**The impact of service quality, trust and satisfaction on young citizen loyalty towards government e-services**

**Abstract**

# Purpose

This study examines the effect of multidimensional constructs on citizen loyalty to e-government services. More specifically, it examines the effects of service quality, trust, and satisfaction on loyalty to these services.

# Design/methodology/approach

The data were collected via a questionnaire that was completed by 780 foundation-year students in government universities in Saudi Arabia. The students who participated in the study had used a unified system provided by the Ministry of Education in Saudi Arabia for university admission. The data were analysed using structural equation modelling.

# Findings

The key findings revealed that the factors service quality, trust in government, trust in e-government services, and citizen satisfaction play a significant role in developing citizen loyalty to e-government services. Trust in government has the strongest direct effect on citizen loyalty to e-government services, and service quality has the strongest total effect on citizen loyalty. In contrast, citizen satisfaction has the least significant influence on citizen loyalty to e-government services.

# Originality

This study proposes a new model for citizen loyalty to e-government services that combines the service quality model and trust theory. In addition, this study is among the first to categorise trust into three factors – trust in government, trust in e-government, and disposition to trust – and integrate them into a model. Furthermore, the study reveals the roles of satisfaction and service quality in developing citizen loyalty. The findings of this study fill a gap in knowledge on citizen trust in, satisfaction with and loyalty to e-government services.

**Keywords**: Education, Loyalty, e-Government, Satisfaction, Service quality, Trust

# Introduction

Rapid advances in information and communications technology (ICT) have led to the public sector coming under increasing pressure to provide services that are more citizen-centric (Alkraiji, 2020a; Zhao et al., 2019; da Silva et al., 2013). E-government refers to “the use of information technology to enable and improve the efficiency with which government services are provided to citizens, employees, business and agencies” (Carter and Bélanger, 2005, p. 5). Electronic government (e-government) has been recognised globally as a cornerstone of effective governance and allows the decentralisation of integrated public services (Janssen et al., 2018).

Over the last two decades, the evaluation of e-government services from the perspective of citizen perception has become a major topic of interest for academics and practitioners. Increasing the number of citizens who use e-government services is key to the success of those services (Kurfalı et al., 2017; Rana et al., 2017; Irani et al., 2012). However, existing studies focus mainly on satisfaction as a driver of citizen engagement with e-government services (e.g., Alkraiji, 2020a; Alzahrani et al., 2018; Rana et al., 2017; Weerakkody et al., 2016; Irani et al., 2012; Chan et al., 2010), while neglecting the aspect of citizen loyalty to those services. It is even more important to consider citizen loyalty than satisfaction, given that a temporary setback in consumer satisfaction with online services does not necessarily affect the long-term relationship between consumers and online services (Choi, 2015; Morgeson III, 2011; Kassim and Ismail, 2009; Lin and Wang, 2006; Davison et al. 2005; Chiou, 2004). The importance of customer loyalty has been emphasised strongly by research on free competitive markets, such as e-commerce, as a way of increasing fidelity to merchant websites (e.g., Kaur et al., 2020; Liao et al., 2020; Yang et al., 2017; Bilgihan, 2016). Satisfaction can measure customers’ current attitudes to the quality of a service (Irani et al., 2012; Brown et al., 2008; Bhattacherjee, 2001), but loyalty focuses on how customers’ attitudes lead to a strong relationship with the brand (Kumar et al., 2020; Liao et al., 2020).

Although there are some studies on loyalty to e-government (e.g., Chatfield and Alanazi, 2013, Morgeson III, 2011, Connolly et al, 2010, Doong et al., 2010), they have not integrated loyalty into the models they have developed. They have included ‘intention to use’ as an independent measure to signify loyalty, but these two measures are not surrogates for each other. Loyalty is not limited to the ‘intention to use’ online services, but also includes a strong attitude of commitment, which shapes the long-term relationship between providers and consumers of online services (Kaur et al., 2020; Zheng et al., 2017). Hence, it is important to address the gap in the literature on the factors that can affect citizen loyalty in the context of e-government services. Among these factors, citizen trust has been highlighted by many existing studies on the use of e-government services (e.g., Alkraiji, 2020a; Kumar et al., 2020; Alzahrani et al., 2018; Santa et al., 2019). However, despite the focus on trust, there is a lack of understanding of what this factor entails in the context of satisfaction with and loyalty to e-government services; in particular, the fact that trust is multidimensional in nature (Lu et al., 2019).

Previous studies on the adoption of e-commerce (e.g., Cyr, 2008; Flavián et al., 2006; Lin and Wang, 2006; Chiou, 2004) suggested that consumer loyalty can be seen as the product of service quality, trust, and satisfaction. Given the importance of citizen loyalty for the success of e-government services, this study aims to examine the effects of multidimensional constructs on citizen loyalty to these services. Specifically, we focus on the role of service quality, citizen trust and satisfaction in shaping young citizens loyalty towards governments e-services. In doing so, a new model that combines the service quality model (Parasuraman et al.,1994) and trust theory (Zucker, 1986) has been developed to integrate factors that are related to citizen loyalty to e-government services. This study focuses on the Unified Electronic Admission System (UEAS), which is used by young students to enrol at government universities and the technical college in Riyadh (the capital of Saudi Arabia).

This study offers a number of theoretical contributions and has some practical implications. With regard to the theoretical contributions, the study fills a gap in the existing literature in terms of studying citizen loyalty to e-government services and categorising trust into three facets: trust in e-government, trust in government, and disposition to trust. The study proposes a new theoretical model that integrates the service quality model (Parasuraman et al.,1994) and trust theory (Zucker, 1986). The model examines the effects of service quality, citizen trust in government, citizen trust in e-government, and citizen satisfaction on citizen loyalty to e-government services. This study advances a theory of e-government adoption in a promising and crucial field: government services in the education sector, in which there is a paucity of studies. E-government services that target citizens are set to be extended beyond general spheres (e.g., municipal affairs, finance, transportation, taxation, and civil services) to include the crucial fields of education, health, and welfare. With regard to the practical contributions of this study, it provides insights for e-government practitioners who wish to increase citizen loyalty, which is viewed as an important catalyst for the adoption of online services (Chatfield and Alanazi, 2013; Cyr, 2008; Flavián et al., 2006).

This paper is organised as follows. The next section presents the theoretical background on user loyalty, satisfaction, trust, and service quality. Section 3 provides an overview of the study’s proposed research model and justifies the proposed hypotheses. The research method is described in detail in Section 4. The results are presented in Section 5, and this is followed by a discussion of the study’s theoretical and managerial implications, its limitations, and avenues for future research. Finally, the conclusions are provided.

# Theoretical background

## The concept of citizen loyalty to e-government services

Doong et al. (2010) described loyalty to e-government services as the degree to which citizens are willing to continue using them. Similarly, Chatfield and Alanazi (2013) and Connolly et al. (2010) adopted ‘intention to use’ to examine various antecedents of citizen loyalty to e-government services. Although both ‘intention to use’ and ‘retention’ are consequences of citizen loyalty (Bilgihan, 2016; Choi, 2015; Davison et al., 2005), they are not substitutes for loyalty. Hence, how loyalty is developed among citizens is an important area of study. In the context of this research, we define citizen loyalty to e-government services as favourable attitudes to e-government that result in a sense of commitment to and dependency on the services provided, a willingness to recommend them to other consumers, and a positive engagement with the government agencies that provide them.

In research on information systems (IS), Choi (2015) stressed that loyalty plays a key role in this context due to rapid advances in ICT, which means that e-government services face the challenge of nurturing loyal users in addition to satisfying those users. In addition, previous research on the adoption of e-government services (e.g., Li and Shang, 2020; Chatfield and Alanazi, 2013; Morgeson III, 2011; Doong et al., 2010) stressed that loyalty is an influential construct that can explain the overall experience of citizens who use e-government services for long periods. Research on the concept of e-loyalty is rooted in the field of marketing, and it focuses on understanding the repeat purchase behaviours of customers (Bilgihan, 2016; Choi, 2015; Pearson et al., 2012; Cyr, 2008; Reichheld and Schefter, 2000). Increasing customer retention rates can dramatically increase company profits over the long term (Reichheld, 1994). Given the growing importance of loyalty, a number of scholars in the area of e-commerce have attempted to adapt the loyalty perspective to find ways of improving fidelity to merchants’ websites, thereby increasing consumer retention rates for services and encouraging repeat purchases (e.g., Kaur et al., 2020; Kumar et al., 2020; Liao et al., 2020; Zheng et al., 2017; Bilgihan, 2016; Choi, 2015).

Governments operate as monopolies; as such, they may not see the need to invest in competing with other providers, as is often the case in the field of e-commerce. Hence, establishing citizen loyalty to government services may not be viewed as desirable (Connolly et al. 2010; Davison et al., 2005). Nevertheless, the concept of e-loyalty is not limited to firms that want to encourage repeat purchasing behaviours in order to gain competitive advantage and growth: it also focuses on understanding the behaviour of online service customers over time as an integrative concept in building the brand and reputation of services (Kaur et al., 2020; Zheng et al., 2015; Chatfield and Alanazi, 2013; Cyr, 2008; Anderson and Srinivasan, 2003). Therefore, loyalty to e-government services can be characterised through different forms of citizen commitment and retention: (1) favouring online use over other, more traditional means (e.g., in person or over the telephone) of government service delivery (Connolly et al. 2010; Davison et al., 2005); and (2) becoming more interactive, with positive beliefs and emotions, in relation to e-government initiatives and guidelines; for example, recommending these services to others, participating in national evaluation surveys, and providing government agencies with comments and suggestions (Alzahrani et al., 2018).

Furthermore, the concept of competitive advantage is not entirely absent from government agendas, because government agencies are competing with each other for excellence by providing a larger number of citizen-centric services; therefore, citizen loyalty can be a key indicator of whether the services provided have achieved their goals (Şentürk, 2014). At a global level, governments also compete with each other in promoting their e-government services and obtaining higher rankings in the international indices for e-government development (Davison et al., 2005). Hence, the full interaction of citizens with the e-government services on offer, including support in the form of providing helpful and continuous feedback and recommendations, is one of the key resources for developing e-government services in a professional manner that raises the reputation of a government agency; this cannot be achieved if the level of e-loyalty to the agency is low.

In the context of e-government, despite the importance of e-loyalty in explaining citizen retention with regard to the services provided and to government agencies, only a few studies have investigated the role of citizen loyalty in explaining service retention behaviours. In this regard, Morgeson III (2011) investigated the role of a set of website qualities in determining user satisfaction and loyalty across the e-government and e-commerce domains in the United States (US). Their study revealed that the website qualities had similar effects on the relationship between satisfaction and loyalty with regard to user experiences of e-commerce and e-government websites. It also revealed that such qualities had a stronger effect on user satisfaction in the e-government domain than in the e-commerce domain. However, Morgeson III (2011) did not directly adopt loyalty in the model; intention to use was included as an alternative measure.

Cyr (2008) examined the relationship between website quality, trust, satisfaction, and loyalty, and suggested that, across cultures, design quality should be a central consideration in websites for the purpose of increasing trust, satisfaction, and, ultimately, customer loyalty. Choi (2015) compared the roles of satisfaction and loyalty in consumer choices of web browsers. The author found that loyalty has a stronger power than satisfaction in explaining user retention behaviours, while suggesting that companies should pay careful attention to maintaining a loyal user base. Zheng et al. (2017) found that e-loyalty mediates the relationship between trust and repeat purchase behaviour.

## E-government service quality

Service quality refers to the consumer perception that results from “a comparison of consumer expectation with actual service performance” (Parasuraman et al., 1985. p. 42). Lewis and Booms (1983) refer to service quality as a measure of how closely the service level that is provided matches customers’ expectations. Parasuraman et al. (1988) proposed a theoretical definition of service quality, which became broadly used as a means to compare the excellence of customer service experiences. Berry et al.(1988) defined service quality as the ability to be compatible and compliant with customer expectations. Thus, service quality reflects the opinions of consumers rather than purely the views of a company’s managerial team. Lewis and Booms (1983) suggested that service quality means matching customers’ expectations and assessing the level of service that consumers receive. There is a general consensus that the consumer is at the heart of service quality. However, even though scholars have explored the concept of service quality multiple times, the ultimate definition of a quality service has not been established (Raza et al., 2020; Orgeron and Goodman, 2011).

There is no empirical evidence to suggest that citizens’ views on the quality of government services differ from their views on the quality of commercially provided services (Morgeson III, 2011; Connolly, 2007; Gefen, 2002). Therefore, it is essential that the government sector understands the dimensions of service excellence. In this context, one of the most widely used measurement scales is the SERVQUAL instrument (Raza et al., 2020; Yadav and Rai 2019; Orgeron and Goodman, 2011), which was developed by Parasuraman et al. (1985, 1988). The SERVQUAL instrument is rooted in the field of marketing and is used to measure the gap between expected service and perceived actual service in order to assess the average across the dimensions of the scale and arrive at an overall score for service quality (Pitt et al., 1995). Parasuraman et al. (1994) integrated service quality into the service quality model, which has been used extensively in existing research (Ameen et al., 2020a).

The SERVQUAL instrument consists of five basic dimensions of consumer perceptions along pivotal areas of performance in service content and delivery (Yadav and Rai 2019; Orgeron and Goodman, 2011). Empirical evidence attests that SERVQUAL is a noteworthy benchmark of service quality in the realm of online services (Raza et al., 2020; Yadav and Rai 2019; Pearson et al., 2012; Orgeron and Goodman, 2011; Connolly et al. 2010; Udo et al. 2010; Kassim, and Abdullah, 2008; Gefen, 2002; Pitt et al., 1995). Table I presents the dimensions and their definitions, which have been adapted from Gefen (2002) and Pitt et al. (1995) to fit the e-government context.

**Table I.** Five dimensions of SERVQUAL

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| --- | --- |
| Dimension  | Definition |
| Tangibles | The functional appeal and physical appearance of e-government services. |
| Reliability | The ability of the e-government portal to perform services dependably and accurately. |
| Responsiveness | The ability of the e-government portal to provide citizens with a helpful and prompt service.  |
| Assurance | The ability of the e-government portal to inspire trust and confidence in citizens while performing the services; it also refers to the knowledge and courtesy of its team staff. |
| Empathy | The ability of the e-government portal to provide services that satisfy the personal needs of citizens. |

In the context of this research, we follow the definition provided by Connolly (2007) and refer to e-government service quality as the extent to which an e-government service is delivered to citizens in a way they expect in order to accomplish their transaction. Li and Shang (2020) described service quality as the extent to which e-government services are provided in a way that satisfies citizens’ needs. Some studies on e-government adoption have employed service quality in their models as an antecedent of citizen trust (e.g., Alkraiji, 2020a; Kumar et al., 2020; Alzahrani et al., 2018) and satisfaction (e.g., Alkraiji, 2020b; Kumar et al., 2020; Li and Shang, 2020); in the commercial field, service quality has been seen as a key antecedent of customer loyalty (e.g., Raza et al., 2020; Gao and Li, 2019; Yadav and Rai 2019).

## The concept of trust

Trust has been defined as an attitude of confident expectation that one’s vulnerabilities in a risky situation will not be exploited (Corritore et al., 2003). It is an important human behaviour that determines the quality of human relationships, especially under conditions of uncertainty and risk (Lara-Rubio et al., 2020; Cao et al. 2018; Ameen et al., 2020a; Maitlo et al., 2019; Ameen et al., 2020b; Ameen et al., 2021). Trust has gained considerable importance in the marketing literature due to its direct impact on building a solid and profitable relationship between service provider and consumer, especially in the online environment, where the absence of face-to-face relationships has exacerbated uncertainty and risk (Kumar et al., 2020; Al-Hujran et al., 2015). Different definitions of trust in the context of online services have been reported in the literature, as trust is a multifaceted and complex construct that spans a wide variety of disciplines (Verkijika & De Wet, 2018; Bélanger & Carter, 2008; Welch et al., 2004). A large number of studies have cited Rotter’s definition, which is rooted in social learning theory. Rotter (1971) defined trust as a party’s expectation that the promise made by the other party can be relied on. The author suggested that the trustor could develop different expectations based on the positive or negative experiences of the promised reinforcements of the trustee.

In addition, research on trust in e-commerce is somewhat rooted in the two basic modes developed by Zucker (1986) as antecedents of trust in a business relationship. These antecedents are ‘institution-based trust’ and ‘process-based trust’ (Kumar et al., 2020; Bélanger and Carter, 2008; Gefen et al., 2003; McKnight et al., 2002; Warkentin et al., 2002). Institution-based trust refers to the consumer’s sense that a merchant’s website provides sufficient structural assurances (i.e., safeguards, guarantees, regulations, promises, legal recourse, or other procedures) that any transaction will be a success as usual. In this case, the customer’s trust of an online service draws on the merchant’s website to provide an alternative guarantee for service exchanges. Process-based trust refers to the customer’s prior experience of the merchant, and it is developed through the iterative interaction with and exchange of services. Therefore, to improve trust and reduce customer uncertainty about online services over time, merchants should convince customers that the same rigorous controls that are applied to traditional transactions will also be applied in the online environment.

Although trust-related behaviours are largely influenced by the risk associated with both trust in the merchant and trust in the enabling technologies (i.e., the merchant’s website), trust is sometimes a result of the psychological disposition of the trustor. This is beyond the immediate control of any trustee (Bélanger and Carter, 2008; Warkentin et al., 2002; Rotter, 1971). Previous studies have found that the psychological disposition of the trustor has a direct impact on the use of online services, as is often attributed as the essential substrate of trust in the psychologically (e.g., Janssen et al., 2018; Bélanger and Carter, 2008; McKnight et al., 2002; Warkentin et al. 2002). A disposition to trust refers to an individual’s general propensity to trust others (Janssen et al., 2018; Bélanger and Carter, 2008; McKnight et al., 2002; Warkentin et al., 2002). These perennial propensities vary widely from one person to another, and they can be attributed to lifelong social tendencies and experiences that play a role in developing a general propensity to trust others (Bélanger and Carter, 2008; Warkentin et al., 2002).

Accordingly, the ability to build positive feelings of confidence among consumers in e-commerce is influenced by three basic constructs: (1) the consumer’s psychological disposition to trust; (2) the consumer’s trust in the enabling technologies used for the merchant’s website; and (3) the consumer’s trust in the merchant in general. These three factors have been widely adapted and applied in the literature on e-government services, as they constitute the foundation for investigating the formation of citizens’ perceptions on adopting e-government services. Studies have focused on the disposition to trust (e.g., Alzahrani et al., 2018; Janssen et al., 2018; Beldad et al., 2012; Srivastava and Teo, 2009; Bélanger and Carter, 2008), trust in government (e.g., Alzahrani et al., 2018; Janssen et al., 2018; Sá et al., 2016; Fakhoury and Aubert, 2015; Abu-Shanab, 2014; Beldad et al., 2012; Morgeson III et al., 2010; Srivastava and Teo, 2009; Bélanger and Carter; 2008 ), and trust in e-government (e.g., Kumar et al., 2020; Santa et al., 2019; Alzahrani et al., 2018; Sá et al., 2016). In the context of this research, we define disposition to trust as the general tendency of citizens to be willing to depend on e-government across a broad spectrum of government services and technologies. Trust in government refers to the aggregation of citizens’ belief in the government’s ability to act faithfully in their interests, while trust in e-government refers to the aggregation of citizens’ belief in the ability of e-government to consistently operate in a proper and safe way.

## Citizen satisfaction

Citizen satisfaction with e-government services can be defined as an ex-post evaluation of user experience of the quality of a service, which can be positive, indifferent or negative (Kumar et al., 2020). Prior research on user satisfaction in the context of e-government has highlighted that e-government initiatives cannot succeed if relationship-based satisfaction between citizens and e-government services is low (Alkraiji, 2020b; Li and Shang, 2020; Weerakkody et al., 2016). Therefore, understanding the relationship between e-government services and satisfaction from the perspective of citizens is essential for improving the quality of the services provided and for increasing citizen engagement with, and participation in, those services (Alkraiji 2020a; Janssen et al., 2018).

In IS research, user satisfaction has been identified as one of the most important indicators used for measuring the success of IT (Irani et al., 2012; Lin and Wang, 2006; Wixom and Todd, 2005; DeLone and McLean, 2003). In the context of e-government service use, Bhattacherjee (2001) explained that satisfaction is a measure of a citizen’s psychology resulting from a cognitive appraisal of their prior feelings about and experiences with an e-government website. Brown et al. (2008) defined citizen satisfaction as the feelings associated with the quality of the e-government services provided. Irani et al. (2012) referred to user satisfaction with e-government as a consequence of assessing the process quality and outcome quality of e-government services, where the assessment is based on the user’s intellectual and emotional beliefs. In the context of this research, we define citizen satisfaction as citizens’ feelings about and experiences with e-government services.

Research on the adoption of technology at the individual level has measured satisfaction as an overall, single-item construct (Brown et al., 2008) and as a multidimensional construct that incorporates different effects of belief and combines various technical, attitudinal, and behavioural factors (Alkraiji, 2020a; Alzahrani et al., 2018; Alawneh et al., 2013). However, there is still no consensus among previous related studies regarding instruments for measuring user satisfaction with e-government services specifically (Alawneh et al., 2013; Irani et al., 2012). Thus, in this research, we examine the direct relationship between service quality and trust on citizen satisfaction, and the effect of satisfaction on citizen loyalty to e-government services. Previous research (e.g., Waheed et al., 2020; Liang et al. 2019; Reichheld and Schefter, 2000) suggested that consumer loyalty could represent a good surrogate measure for consumer satisfaction in the e-commerce setting. In addition, in IS research, overall consumer satisfaction is often determined by the quality of an online service (e.g., Gao and Li, 2019; Alzahrani et al., 2018) and trust in the online service (e.g., Lara-Rubio et al., 2020; Cao et al. 2018).

# Research model and hypothesis development

Drawing on the service quality model (Parasuraman et al.,1994) and trust theory (Zucker, 1986), this research proposes a new model that integrates different factors that can affect citizen loyalty to e-government services. The model developed in this research aims to derive an understanding of the development of the conceptual relationships between service quality, trust, and satisfaction, and the incidence of these constructs on citizen loyalty to e-government services, as shown in Figure 1. This section begins by capturing the antecedents of citizen trust in e-government services, including trust in government and disposition to trust, in conjunction with service quality. Then, Then, the direct relationships are developed between service quality, trust in government, and trust in e-government services, and citizen satisfaction. Finally, direct relationships are hypothesised between the variables of service quality, trust in government, and trust in e-government services, and citizen satisfaction, with citizen loyalty as an independent factor.



**Figure 1**. Conceptual research model

## Antecedents of trust

Previous studies explored different factors that influence citizens’ beliefs and perceptions of trust in e-government. For example, Abu-Shanab (2014) examined trust-related antecedents that can influence citizens’ perceptions of using e-government services and found that trust in the government, trust in enabling technology, and privacy and security concerns exerted a significant influence in this regard. Janssen et al. (2018) conducted a meta-research project to impose order and direction on the complexity of the relationships among the variables of citizen trust in e-government services. The authors found that certain variables, such as trust in government, trust in enabling technology, disposition to trust, user familiarity with technology, service quality, privacy, and security risks were the most significant factors influencing trust in e-government.

In the context of this research, we focus on the relationships between disposition to trust, service quality, trust in government, and trust in e-government; we exclude the factors trust in enabling technology, privacy, security risks, and users’ familiarity with technology. There are three reasons for this choice. First, Bélanger and Carter (2008) found that trust in government, but not trust in enabling technology, had a significant negative influence on the perceived risk of using e-government services. Similarly, Teo et al. (2008) found that trust in government is positively related to trust in e‑government. However, trust in enabling technology did not have a significant effect. The influence of trust in enabling technology on trust in e-government is likely to have been minimised in recent years, due to the rapid development in ICT (Alkraiji, 2020a; Zhao et al., 2019) and the high dependence of people on online services worldwide (Kumar et al., 2020).

Second, Srivastava and Teo (2009) stated that the willingness of citizens to expose vulnerabilities while dealing with e-government services is significantly influenced by their belief in the performance and ability of the government, but not by their security concerns. Alzahrani et al. (2018) confirmed that risk factors associated with privacy and security issues had the lowest impact on the use of e-government services in Saudi Arabia. Indeed, in the context of e-government, it is thought to be unlikely that citizens are concerned about the privacy of their personal information, given that the government already has access to information about its citizens.

Third, previous studies on the adoption of e-government emphasised that familiarity and experience with technology have failed to predict trust in e-government (e.g., Abu-Shanab, 2014; Teo et al., 2008). That is because this technology has become an essential part of modern life (Kumar et al., 2020); people have become more aware of the technology, so in general they do not have as much difficulty using it (Li and Shang, 2020). In addition, e-government services are becoming easier to use, sometimes requiring only a few clicks to accomplish a task; therefore, the effect of user familiarity with technology on the use of e-government services has been diminished (Alkraiji, 2020b). Further, the social sample of participants in this research contains high-school graduates, who are generally expected to be tech-savvy and have advanced technology skills (Chan et al., 2010); thus, issues related to user familiarity with technology are excluded. Due to the different levels of variance in relation to factors that influence citizen trust in e-government services (Janssen et al., 2018), this research focuses on examining the direct relationships between the core foundation factors and trust in e-government. These factors include disposition to trust and trust in government, because these are the cornerstones of building trust among the parties of e-government services (Bélanger and Carter, 2008; Pavlou, 2003). Trust-building strategies may differ from one person to another depending on the level of trusting beliefs that each consumer has (Bélanger and Carter, 2008). Indeed, previous research found that the stronger a citizen’s disposition to trust, the more trust that person will have in government agencies and e-government services (e.g., Alzahrani et al., 2018; Janssen et al., 2018; Beldad et al., 2012). Hence, we propose the following hypotheses:

*H1*. Disposition to trust has a direct and positive influence on citizen trust in government.

*H2*. Disposition to trust has a direct and positive influence on citizen trust in e-government services.

In addition, developing citizen trust in e-government services requires citizens to have trust in the government organisation that is providing these electronic services (Alzahrani et al., 2018; Janssen et al., 2018; Sá et al., 2016; Fakhoury and Aubert, 2015; Abu-Shanab, 2014). In the context of e-commerce research, consumer perceptions of a company’s reputation, which is measured by the extent of the company’s sincerity and credibility in its dealings with customers, are considered to be a milestone in users’ trust in the company’s website services (Kaur et al., 2020; Zheng et al., 2017). In public administration research, trust in government is often seen to be related to the effectiveness of a government organisation, so the positive engagement of citizens with government actions, policies, and procedures depends on the extent to which citizens believe in the government’s work (Janssen et al., 2018; Welch et al., 2004). On the other hand, an untrusted government would be suspicious of citizens in its actions, pronouncements, and policies (Horsburgh et al., 2011; Bélanger and Carter, 2008). In addition, trust in government has implications for confidence in e-government. Hence, when citizens are convinced that their government is developing its online services to enhance the effectiveness, transparency, and fairness of public services, they are likely to be more confident that the government has sufficient safeguards in place to provide reassurance about online service transactions (Pérez-Morote et al., 2020; Bélanger and Carter, 2008). Hence, we hypothesise that trust in government organisations will enhance citizens’ compliance with and trust in the organisation’s electronic services. Accordingly:

*H3*. Trust in government has a direct and positive influence on citizen trust in e-government services.

In addition, in e-government research, service quality is an essential antecedent of trust (Li and Shang, 2020). The mediating effects of trust on the relationship between service quality and loyalty has also been confirmed in the existing e-commerce literature (e.g., Pearson et al., 2012; Cyr, 2008). High-quality e-government services that consistently match citizens’ expectations are seen to foster trust among citizens with regard to their government (Fakhoury and Aubert; 2015; Beldad et al., 2012; Welch et al., 2004) and to e-government services (Alzahrani et al., 2018; Morgeson III et al., 2010; Gefen, 2002). Thus, the following hypotheses are proposed:

*H4*. Service quality has a direct and positive influence on citizen trust in government.

*H5*. Service quality has a direct and positive influence on citizen trust in e-government services.

## Antecedents of satisfaction

This research hypothesises the direct relationships between service quality, trust in government, trust in e-government, and citizen satisfaction. While a solid service quality index and function quality deployment are likely to increase consumers’ psychological satisfaction with e-government services (Morgeson III et al., 2010), dissatisfaction among consumers who use e-government services may occur if the quality of those services is low (Alawneh et al., 2013). Previous studies indicated that a strong relationship exists between service quality and satisfaction in the context of e-government (e.g., Kumar et al., 2020; Dwivedi et al., 2016; Sá et al., 2016; Irani et al., 2012; Welch et al., 2004; Warkentin et al., 2002). Indeed, high service quality increases the performance of e-government, which, in turn, shapes citizens’ overall confidence in and satisfaction with e-government services (Kumar et al., 2020; Alzahrani et al., 2018; Sá et al., 2016; Morgeson III et al., 2010). Therefore, the following hypothesis is proposed:

*H6*. Service quality has a direct and positive influence on citizen satisfaction with e-government services.

In addition, previous research indicated that it is important to address the influence of trust in government on citizen satisfaction with e-government services (Janssen et al., 2018; Irani et al., 2012; Bélanger and Carter, 2008; Carter and Bélanger, 2005; Gefen et al., 2005). For example, Carter and Bélanger (2005) found that there is a positive relationship between citizens’ belief that the government is trustworthy and their satisfaction with e-government services. Further, de Jong et al. (2019) explained that trust in government and perceived responsiveness are positively related to e-participation. Citizens should be able to trust that government organisations possess the intelligence and technical resources that are essential for implementing and securing these systems (Kumar et al., 2020; Alzahrani et al., 2018; Janssen et al., 2018; Sá et al., 2016). This supports the direct link between citizen trust in government and citizen satisfaction with e-government services. Thus, we propose the following hypothesis:

*H7*. Trust in government has a direct and positive influence on citizen satisfaction with e-government services.

Further, citizen trust in e-government services to operate consistently is important for the success of these services (Teo et al., 2008). Previous studies (e.g., Santa et al., 2019; Sá et al., 2016; Lee and Kim, 2014; Chan et al., 2010; Teo et al., 2008) found that prior trust in e-government can lead to greater satisfaction and interaction with newly introduced services. For example, Abu-Shanab (2014) found that less trust in e-government services leads to less interaction with e-government portals and less satisfaction with e-government services, whereas Teo et al. (2008) showed a positive relationship between trust in e-government and citizen satisfaction with it. Therefore, this study hypothesises:

*H8*. Trust in e-government services has a direct and positive influence on citizen satisfaction with e-government services.

## Antecedents of loyalty

This research hypothesises that service quality, trust in government, trust in e-government, and citizen satisfaction have direct effects on citizen loyalty. The role of service quality in the transformation of public services has increasingly been recognised in e-government research (Alzahrani et al., 2018; Chatfield and Alanazi; 2013), because citizens often have a high propensity to expand their use of e-government services over time (Zhao et al., 2019; da Silva et al., 2013; Bélanger and Carter, 2008). In general, customer loyalty is built up through superior service quality (Li and Shang, 2020; Pearson et al., 2012; Cyr, 2008). In the context of online environments, ensuring website quality is important for increasing consumers’ willingness to return and do more business or recommend a service provider to others. This is the case in any relationship established between a client and a traditional service provider (Gao and Li, 2019; Sá, et al., 2016). Perceived service quality has been shown to have a significant effect on consumer loyalty (Yadav and Rai 2019; Gefen, 2002). In e-government research, the direct effect of service quality on citizen loyalty has also been supported (Li and Shang, 2020; Chatfield and Alanazi; 2013; Connolly et al., 2010). Thus, in this study, we argue that high service quality should arguably increase citizen loyalty to e-government services. Thus, we hypothesise:

*H9*. Service quality has a direct and positive influence on citizen loyalty to e-government services.

In addition, citizen trust of government agencies plays a central role in forming citizen loyalty to e-government services. Citizen trust in government develops over time according to the social context or their interaction with government agencies’ programmes and services (Welch et al., 2004). Thus, the stronger a citizen’s belief that government agencies will act in their best interests, in a transparent and fair manner and according to professional and ethical standards, the greater their confidence in government services (Alkraiji, 2020a, Janssen et al., 2018; Bélanger and Carter, 2008). Thanks to rapid advances in ICT, governments have the opportunity to build the confidence of their citizens by increasing the effectiveness of e-government; they should develop and provide e-government services in line with the concept of citizen-centric services in order to add value for citizens and increase their trust in and commitment to these services (Li and Shang, 2020; Alzahrani et al., 2018; Irani et al., 2012). In the context of this research, if students in Saudi Arabia believe that the Ministry of Education will faithfully carry out the admission process on behalf of government-run universities, those students will not only become convinced of the effectiveness, reliability, and outputs of the admission system but also, and more importantly, they will be more engaged with and committed to the e-government services provided by the Ministry of Education. Therefore, it can be argued that citizen trust in the government constitute the basis of citizen loyalty to e-government services. Thus, the following hypothesis is proposed:

*H10.* Trust in government has a direct and positive influence on citizen loyalty to e-government services.

In terms of the link between trust in e-government and citizen loyalty, research on e-commerce has shown that trust beliefs directly influence trust intentions to consider repeating the use of a merchant’s website services and recommending them to other consumers (Zheng et al., 2017; Bilgihan, 2016; Kassim and Ismail, 2009; Cyr, 2008; Flavián et al., 2006; Lin and Wang, 2006; Gefen, 2002; McKnight et al., 2002). The degree of citizen trust in e-government plays a central role in developing ‘long-term relationships in e-service provision (Tegethoff et al., 2019). Hence, the following hypothesis is proposed:

*H11.* Trust in e-government has a direct and positive influence on citizen loyalty to e-government services.

Satisfaction is also considered to be a key driver of long-term relationships between e-government services and citizens (Weerakkody et al., 2016; Irani et al., 2012). It represents a useful indicator of citizen loyalty and of the future growth of e-government services (Chatfield and Alanazi, 2013; Morgeson III, 2011). DeLone and McLean (2003) indicated that there is an interdependent relationship between user satisfaction and increased use of a system. Other scholars have claimed that historically, satisfaction has been used globally as the primary indicator of customer loyalty to a firm (e.g., Waheed et al., 2020; Yadav and Rai 2019; Chiou, 2004). Research on e-loyalty has shown that satisfaction affects variables that are indicators of consumer loyalty to, or orientation towards a long-term relationship with, a service provider (Liang et al. 2019; Lam et al., 2004). Previous research has confirmed that satisfaction is not only a primary driver of the use of e-government services but also the key to sustaining a loyal base for a long-term relationship with citizens (e.g., Li and Shang, 2020; Alawneh et al., 2013). Hence, the following hypothesis is proposed:

*H12*. Citizen satisfaction has a direct and positive influence on citizen loyalty to e-government services.

# Methods

## Research context

The government of Saudi Arabia is directing resources at e-government schemes in line with one of the strategic goals of its Vision 2030 initiative, with the aim of transiting its services to the electronic domain (Santa et al., 2019). Furthermore, Saudi Arabia had set its sights on achieving the ranking of 25th in the UN’s e-Government Development Index for the year 2020 (Albrahim et al., 2018). In 2020, the Saudi government also introduced a unified e-government services portal that can be easily accessed by citizens and residents alike for services in the promising and central fields of education, health, justice, and law, among others (Basahel and Yamin, 2017).

The shift of education services to the e-government domain is the top priority of the Saudi government. This is because the country has an annual population growth of 2.5 per cent (among the highest worldwide), it is home to almost 20 million people, and 70 per cent of the population is under the age of 30 (The General Authority for Statistics, 2018). Hence, there will continue to be a high demand for education services in the country.

The UEAS was initiated as a joint effort by the Ministry of Education, the government universities, the technical college in Riyadh, the National Centre for Assessment, and Yesser (the national e-government programme). Its aim is to establish an innovative method that normalises and simplifies academic admission procedures and efficiently distributes the university places that are available, while providing equal and fair opportunities to all students. After a period of continuous development through various means – such as taking suggestions from universities, students, and parents – the UEAS is expected to be extended to all government universities across Saudi Arabia. Therefore, it represents a research context that is suited to investigating citizen loyalty to e-government services.

## Measurement items

The measurement items and their original sources are shown in Appendix A. The measurement items were operationalised using a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5). To ensure content validity, the instrument measures in this study were designed primarily on the basis of previously validated scales (Wang and Liao, 2008). However, some modifications were made to some of the scales to better fit the research setting of the UEAS.

The items for disposition to trust, trust in government, and trust in e-government were adopted from Bélanger and Carter (2008). In the context of service quality, the SERVQUAL instrument was used to assess citizens’ perceptions with regard to the five basic attributes: tangibles (SQT), reliability (SQR), responsiveness (SQR), empathy (SQE), and assurance (SQA). The measurement items for the five basic attributes were adapted from Gefen (2002) and Pitt et al. (1995). The remaining constructs were adapted from relevant research and included citizen satisfaction (Chan et al., 2010; Brown et al., 2008; Davis, 1993) and citizen loyalty (Lin and Wang, 2006; Chiou, 2004; Gefen, 2002).

In addition to the focal constructs, this research measured students’ demographic characteristics, including gender, final GPA recorded on their high-school diploma, and university. The instrument was translated from English into Arabic, which is the main language in Saudi Arabia. To approve and confirm the equivalence in meaning, the English and Arabic versions were both reviewed by two academics in the field of translation and linguistics in Saudi Arabia (Brislin, 1970).

## Participants and procedure

The sampling frame was the students who had applied for academic admission through the UEAS. These students were sampled from the foundation year in government universities and the technical college in Riyadh, as they had recently used the UEAS system for admission purposes. The research offices of the government universities and the technical college in Riyadh were contacted for approval to distribute the questionnaires among the students in the foundation year. Only two of the universities – King Saud Ibn Abdulaziz University for Health Science (KSAU-HS) and Princess Nourah bint Abdulrahman University (PNU) – alongside the technical college gave their consent for the data collection. Following a recommendation made by the research offices of the case universities, a paper-based questionnaire was used instead of an online survey, because this was considered to be a more reliable approach in the context of universities in Saudi Arabia.

Furthermore, the research offices of the case universities followed a systematic sampling technique to distribute the self-administered questionnaires to the students. On behalf of the researchers, the research offices distributed the questionnaires during the last 15 minutes of lectures that were considered less problematic than others (i.e., Arabic Editing and Introduction to Computing but not Maths, Physics, or Biology). This technique helped to ensure that each student had an equal chance of being selected from the population, thereby producing a representative educational establishment sample. The data collection process was carried out during the first semester of 2018, starting in October and ending in late November. During this period, 1,050 questionnaires were equally distributed and, of the 832 surveys collected, 780 were completed in full. This number represents 74.3 per cent of all the questionnaires that were distributed. Table II lists the statistics for the survey response rates, grouped by university. Table III shows a profile of the respondents’ characteristics, which are organised in three categories: gender, final GPA result, and educational establishment.

**Table II.** Survey response rates

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| University  | Distributed  | Received  | Excluded  | Included  |
| PNU | 350 | 277 | 11 | 266 |
| Technical College | 350 | 301 | 27 | 274 |
| KSAU-HS | 350 | 254 | 14 | 240 |
| Total  | 1,050 | 832 | 52 | 780 |

**Table III.** Demographic profile of all respondents

|  |  |  |
| --- | --- | --- |
| Category | Frequency | % |
|  |  |  |
| *Gender* |  |  |
| Male | 420 | 53.8 |
| Female | 360 | 46.2 |
| Total | 780 | 100 |
|  |  |  |
| *Final GPA result* |  |  |
| < 70% | 15 | 1.9 |
| < 75 – 70% | 29 | 3.7 |
| < 80 – 75% | 61 | 7.8 |
| < 85 – 80% | 107 | 13.7 |
| < 90 – 85% | 182 | 23.3 |
| < 95 – 90% | 194 | 24.9 |
| ≥ 95% | 192 | 24.6 |
| Total | 780 | 100 |
|  |  |  |
| *University* |  |  |
| KSAU-HS | 240 | 30.8 |
| PNU | 266 | 34.1 |
| Technical college | 274 | 35.1 |
| Total | 780 | 100 |

# Results

This section presents the descriptive statistics and results for the measurement model and the structural model. The descriptive statistics include the mean and the standard deviation (SD). The assessment of the measurement model includes examining the Cronbach’s alpha coefficient to test the reliability of the model, the discriminant validity, and the convergent validity, and the assessment of the structural model is based on hypothesis testing and the goodness-of-fit indices.

## Descriptive statistics

Table IV provides the mean, SD, and Cronbach’s alpha statistics for all the constructs considered in the proposed research model. For most of the constructs, the mean values were greater than 3, which means that the students’ responses were, by and large, in favour of using the UEAS for academic admissions. However, the mean value for disposition to trust was just below 3 (i.e., 2.998). In addition, the SD values were less than 1 for almost all of the constructs, which indicated that the students’ responses did not fluctuate much across the mean values. The relatively large value for SD (i.e., 1.058) for trust in government indicated that the users’ responses were found to have fluctuated more across the mean values when they responded to the items for this construct.

**Table IV.** Descriptive statistics

|  |  |  |  |
| --- | --- | --- | --- |
| Construct | Mean | SD | Cronbach’salpha |
| TG | 3.405 | 1.058 | 0.921 |
| DT | 2.988 | 0.960 | 0.836 |
| SQ | 3.539 | 0.693 | 0.878 |
| TEG | 3.727 | 0.883 | 0.890 |
| CS | 3.672 | 0.980 | 0.882 |
| CL | 3.631 | 0.910 | 0.884 |
| Notes: TG, trust in government; DT, disposition to trust; SQ, service quality; TEG, trust in e-government services; CS, citizen satisfaction; CL, citizen loyalty |

## Measurement model

A potential threat to the validity of results may be expected with a survey that contains perceptual questions (Podsakoff et al., 2003). Hence, the common method bias (CMB) test was conducted. CMB indicates any bias in the data set that might be caused by external sources that could influence the answers of the respondents. A data set that is affected by CMB is one in which most of the variance can be explained by one factor (Podsakoff et al., 2003). This research employed Harman’s single factor to test 21 scale items for CMB (Harman, 1976). The maximum explained variance by a single factor was 41.81 per cent, which is less than the threshold of 50 per cent. Therefore, this is a strong indication that CMB was not present in the data set of the current study (Podsakoff et al., 2003; Harman, 1976).

We used confirmatory factor analysis to specify how each group of the observed items depended on its construct and to assess the convergent and discriminant validity of the scales. Convergent validity refers to the extent to which each measurement item correlates with its theoretical construct, whereas discriminant validity measures the degree to which two theoretical constructs are uncorrelated (Anderson and Gerbing, 1988). Table V presents the standardised factor loadings (FL), average variance extracted (AVE) and composite reliability (CR) for the purpose of assessing convergent validity. All the factor loadings were greater than the minimum value (0.70), as recommended by Hair et al. (1995) and Nunnally (1993), for their predefined constructs. The AVE values of all the constructs were greater than 0.5, and the CR values of all the constructs exceeded 0.70 and were greater than AVE for each factor; this means that convergent validity was established (Hair et al, 1995; Bagozzi and Yi, 1988; Anderson and Gerbing, 1988; Fornell and Larcker, 1981).

We assessed the reliability of the scale (or internal consistency) using the Cronbach’s alpha coefficient, which indicates the average correlation among all the items in each construct and is a common indicator of the internal consistency or scale reliability of items that measure the same factor (Pallant, 2005; Zikmund, 1994; Nunnally, 1993). For all constructs, the Cronbach’s alpha values were higher than the threshold of 0.70, with almost all of them above 0.80; this reflects an acceptable level of internal consistency (Nunnally 1993; Zikmund, 1994).

**Table V.** Measurement model results

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Construct | Item | FL | AVE | CR | Cronbach’salpha |
|  |  |  |  |  |  |
| TG | TG1 | 0.878 | 0.744 | 0.921 | 0.921 |
| TG2 | 0.885 |  |  |  |
| TG3 | 0.842 |  |  |  |
| TG4 | 0.844 |  |  |  |
|  |  |  |  |  |  |
| DT | DT1 | 0.783 | 0.635 | 0.839 | 0.836 |
| DT2 | 0.860 |  |  |  |
| DT3 | 0.744 |  |  |  |
|  |  |  |  |  |  |
| SQ | SQT | 0.674 | 0.605 | 0.884 | 0.878 |
| SQR | 0.785 |  |  |  |
| SQP | 0.803 |  |  |  |
| SQA | 0.834 |  |  |  |
| SQE | 0.784 |  |  |  |
|  |  |  |  |  |  |
| TEG | TEG1 | 0.818 | 0.732 | 0.891 | 0.890 |
| TEG2 | 0.882 |  |  |  |
| TEG3 | 0.866 |  |  |  |
|  |  |  |  |  |  |
| CS | CS1 | 0.868 | 0.716 | 0.868 | 0.882 |
| CS2 | 0.860 |  |  |  |
| CS3 | 0.809 |  |  |  |
|  |  |  |  |  |  |
| CL | CL1 | 0.859 | 0.720 | 0.885 | 0.884 |
| CL2 | 0.88 |  |  |  |
| CL3 | 0.805 |  |  |  |

Furthermore, discriminant validity was examined using the factors correlation matrix and square root of AVE. To verify discriminant validity, the correlation coefficient for each pair of factors should be less than the square root of AVE for each factor in the factor correlation matrix (Anderson and Gerbing, 1988; Fornell and Larcker, 1981), and this was the case in our sample (as shown in Table VI). For example, the correlation coefficient between trust in government and disposition to trust was 0.453, which is less than the square root of AVE (i.e., 0.863 and 0.797, respectively), as shown in bold and italics across the diagonal in Table VI. In addition, we did not find any multicollinearity issues, because all the correlation coefficients among the constructs were less than 0.80 (Asteriou and Hall, 2007). Overall, the results show that the convergent validity and discriminant validity of the measurement model were confirmed.

**Table VI.** Correlation matrix and discriminant validity of factors

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Factor | TG | DT | SQ | TEG | CS | CL |
| TG | ***0.863*** |  |  |  |  |  |
| DT | 0.453 | ***0.797*** |  |  |  |  |
| SQ | 0.632 | 0.335 | ***0.778*** |  |  |  |
| TEG | 0.541 | 0.318 | 0.702 | ***0.856*** |  |  |
| CS | 0.532 | 0.233 | 0.554 | 0.486 | ***0.846*** |  |
| CL | 0.728 | 0.346 | 0.659 | 0.611 | 0.53 | ***0.849*** |
| Note:Square roots of AVE are presented in bold and italics. |

## Structural model

Structural equation modelling (SEM) was conducted using SPSS/AMOS V21 to examine the model’s fit in terms of each construct and to test the relationships among the constructs (i.e., to test the hypotheses in the structural model). The two-step approach by Anderson and Gerbing (1992) was adopted using the maximum likelihood method to estimate the measurement and structural model. The size of the sample (N 780) in this research study is adequate for conducting a confirmatory factor analysis (CFA) and SEM test (Kline, 2015; Malhotra, 2010). Covariance‐based structural equation modeling (CB‐SEM) is a powerful technique which has become a technique of choice in many recent studies (e.g., Doargajudhur and Dell, 2019; Al Mansoori et al., 2018; Siala et al., 2019; Esmaeilzadeh et al., 2021; Shiau and Chau, 2015), as it considers as an integration of several multivariate statistical methods such as regression analysis, path analysis and confirmatory factor analysis. It also allows conducting a simultaneous analysis of observed variables and latent structures. Furthermore, it provides more accurate estimates of the model parameters and effects (Zhang et al., 2020). By calculating a range of goodness-of-fit statistics, CB-SEM can assess whether the theoretical model is confirmed (Astrachan et al., 2014).

In addition, the authors used parceling items strategy to examine the effect of service quality. Parceling strategy allows combining item-level responses into aggregate item parcels and using those aggregates as indicators of latent constructs. It can be implemented by utilizing several techniques including sub-items parcel and all-items parcel (Matsunaga, 2008). The use of item parcels has become quite common methods in SEM or CFA research (Bandalos 2002). Bandalos (2002) conducted simulation studies to investigate the effects of the practice of item parceling. The use of item parcels of a unidimensional structure resulted in better fitting solutions (e.g., RMSEA, CFI, and chi-square test), as well as having less bias in estimates of structural parameters than solutions based on the individual items (Bandalos 2002, Hall et al., 1999).

A set of goodness-fit indices was used to evaluate the adequacy of the structural model. These goodness-fit indices were as follows: chi square adjusted for degree of freedom (CMIN/DF); the goodness-of-fit index (GFI); the adjusted goodness-of-fit index (AGFI); the normed fit index (NFI); the comparative fit index (CFI); the incremental fit index (IFI); and the root mean square error of approximation (RMSEA). As presented in Table VII, all the model’s fit indices exceeded their respective recommended values as suggested by Schumacker and Lomax (2010). Thus, the proposed structural model presented in Figure 2 adequately fits the sample data.

**Table VII.** Fitness indices

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Fit Index | (CMIN/DF) | GFI | AGFI | NFI | CFI | IFI | RMSEA |
| \*Recommended Value | ≤ 5 | ≥ 0.900 | ≥ 0.900 | ≥ 0.900 | ≥ 0.900 | ≥ 0.900 | 0.05 to 0.08 |
| Actual Value | 3.422 | 0.931 | 0.911 | 0.947 | 0.962 | 0.962 | 0.056 |
| \* Source: Schumacker and Lomax, 2010. p.76. |

Based on the maximum likelihood estimation method, 12 hypotheses were also tested using SEM with latent variables, as shown in Figure 2. Table VIII reveals the path coefficients, critical ratios (CR), probability values (P), and the results of the hypothesis testing. As shown in Table VIII, all path coefficients were statistically significant since their probabilities were less than α ≤ 0.05. Therefore, hypotheses H1 to H12 are supported at the common statistical levels of significance (Byrne, 2001).

**Table VIII.** Hypothesis-testing results

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Hypothesis | Path | Path coefficient | CR | *p-*value | Result |
| H1 | DT TG | 0.331\*\*\* | 8.522 | 0.000 | Supported |
| H2 | DT TEG | 0.073\*\* | 2.280 | 0.023 | Supported |
| H3 | TG TEG | 0.112\*\*\* | 3.126 | 0.002 | Supported |
| H4 | SQ TG | 0.256\*\*\* | 15.402 | 0.000 | Supported |
| H5 | SQ TEG | 0.222\*\*\* | 13.023 | 0.000 | Supported |
| H6 | SQ CS | 0.124\*\*\* | 5.140 | 0.000 | Supported |
| H7 | TG CS | 0.270\*\*\* | 6.255 | 0.000 | Supported |
| H8 | TEG CS | 0.163\*\*\* | 2.655 | 0.008 | Supported |
| H9 | SQ CL | 0.077\*\*\* | 3.964 | 0.000 | Supported |
| H10 | TG CL | 0.422\*\*\* | 11.359 | 0.000 | Supported |
| H11 | TEG CL | 0.212\*\*\* | 4.345 | 0.000 | Supported |
| H12 | CS CL | 0.087\*\* | 2.486 | 0.013 | Supported |
| Notes: \**p* < 0.1; \*\**p* < 0.05; \*\*\**p* < 0.01 |

Figure 2 illustrates the structural research model with standardised path coefficients, factor loadings, *R*2 values, and model fitness indices. For instance, the path coefficient of 0.14 between trust in government and trust in e-government indicates that when trust in government increases by 1 SD, trust in e-government increases by 0.14 SD. In addition, the coefficient of determination *R*2 of citizen loyalty is 0.60, which shows that the predictors of citizen loyalty explain about 60 per cent of its variance.

The coefficient of determination, which is also denoted as *R*-squared (*R*2), was estimated as an essential criterion for the assessment of the endogenous latent variables of the structural model (Henseler et al., 2009). As SEM is multivariate extension of the multiple linear regression with one explained variable, *R*2 indicates the proportion of variance in the latent variable accounted for by the set of observed variables. In other words, the value of *R*2 serves as an indicator of the strength of the structural relationships (Schumacker and Lomax, 2010). Several related IS studies have reported significant level or *R*2 by CB-SEM (e.g., Rana et al., 2017; Rana et al., 2017; Weerakkody et al., 2016). The *R*2 values ranged from 0 to 1 (Alzahrani et al., 2018). As shown in Table IX, the *R*2of 0.418 means that the predictors of trust in government (e.g., disposition to trust and service quality) explain 41.8 per cent of its variance, while the residual is due to the error variance.

**Table IX.** Coefficients of determination

|  |  |
| --- | --- |
| Construct | *R*2 |
| TG | 0.418 |
| TEG | 0.490 |
| CS | 0.354 |
| CL | 0.600 |

In addition, the path analysis method was adopted to show the direct, indirect, and total effects (standardised beta coefficients) in the structural model. This method enables researchers to investigate the direct and indirect effects of the variables, but it requires the existence of some perquisites, such as the theoretical causal relationship, the temporal ordering, covariance, and correlation among the variables of interest (Schumacker and Lomax, 2010). As shown in Table X, the direct effect of service quality on citizen loyalty is 0.188 and the indirect effect is 0.440, so the total effect of service quality on citizen loyalty is 0.188 + 0.440 = 0.628. This means that, when service quality increases by 1 SD, citizen loyalty increases by 0.628 SD.

**Table X.** Direct, indirect, and total effects in the structural model

|  |  |  |  |
| --- | --- | --- | --- |
|  | Direct effect | Indirect effect | Total effect |
|  | SQ | DT | TG | TEG | CS | SQ | DT | TG | TEG | CS | SQ | DT | TG | TEG | CS |
| TG | .573 | .300 |  |  |  |  |  |  |  |  | .573 | .300 |  |  |  |
| TEG | .604 | .080 | .137 |  |  | .078 | .041 |  |  |  | .682 | .121 | .137 |  |  |
| CS | .283 |  | .275 | .136 |  | .251 | .099 | .019 |  |  | .534 | .099 | .294 | .136 |  |
| CL | .188 |  | .457 | .189 | .092 | .440 | .169 | .053 | .013 |  | .628 | .169 | .510 | .202 | .092 |



**Figure 2.** Structural model testing

# Discussion

This study investigated citizen loyalty to e-government services; namely, the UEAS for academic admissions in Saudi Arabia. Drawing on existing theories and research in the domains of IS, e-government, and marketing, this research proposed and empirically examined the direct and indirect effects of service quality, trust, and satisfaction on citizen loyalty to e-government services. Overall, the results support the model and hypotheses proposed in this research. The integration of these factors advances the theoretical understanding of building citizen loyalty to e-government services as an essential method of enhancing citizens’ sense of commitment to e-government services and increasing their likelihood of patronising government agencies again (Chatfield and Alanazi, 2013; Connolly et al. 2010; Doong et al., 2010).

The findings of this study revealed that disposition to trust has a more significant effect on trust in government than on trust in e-government. This result is not consistent with the existing literature (e.g., Bélanger and Carter, 2008), which showed that disposition to trust has an almost equal direct effect on both trust in government and trust in e-government. This may mean that the students in this study had confidence in the Saudi Arabian government to work for their benefit in the academic admission process, but were less confident that the electronic services would help the government to achieve its goals.

The results also showed that service quality has a significant effect on trust in government, trust in e-government, and citizen satisfaction. Previous studies indicated that high levels of service quality can foster citizen trust in government (Fakhoury and Aubert; 2015; Beldad et al., 2012; Welch et al., 2004), citizen trust in e-government services (Alzahrani et al., 2018; Morgeson III et al., 2010; Gefen, 2002), and citizen satisfaction (Kumar et al., 2020; Alzahrani et al., 2018; Sá et al., 2016).

The results showed that higher levels of both trust in government and trust in e-government have significant impacts on citizen satisfaction. It is obvious that the higher levels of student trust in the Ministry of Education in Saudi Arabia (i.e., trust in government) and trust in the UEAS for academic admissions (i.e., trust in e-government) are positively related to higher levels of student satisfaction. A number of IS success models for e-government demonstrated the significant impact of both trust in government (e.g., Janssen et al., 2018; Irani et al., 2012; Bélanger and Carter, 2008; Carter and Bélanger, 2005; Gefen et al., 2005) and trust in e-government (e.g., Santa et al., 2019; Sá et al., 2016; Lee and Kim, 2014; Chan et al., 2010; Teo et al., 2008) on citizen satisfaction.

In addition, the findings revealed that the indirect effect of service quality on satisfaction through trust significantly increases student satisfaction with e-government services. In the context of this research, students’ general appraisals of and judgements on the superiority of the academic admissions service provided through the UEAS led to an improved perception and level of user satisfaction (Veeramootoo et al., 2018; Xu et al., 2013). The results showed that the impact of service quality on consumer satisfaction corroborates with both the existing marketing literature (e.g., Udo et al. 2010) and previous IS studies (e.g., Alzahrani et al., 2018; Wang and Liao, 2008). Further, the findings indicated that the total effects of trust in government on citizen satisfaction are stronger than the effects of trust in e-government on citizen satisfaction, thus validating the results of Bélanger and Carter (2008). This indicates that, among citizens, trust in government increases confidence in and acceptance of e-government services.

Unlike e-commerce services, where customer loyalty is mainly associated with repeat purchase behaviour (Zheng et al., 2017; Anderson and Srinivasan, 2003), citizen loyalty to e-government services can be formed through a strong partnership between government and citizens in developing those services (such as sharing feedback and success stories about e-government services), and by enhancing user dependence on e-government services, which therefore ensures the success of the services provided (Alzahrani et al., 2018; Veeramootoo et al., 2018; Chatfield and Alanazi, 2013). Therefore, this study has extended the IS success research to include the construct of citizen loyalty in the context of e-government services, which has been neglected by previous studies on e-government.

The results showed that trust in government exerts a stronger direct effect on citizen loyalty than the effects of service quality, trust in e-government, and citizen satisfaction; however, service quality exhibits a stronger total effect on citizen loyalty than that of trust in government. Therefore, service quality and trust in government are both important aspects of increasing citizen loyalty in the context of e-government services, thus tying together the literature on service quality and trust in this context. The findings are consistently supported by previous studies (Gefen, 2002; Reichheld and Schefter, 2000), in which both service quality and trust in the service provider have been shown to be significant predictors of customer loyalty in an e-commerce setting.

In contrast, citizen satisfaction exerts a weaker total effect on citizen loyalty than other factors did. This result, however, is inconsistent with those of prior studies (e.g., Flavián et al., 2006; Lin and Wang, 2006), which showed customer satisfaction to be the strongest predicator of loyalty. The results also showed that citizen satisfaction is a mediating construct between the factors service quality, trust in government, and trust in e-government on the one hand, and the factor citizen loyalty on the other. This corroborates with prior studies (e.g., Lin and Wang, 2006), which indicated that satisfaction can play a crucial mediating role in the relationship between cognitive variables (e.g., service quality and trust) and conative outcomes (e.g., customer loyalty).

## Theoretical contributions

The main contribution of this research in terms of theory lies in its extension of the lens of citizen loyalty in the context of e-government services. The study proposed and empirically tested a new model combining the service quality model (Parasuraman et al.,1994) and trust theory (Zucker, 1986) and integrates satisfaction as a factor. The study has advanced knowledge in the areas of technology adoption and use in the context of e-government services. The integration of these factors advances the theoretical understanding of building citizen loyalty to e-government services as an essential method for enhancing the sense of commitment to e-government services among citizens and increasing the likelihood that they will patronise government agencies again (Chatfield & Alanazi, 2013; Connolly et al. 2010; Doong et al., 2010).

In addition, the study has filled a gap in the research on citizen loyalty to e-government services, given that the majority of existing studies focused on satisfaction (e.g., Alkraiji, 2020a; Alzahrani et al., 2018; Rana et al., 2017; Weerakkody et al., 2016; Irani et al., 2012; Chan et al., 2010; Teo et al., 2008; Wang and Liao, 2008). In doing so, this study has offered new insights and identified relationships between different factors that can influence citizen loyalty to e-government services. Unlike the majority of existing studies, which focused on trust as institution-based trust and as process-based trust (Kumar et al., 2020; Bélanger & Carter, 2008; Gefen et al., 2003; McKnight et al., 2002; Warkentin et al., 2002), this study examined three main categories of trust in the context of using e-government services: trust in e-government, trust in government, and disposition to trust. This categorisation allows researchers to gain a deeper and more accurate understanding of trust in the context of e-government services. The findings also indicated that service quality exhibits a stronger total effect on trust in e-government than trust in government, whereas trust in government exhibits a stronger total effect on both citizen satisfaction and citizen loyalty than trust in e-government. This result confirms the assertion that the willingness of citizens to expose vulnerabilities while using e-government services is significantly influenced by their belief in the performance and ability of the government. This is consistent with the findings of the studies conducted by Srivastava and Teo (2009) and Bélanger and Carter (2008).

Furthermore, the study revealed significant relationships between service quality, trust, satisfaction, and loyalty. The results showed that the dimensions proposed by the SERVQUAL instrument are applicable to operationalising citizens’ perceptions of trust, satisfaction, and loyalty with regard to e-government services. Based on the total effect, the SERVQUAL instrument revealed a significant impact on the research model constructs. While some IS scholars (e.g., Orgeron and Goodman, 2011; Kassim, and Abdullah, 2008) have questioned the precision and value of the SERVQUAL dimensions scale in measuring online services, others (e.g., Connolly et al. 2010; Udo et al. 2010; Gefen, 2002; Pitt et al., 1995) have validated the instrument as a valuable benchmark of service quality in the realm of online services.

## Practical implications

This research has practical implications for the UEAS, government agencies in general, and government officials who wish to develop loyalty to services they offer online. Even in the context of e-government services, where there is no competition, the importance of building citizen loyalty cannot be overestimated, because loyalty motivates citizens to continue using these services rather than rather than traditional means of accessing these services. Hence, this research focused on the factors that may increase citizen loyalty to these services.

Government agencies need to be concerned about the quality of their e-services from the point at which a citizen first encounters a service until the citizen has finished using the service. This supports the initiation and development of citizen trust in both government and e-government services, which, in turn, can enhance satisfaction and ultimately influence loyalty to these services. This research showed that service quality has the strongest total effect on trust in e-government, citizen satisfaction, and citizen loyalty. The quality of an e-government service can be enhanced by ensuring that the information available on the service website is up to date, uploading content that is well organised and easy to navigate, providing an outstanding citizen support team to solve any problems efficiently and in a timely manner, promoting new services so that citizens are regularly updated, ensuring the security of online transactions and personal information by developing efficient testing models, and hiring staff who are knowledgeable about the types of problems citizens face in the context of government online services.

Moreover, building trust in government is an important aspect of developing citizen satisfaction and loyalty. For example, when students trust their government to carry out the university admission process faithfully, they are likely to develop feelings of loyalty and satisfaction. Another example is when students believe that the Ministry of Education is generally trustworthy and will keep in mind their best interests in terms of specialisations. Therefore, policymakers and government officials can attempt to build citizen trust in e-government by putting in place sufficient safeguards to reassure users during the application process that the UEAS will meet the legal and technological standards required to avoid admission problems and that the UEAS system is robust and safe to use. Developing this trust is likely to increase citizen trust in government, too. Therefore, if governments seek to obtain higher levels of citizen loyalty, they should take managerial action to develop trust between government agencies and citizens by ensuring that the e-government services they provide are carried out faithfully while reassuring users that there is adequate security protection in the service processes. The empirical results of this research also encourage governments to include measures of service quality, disposition to trust, trust in government, trust in e-government services, citizen satisfaction, and citizen loyalty in their loyalty-evaluation methods and take the necessary corrective actions to improve them.

In the context of this study (i.e., Saudi Arabia), the trust of a generation of young citizens in e-government services stems primarily from their certainty or uncertainty about the government’s ability to introduce an effective e-government infrastructure while ensuring equal and fair services for citizens. From a managerial standpoint, this requires government agencies to increase citizen involvement and awareness when developing e-government services, while building citizen confidence in the government’s performance in this regard. Increasing citizen awareness of e-government services helps to develop their understanding of the services that the government provides. In addition, bi-directional feedback and comment channels should be provided so that citizens can be involved in, and regularly participate during, the process of developing e-government services, two-way as this is another way of improving citizen trust in government. This strategy can also increase levels of citizen satisfaction with and commitment to e-government services.

## Limitations and future research

Despite the contributions of this empirical research, it has some limitations, which can be addressed in future studies. One of these limitations is that the empirical data were collected through a single study that examined the antecedents of citizen loyalty to the UEAS for the purpose of academic admission to government universities and the technical college in Riyadh, Saudi Arabia, while targeting a specific group (i.e., foundation-year students). Citizen loyalty to e-government services is a relatively new concept; hence, the research findings and implications should be considered with caution when generalising the findings and extending the discussion to include other e-government service categories or user groups. Future research is needed to validate the research model in a large, cross-cultural sample from different e-government contexts, which may also allow the generalisation of the findings of this research.

Secondly, as this research did not conduct a multigroup analysis (i.e., gender, university, culture, and economic background), additional research is needed to examine the impact of the diversity of the sample on the research model in order to increase the generalisability of the findings. Thirdly, given that the research model explained just under 60 per cent of its variance (in citizen loyalty to e-government services), there is still a need to incorporate other factors that can improve the prediction of citizen loyalty to e-government services. Therefore, longitudinal empirical IS studies may advance a theoretical understanding of the multidimensional antecedents of citizen loyalty to e-government services, and the causality and interrelationships among them.

# Conclusion

The aim of this research was to extend the IS research on customer loyalty to e-commerce services into electronic public services, such as e-government services. In doing so, this study empirically tested the effects of service quality, trust in government, trust in e-government services, and citizen satisfaction on citizen loyalty in the context of e-government services (i.e., the UEAS for academic admissions in Saudi Arabia). The findings demonstrated the importance of service quality, trust in government, trust in e-government services, and citizen satisfaction in the development of citizen loyalty to e-government services. The findings supported all 12 research hypotheses and successfully validated the research model.

The results confirmed that service quality and trust in government were the most significant predictors of citizen loyalty in the context of e-government services, whereas citizen satisfaction demonstrated the least important effect. The outcomes of this study are expected to strengthen the theoretical research cycle in the context of citizen loyalty to e-services, while providing support for e-government practitioners to adjust managerial intervention in creating effective citizen loyalty programmes.

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# Appendix A: Research measurement items

|  |  |  |  |
| --- | --- | --- | --- |
| Construct | ID | Measure | Original source |
| Disposition to trust (DT) |
| DT | DT1 | I generally trust other people. | (Bélanger and Carter, 2008) |
| DT2 | I feel that people are generally reliable. |
| DT3 | I generally trust other people unless they give me reason not to. |
|  |  | Trust in government (TG) |  |
| TG | TG1 | I trust the Ministry of Education and the committee of the Unified Electronic Admission System (UEAS). | (Bélanger and Carter, 2008) |
| TG2 | The Ministry of Education can be trusted to carry out faithfully the student admission process in government universities in Riyadh. |
| TG3 | I trust that the Ministry of Education will keep in mind my best interests in terms of specialisations.  |
| TG4 | In my opinion, the Ministry of Education is trustworthy. |
|  |  | Trust in e-government (TEG) |  |
| TEG | TEG1 | The UEAS has sufficient safeguards to reassure applicants during the application process.  | (Bélanger and Carter, 2008) |
| TEG2 | The UEAS reassures users that the legal and technological standards applied provide adequate protection from admission problems.  |
| TEG3 | The UEAS is in general a robust and safe system to use when making a personal application for admission. |
| Service quality (SQ) |
| SQT | SQT1 | The UEAS has an up-to-date website. | (Gefen, 2002; Pitt et al., 1995) |
| SQT2 | The UEAS is visually appealing. |
| SQT3 | The UEAS is neat in its appearance.  |
| SQT4 | The UEAS is in keeping with the services it provides. |
| SQR | SQR1 | The UEAS has a disciplined time schedule for the services it performs.  | (Gefen, 2002; Pitt et al., 1995) |
| SQR2 | The UEAS shows a real interest in solving the user’s problems. |
| SQR3 | The UEAS is dependable. |
| SQR4 | The UEAS provides its services at the time it promises to do so.  |
| SQP | SQP1 | The UEAS tells the user exactly when a service will be performed.  | (Gefen, 2002; Pitt et al., 1995) |
| SQP2 | The UEAS offers prompt services to the user.  |
| SQP3 | The UEAS is always willing to deal with the user’s requests.  |
| SQP4 | The UEAS is always ready to respond quickly to the student’s requests.  |
| SQA | SQA1 | The UEAS instils confidence in the user about its performance.  | (Gefen, 2002; Pitt et al., 1995) |
| AQA2 | The UEAS is safe when carrying out transactions. |
| SQA3 | The UEAS has knowledgeable staff to deal with queries.  |
| SQE | SQE1 | The UEAS has operating hours that are convenient for the user.  | (Gefen, 2002; Pitt et al., 1995) |
| SQE2 | The UEAS has the user’s best interests at heart.  |
| SQE3 | The UEAS has experienced staff who understand the specific needs of each user. |
| Citizen satisfaction (CS) |
|  | CS1 | The use of the UEAS is extremely positive. | (Chan et al., 2010; Brown et al., 2008) |
| CS2 | The use of the UEAS is extremely good. |
| CS3 | The use of the UEAS is extremely beneficial. |
| Citizen loyalty (CL) |
| CL | CL1 | I will use similar e-government services developed by the Ministry of Education again. | (Lin and Wang, 2006; Chiou, 2004; Gefen, 2002) |
| CL2 | I will recommend e-government services developed by the Ministry of Education to others. |
| CL3 | I consider myself to be a loyal user of e-government services developed by the Ministry of Education. |