermediaries' role is to improve e-services awareness in the society, thereby increasing success rate of e-government projects. Howells (2006) highlights a significant role of intermediaries is to tackle several issues involving dissemination of innovation information and their impact on the societal rates of adoption. A study to find the significance of the role played by e-government intermediaries in enhancing awareness (Al-Sobhi et al., 2009; Wahid et al., 2011) advocates the intermediaries' role in transforming society through the promotion of awareness. This is also supported by (Rehman et al., 2012) who elaborates on the crucial role of intermediaries in raising awareness, supporting networks and creating societal trust, thus impacting citizens' use of e-government usage.

In general speaking, in Saudi Arabia, e-government intermediaries are a platform for socially effective marketing of e-government services and for focusing on citizens in hard-to-reach locations (Al-Shafi and Weerakkody, 2007). Therefore, e-government intermediaries may bring about e-government services usage through thorough and effective marketing strategies (Al-Sobhi et al., 2010).

## **6 Implications and future research suggestions**

The contribution of the current study to the literature involves examining the citizens' actual behaviour in using the e-government services among the employees in universities in Saudi Arabia. From the theoretical perspective, Venkatesh et al. (2012) and Belanger and Carter (2012) argue that there is a lack of knowledge about the constructs that have an effect on online government websites usage and the extent of such usage.

Thus, this study develops an integrated model for e-government usage by integrating these factors in the TPB. The model of this study shows how the selected factors influence the usage of e-government services. Additionally, the value of this research lies in identifying multiple ways through which e-government service awareness, perceived risk, social influence, trust of internet and trust of the intermediaries impact on the citizens' usage of government portals, particularly in the context of e-services in the government of one of developing countries, Saudi Arabia.

One of the interesting finding in the current study involves the examination of the effect of intermediaries in enhancing the use of online agencies' websites at individuals' level and how this role could mediate the effect of other factors in the model. Thus, the present research contributes by developing an integrated framework that considers the e-government intermediary's role to recognise e-government applications usage from citizens' viewpoints when they utilise these channels.

In practice, the findings of this study could be used by Saudi policy-makers and managers to encourage the citizens' usage of e-government agencies nationwide. This trend is expected to enhance the transformation of the economy to a knowledge-based economy and further the current development. The results indicate the significant effect of citizens' awareness on their actual usage of e-government services that might reflect their future behaviour. This further implies that the public agencies have to run more marketing promotions to confirm that citizens are utilising the online applications. Governments, on the other side, have to carry out awareness campaigns to show all the available services and encourage all citizens to intensively utilize this platform. In addition, the quality of the offered services should be assessed and the satisfaction of citizens on these services should be objectively measured. This could lead the government to have regulations to offer its services and transactions through this platform and more incentives should be provided.

Hence, managers should appreciate the influence of the government portals awareness and the social influence to increase actual usage of e-government services. Ultimately, their investments in e-government projects could be worthwhile. In addition, public agencies should consider increasing e-government awareness of the online services over the use of traditional means.

More importantly, this finding presents yet another important fact for e-government managers to utilise the intermediaries to promote and motivate trust and assist in e-government usage among their citizens. The current study's outcomes indicate that the

management of Saudi e-government projects has to utilise the e-government intermediary model to enhance awareness of the e-government systems in Saudi society. Thus, to advertise e-government portals, e-government authorities have to leverage on the continual visits of e-government intermediaries' by citizens to promote their portals, to increase e-government agencies' awareness and ultimately to disseminate online applications of agencies throughout society.

As this study used a sample of employees from universities, the results obtained should be interpreted cautiously in that view. Therefore, future study may study a larger spectrum of the population to have the ability to generalise the findings on the whole population.

However, future research could examine other antecedents or mediating constructs. These variables could include readiness, cost, time, motivation, perceived service quality, resistance to change, website features and others. Future studies can follow this approach of investigation in other e-government services to enhance understanding of the mechanisms by which e-government services awareness could improve usage. In addition, future research could focus more on e-services of the government of Saudi Arabia since there are only a few past studies that have investigated this area. Comparative research could be conducted to compare between Saudi e-government and other countries. Further, future research on citizens' usage of e-government could investigate the e-government intermediaries' roles to encourage citizens' usage of e-government with other samples.

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